ATOMIC ENERGY CENTRAL SCHOOL No. 4, RAWATBHATA

Confidence Examination – II (Session - 2019-20)

Class – XII, English Core (Code 301)

Time: 3hrs **Maximum Marks : 80**

General Instructions :

A. **This paper is divided into three sections. All the sections are compulsory.**
B. **Separate Instructions are given with each section and question, wherever necessary. Read these instructions very carefully and follow them faithfully.**
C. **Do not exceed the prescribed word limit while answering the questions.**

SECTION –A (READING) 20

Q.1. Read the passage carefully and answer the questions that follow : (12 Marks)

1. We have entered a new world. The fall of the Berlin wall put an end to the bipolar world and gave birth to hope for freedom and prosperity; there were States that gained their independence. Most adopted the democratic model which corresponds to our shared political values. Globalization further enhances these changes. It offers extra-ordinary opportunities to individuals who are in a position to seize them; easier access to information, speedier communications and unimpeded travels. But it also develops new forms of vulnerabilities; a financial crisis can run from Thailand to Russia via Latin America. Epidemics spread faster and further, be it mad cow's disease or bird flu.
2. Therefore, our destiny is no longer shaped within safe frontiers but on an international scale. Given the extent of these changes, we must define our world's new principles of organization. In this endeavor for a new order, India-has a major role to play; because it is an example of dynamism and energy. A country of youth; 33 per cent of the population is under the age of 15. We are aware of the tremendous asset and the immense responsibility that this represents. A young population is a guarantee of imagination, renewal, awakening and hope. But it is also a challenge in terms of education, health and training.
3. India has been able to make the most of globalization and has gained a pivotal role. It provides the example of an economy which has allied dynamism and equilibrium. The past year offers the two-fold satisfaction of a spectacular 7.5 percent growth rate and inflation under control. Thanks to the size and dynamism of its domestic market, it can project itself into the future with confidence.
4. India is now the biggest international service provider in information technologies, and this at a time when the Western countries are experiencing a real shortage of manpower in this very field. A scientific power, India, today, is also a key player in space research. Thanks to the excellence of the Indian Space Research Organization, it is the forefront of technologies for launchers and the construction of satellites.

5. This economic vitality has developed on the basis of a strong concern for social justice. In the face of inequalities that still remain and could be increasing, India has given priority, to poverty reduction, job creation and support of the agricultural sector. Our country has shown that economic growth and concern for the greater good are not incompatible. India, however, does not only offer an economic model. It stands as an example for nations that show due respect for cultural identities.
6. This represents a major challenge as globalization is inherent in its two-fold risk. First of all, there is the risk of domination of certain forms of thinking, of certain ways of life and expression. The diversity of cultures, religions, traditions and memories is an essential component of the richness of our world. If we are not careful, it could die one day. Then there is the risk of confrontation of identities. Lack of respect for what people stand for can nurture claims of nationalists and fundamentalists. With 18 official languages and over 1652 dialects, India is at the forefront of cultural diversity. It is a proof that openness to the outside world and preservation of its own roots can go hand in hand. The movement of exchange between cultures must not lead to silencing the polyphony of voices arid views. In the heart of its democracy, India has been able to define an identity respectful of each and everyone's specificity.

1.1. Choose the correct option to answer the following questions:- (1x5=5)

a. India has a major role to play because

i.. It has a large geographical area

ii. It is rich in natural resources

iii. It is example of enthusiasm and energy to make new things happen successfully

iv. India is a secular country

b. India is the biggest service provider in the field of information technologies as…..

i. Unemployed youth are more in number in India

ii. Western countries have a shortage of manpower in this very field.

iii. People outside India are not willing to work

iv. Indian population is educated

c. The speaker thanks the Indian Space Research Organization, because

i. It is in a leading position in the field of satellites

ii. It is leading in producing rockets

iii. There is a strong group of scientists working together in this field.

iv. Indian scientists are very intelligent

d . Development of Indian economy is the result of our serious concern to

i.. promote agriculture

ii. create employment opportunities

iii. uproot poverty

iv. all of the above

e. Find out the word which mean: To be in the lead role (para 6)

i. Genocide

ii. Polyphony

iii. Forefront

iv. Confrontations

1.2. Answer the following questions briefly:- (1x5=5)

a. Why did the speaker say that we entered a new world? 1
b. What are the benefits of globalization? 1
c. What takes India at the forefront of cultural diversity? 1
d. How does young population put forth certain challenges? 1
e. Why is there a risk of clash of identities? 1

1.3. Find from the passage the most appropriate word for the following : (**1x2 = 2)**

a. An attempt or effort to do something (para 2) 1

b. Challenge someone face to face (para 6) 1

Q.2. Read the passage given below and answer the questions that follow: (8 Marks)

An Interview is a powerful interpersonal communication tool among individuals. It may also be defined as a direct interaction between the candidate (prospective employee) and the employer. In a face-to-face interview, the candidate is in 'view' before a panel of prominent persons and is closely examined by them. Only a successful interview will win you the job you are seeking.

Many people attend different types of interviews. Based on the situation, nature and purpose, interviews are broadly divided into two categories: Formal Interview and Informal Interview. Informal interviews are conducted in an informal set up and the process, evaluation and preparation are not aimed towards selection of any kind. It is an informal chat designed to know the candidate closely. Celebrity interviews and television chat shows fall under this category. Formal interviews are serious and conducted with a specific aim and in an official set up with an adequate preparation. The evaluation holds greater importance, as it is decisive in nature.

How does one prepare for an interview? The candidate must be physically, mentally and psychologically prepared for the interview. Pre-interview preparation techniques include going through your resume where you have mentioned self-analysis, analyzing your background, identifying your achievements, accomplishments, special interests and hobbies and analyzing your skills. You should also revise our domain knowledge and gather enough information about the organization/institute that you wish to join. Your interview file should include all the important documents like certificates. You need to take interest in your personal appearance-it makes an impression on the panel. The important factors that contribute to appearance are grooming and personal hygiene. Care of skin, nails, feet and hair is also necessary. The right attire gives you a smart appearance in the interview. Wear a formal dress that you are comfortable in. Avoid gaudy attire. Reach the venue well in advance, so that you get used to the place, and you can study the place and the people around you.

Your performance in interview will have two aspects-verbal and non-verbal. Verbal communication includes the resume you have drafted and your oral communication in the interview room. You should speak in simple, uncomplicated English without any slang or jargon. Answer the questions in complete sentences that are grammatically correct. Avoid monosyllabic responses and nods as answers. Non-verbal communication includes your personal appearance, the etiquette you follow and your body language. You need to be thorough with the resume you have sent, because the panel will take it seriously. Each aspect that you have presented regarding yourself will be under screening before and during the interview. The vocabulary used by you, the sentences constructed by you, and information regarding your skills, personality, educational background etc. are in front of the panel and they will draw questions from these to ask you. Posture, Facial expression, Eye contact, Gestures etc. are very important in non-verbal communication.

A. On the basis of your reading of the passage, make notes on it, using headings and sub-headings. Use recognizable abbreviations as necessary. Give a suitable title to the passage. (4)

B.Write a summary of the notes prepared in not more than 80 words. (4)

SECTION – B (WRITING) - 30 marks

3. You are planning to start a coaching centre for personality and language development. Draft a classified advertisement giving all details. You are Abhinav/Arya. (Word limit - 50 words) **(4)**

OR

The Literary Club of your school is planning to have an Inter-school One Act Play Competition for the CBSE schools of Kochi. Write a notice in about 50 words for the school notice board asking the club members to be present for a meeting to discuss the rules, eligibility, theme etc. for the competition. You are Saudarsh/Sugandha, the President of the Literary Club of Green Wood Public School, Kochi. (Word limit – 50 words)

4. You are Shambhu/Shimna, a resident of Goa. You are shocked to find that the beaches have been littered with bottles, plastic bags, e-waste etc. It not only aggravates pollution but leads marine organisms into extinction. You decide to write a letter to the Editor of a national daily highlighting this serious issue and suggest ways to make the tourists and citizens responsible towards protecting the environment. (120-150 words) **(6)**

OR

You have recently hosted a dinner for your parents, grandparents and your sister at a popular restaurant in the city after getting your first salary. Unfortunately, the behaviour of the staff, the quality of food etc. made it a disappointing experience for you. You decide to write a letter of complaint to the Manager about this asking for immediate action. You are Zakir/Zeba, from Pune. (120-150 words)

5. The erosion of values is causing havoc in our society. Cases of crime and corruption are on the high. Therefore, value education is imperative in today's world. Write an article for your school magazine on the need to impart value education in schools. Also give practical suggestions on the ways of implementation. You are Indrajith/Indira, a student of class XII.(150 – 200 words) **(10)**

OR

Nepotism and corruption have marred India's image in the international arena. Politicians and officials are equally responsible for this and news of new scams hit the headlines on a daily basis. You are pained by this as the consequences of corrupt practices ultimately affect the common man. Prepare a speech to be delivered in the morning assembly on the need to be alert against such practices and what young people can do to stem this malady. (150 – 200 words)

6.'Electronic Media will bring about the end of print Media'. Write a debate in about 150 to 200 words in 'FOR' or 'AGAINST' the topic. **(10)**

OR

You are Nakul/Neha, a student of Class XI. You have recently attended a two days' residential camp on 'Youth and Leadership' organized by the Rotary Club of your city. It was an absolutely enriching experience where you could interact with students from other schools and personalities from various walks of life. Write a report about the camp in about 150-200 words for the student edition newspaper of your school.

SECTION – C (LITERATURE) 30 Marks

Q.7. a. Read the following extract and answer the questions. **(1x 4)**

No, in country money, the country scale of gain

The requisite lift of spirit has never been found,

Or so the voice of the country seems to complain

a) What is country money?
b) How does money provide the requisite lift of spirit?
c) What is the complaint of the country people?
d) What does the phrase 'Voice of the country' refer to?

b. Not much older in years, she has begun to command respect as *the bahu*, the daughter in law of the house, already in-charge of three men , her husband, Mukesh and their father. (**1x4=4)**

a) From which lesson has this extract been taken? Who is the writer?
b) Who is the young woman referred to here?
c) What is she doing?
d) Which social evil is referred to here?

Q.8. Answer any <u>five</u> of the following questions in 30 – 40 words each: (2x5=10)

a) What difference does Mr.Lamb and Derry have in their way of looking at life?
b) What plan did General Takima chalk out to save Dr. Sadao? What happened then?
c) What do the parting words of the poet, Kamala Das and her smile signify?
d) Who was Sophie? How was she different from her family members?
e) What caused the lack of communication between the English man and the people at Gemini Studio?
f) What precautions were taken by the prison authorities a day before the Examination in Oxford Prison?
g) Mention two attractions which held Bama's attention on her way back home?

Q.9. Answer the following question in 120-150 words : (6)

Saheb and Mukesh are from similar marginalized backgrounds but their responses to their plight are different. Justify.

OR

What impression do you form about Umberto Eco as a scholar and writer on the basis of "The Interview." ?

Q.10. Answer the following question in 120-150 words: (6)

'It is better to have tried and failed than never to have tried at all'. How would you relate this observation to the author of the episode "The Cutting Of My Long Hair"?

OR

Giving a bribe is an evil practice. How did the Tiger king bribe the British Official to save his Kingdom? How do you view this act of his ?

Atomic Energy Central School No.4, Rawatbhata

CLASS XII - PHYSICS

Confidence Examination – II (2019 – 2020)

Time Allowed: 3 hours Maximum Marks: 70

General Instructions:

1. All questions are compulsory. There are 37 questions in all.
2. This question paper has four sections: Section A, Section B, Section C and Section D
3. Section A contains twenty questions of one mark each, Section B contains seven questions of two marks each, Section C contains seven questions of three marks each, and Section D contains three questions of five marks each.
4. There is no overall choice. However, internal choices have been provided in two questions of one mark each, two questions of two marks, one question of three marks and three questions of five marks weightage. You have to attempt only one of the choices in such questions.

Section A

1.An electric dipole when placed in a uniform electric field E will have minimum potential energy, if the positive direction of the dipole moment makes an angle with E.

(a) Zero (b) $\frac{\pi}{2}$ (c) π (d) $\frac{3\pi}{2}$

2. A parallel plate capacitor is first charged and then dielectric slab is introduced between the plates. The quantity that remains unchanged is

(a) charge (b) electric potential (c) capacitance (d) energy

3. A battery of emf 10 V and internal resistance 3 ohm is connected to a resistor. The current in the circuit is 0.5 A. The terminal voltage is

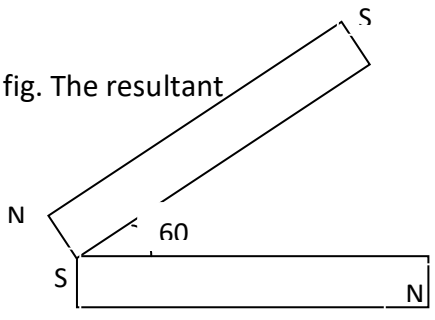
(a) 10 V (b) Zero (c) 1.5 V (d) 8.5 V

4. Three resistances of 2 ohm each are connected in a triangle. The resistance in ohms, between two Vertices is

(a) 3 ohm (b) 4 ohm (c) 6 ohm (d) $\frac{4}{3}$ ohm

5. Two magnets of equal magnetic moment m each are placed as shown in the fig. The resultant magnetic moment is

(a) m (b) $\sqrt{3}$ m (c) $\sqrt{2}$ m (d) $\frac{m}{2}$



6. An electromagnetic wave of wavelength 5 X 10^{-5} cm lies in the region

(a)gamma rays (b) U.V (c) Visible (d) I.R

7. Ratio of intensity of two waves is given by 4 :1. Then, ratio of the amplitude of two waves is

(a) 2:1 (b) 1:2 (c) 4:1 (d) 1:4

8. If an object is placed at the focus of concave lens, then the image is formed

(a) at infinity (b) within the focus (c) Between F and 2F (d) none of these

9. Energy equivalent to mass of an electron is

(a) 511 Mev (b) 5.1 Mev (c) 51.1 Mev (d) 0.511 Mev

10. If we consider electrons and photons of same wavelength, then they will have the same

(a) velocity (b) angular momentum (c) energy (d) momentum

11. The ----------electron in an atom behave as tiny current loops

(OR)

The material used for making ----- magnets have high coercivity.

12. A metal rod moved normal to the uniform magnetic field B produces ------- across

13. When ac flows through an inductor , the voltage leads the current by a phase ϕ = ---------

14. A change in the intensity of light ------ cause any change in the kinetic energy of the photoelectrons.

15. When a convex lens is held in water, there will be ------- in the focal length of the lens.

16. When radioactive nucleus emits a beta particle, what changes in the proton/neutron ratio

17. Why do we use very thin gold foil in Rutherford's alpha particle scattering experiment?

18. What is the momentum of a photon of frequency f?

19. What is a hole? Which type of doping creates a hole?

(OR)

Distinguish between an intrinsic semiconductor and p type semiconductor.

20. Which process causes depletion region in a p-n junction?

Section B

21. A 12 pF capacitor is connected to a 50 V battery. How much electrostatic energy is stored in the Capacitor and in what form.

22. Distinguish between a diamagnetic substance and a paramagnetic substance, stating two points of difference.

23. Mention one use of each: (i) infrared rays (ii) Gamma rays (iii) microwave (iv) ultraviolet radiation

24. Given the ground state energy E_o = --13.6 eV amd Bohr radius a_o = 0.53 A. Find out how the de- Broglie wavelength associated with the electron orbiting in the ground state would change when it jumps into the first excited state.

25. Define half life and decay constant of a radioactive substance and find the relation between them.

(OR)

A radioactive isotope has a half life of 10 years. How long will it take for the activity to reduce to 3.125 % ?

26. What do you mean by "Donor energy level"?

(OR)

A photodiode is fabricated from a semiconductor with a band gap of 2.8 eV. Can it detect Wavelength of 6000 nm? Justify.

27. What is electric power? Give its unit.

Section C

28. Apply Ampere circuital law to find magnetic field due to long current carrying conductor.

29. An ac supply of 220 V is applied to a series LCR circuit. Given L = 20 mH, C = 800/ π^2 μF and R = 110 ohm. Find (i) The frequency of the source , for which average power absorbed by the circuit is Maximum. (ii) the value of maximum current amplitude.

30. When an unpolarised light is incident on a plane glass surface, find the expression for the angle of incidence so that the reflected and refracted light rays are perpendicular to each other. What is the state of polarization, of reflected and refracted, under this condition?

31. Derive an expression for the width of the central maxima for diffraction of light at a single slit. How does this width change with increase in width of the slit? What is the essential condition for diffraction of wave?

(OR)

What do you mean by interference of light? Deduce the condition for constructive and destructive interference in Young's double slit experiment.

32. The energy of the electron in the hydrogen atom is known to be expressible in the form

E = - $\frac{-13.6\ eV}{n^2}$ eV (n = 1,2,3….) Use this expression to show that

(i) Electron in the hydrogen atom cannot have an energy of -6.8 eV.

(ii) Spacing between the lines (consecutive energy levels) within the given set of observed hydrogen spectrum decreases as n increases.

33. Define nuclear size and nuclear density. Show that nuclear density is same for all nuclei.

34. Define internal resistance of a cell. State the principle of potentiometer.

How is it used to measure the internal resistance of a cell?

Section D

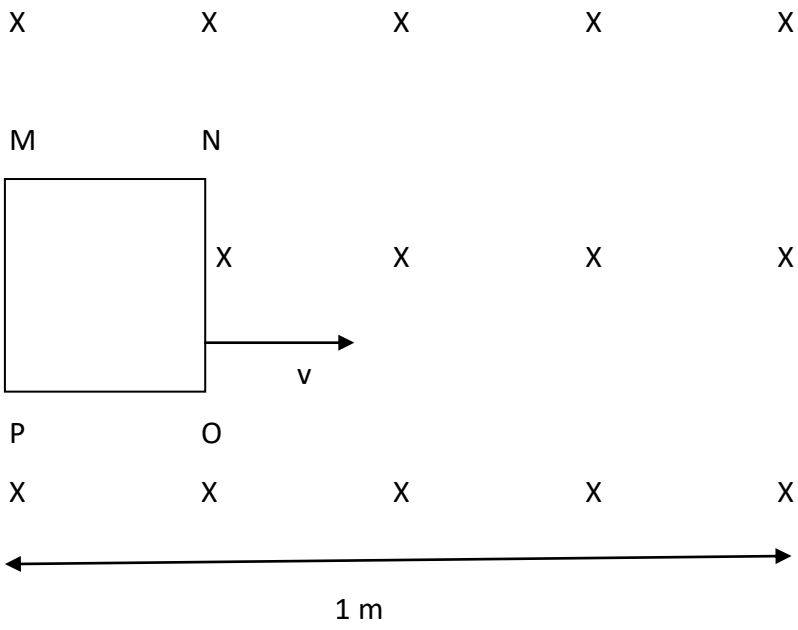
35. State Gauss's theorem. By using it derive an expression for electric field intensity (i) outside (ii) on and (iii) inside a charged spherical shell.

(OR)

(i) Derive Coulomb's law from Gauss's theorem.(ii) Two charged conducting spheres of radii r_1 and r_2 connected to each other by a wire. Find the ratio of electric fields at the surfaces of the two spheres.

36. (i) Define self-inductance of a coil. Obtain an expression for the energy stored in a solenoid of self inductance **'L**' when the current through it grows from zero to **I**

(ii) A square loop MNOP of side 20 cm is placed horizontally in a uniform magnetic field acting vertically downwards as shown in the figure. The loop is pulled with constant velocity of 20 cm/s till it goes out of the field.(a) Depict the direction of the induced current in the loop as it goes out of the field. For how long would the current in the loop persist? (b) Plot a graph showing the variation of magnetic flux and induced emf as a function of time.



(OR)

Define relative permeability and magnetic susceptibility. Find relation between them.

A 25 cm long solenoid has radius 2 cm and 500 total number of turns. It carries a current of 15 A

If it is equivalent to a magnet of the same size and magnetization then find the magnetization

37. With the help of a suitable diagram, derive a relation between the object distance (u), image Distance (v) and radius of curvature (R) for a convex spherical surface, when a ray of light travels from rarer to denser medium.

(OR)

(i) Draw a ray diagram showing the image formation by a compound microscope. Obtain expression for total magnification when the image is formed at infinity

(ii) How does the resolving power of a compound microscope get affected when (a) focal length of the objective is decreased. (b) the wavelength of light is increased. Give reasons to justify your answer.

Atomic Energy Central School No 4

Rawatbhata

CLASS 12 - CHEMISTRY

Confidence Examination- II (2019-20)

Time Allowed: 3 hours **Maximum Marks: 70**

General Instructions:

1. All questions are compulsory.
2. Section A: Q.no. 1 to 16 are very short answer questions (objective type) and carry 1 mark each.
3. Section B: Q.no. 17 to 23 are short answer questions and carry 2 marks each.
4. Section C: Q.no. 24 to 30 are long answer questions and carry 3 marks each.
5. Section D: Q.no. 31 to 33 are also long answer questions and carry 5 marks each.
6. There is no overall choice. However an internal choice has been provided in two questions of two marks, two questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
7. Use log tables if necessary, use of calculators is not allowed.

Section A

1. Electrolysis is the process in which electrical energy is converted to chemical energy. In electrolytic cell, oxidation takes place at anode and reduction at cathode. Electrode process depends on the electrode taken for electrolysis. Amount of substance liberated at an electrode is directly proportional to hte amount of charge passed through it. The mass of substance liberated at electrode is calculated using the following relation: $m = \frac{ItE}{96500}$ **[5]**

   Here, E represents the equivalent mass and 96500 C is called the Faraday constant. Faraday (96500 C) is the charge of 1 mole electron, i.e., 6.023×10^{23} electrons; it is used to liberate one gram equivalent of the substance.

   Answer the following questions:

   i. The passage of current liberates H_2 at cathode & Cl_2 at the anode. The solution is (a) copper chloride in water (b) NaCl in water

   ii. What is obtained at the anode on electrolysis of dilute H_2SO_4 using platinum electrodes as a product?

   iii. The platinum electrodes were immersed in a solution of cupric sulphate ($CuSO_4$) and the electric current is passed through the solution. After some time, it was observed that the colour of copper sulphate disappeared with the evolution of gas at the electrode. The colourless solution contains _____.

   iv. Calculate the volume of gas liberated at the anode at S.T.P. during the electrolysis of a $CuSO_4$ solution by a current of 1 A passed for 16 minutes and 5 seconds.

   [Hint: At anode: $2OH^- \rightarrow H_2O + 1/2\ O_2 + 2e^-$ (Oxygen gas is evolve) ,Equivalent volume V_e of oxygen = 5.6 litre].

v. What is the change in free energy for a galvanic cell?

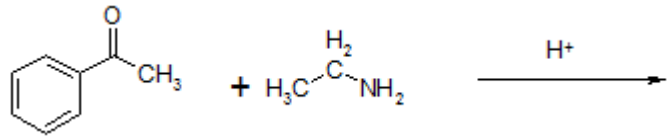
2. What is pig iron? **[1]**

3. Classify the following into monosaccharides and disaccharides : **[1]**
Ribose, 2-deoxyribose, maltose, galactose, fructose and lactose

4. Name the bases present in RNA. Which one of these is not present in DNA? **[1]**

5. Classify following on Homopolymer and copolymer- PVC, Polystyrene, Buna - S, Neoprene, Buna - N, Teflon. **[1]**

6. Predict the products of the following reaction:- **[1]**



7. Preparation of ethers by acid dehydration of secondary or tertiary alcohols is not a suitable method. **[1]**

a) alkyl group is hindered.
b) None of these
c) alkyl group should be unhindered
d) elimination competes over substitution and alkenes are easily formed

8. Heating mixture of Cu_2O and Cu_2S will give **[1]**

a) CuO + CuS
b) Cu + SO_3
c) Cu + SO_2
d) Cu_2SO_3

9. The most stable ion is **[1]**

a) Fe^{2+}
b) Mn^{2+}
c) Cr^{2+}
d) All are equally stable

10. The isomers $[(C_6H_5)_3P_2Pd(SCN)_2]$ and $[(C_6H_5)_3P_2Pd(NCS)_2]$ show **[1]**

a) Linkage isomerism
b) Coordination isomerism
c) Geometrical isomerism
d) Ionization isomerism

11. Which of the following polymers can have strong intermolecular forces? **[1]**

a) Nylon
b) Rubber
c) Polyesters
d) Both Nylon and Polyesters

12. **Assertion:** The newly formed RNA dictates the synthesis of protein at the ribosome. **[1]**
Reason: DNA has a double helical structure while RNA has single stranded structure.

a) Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
b) Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
c) Assertion is CORRECT but, reason is INCORRECT.
d) Assertion is INCORRECT but, reason is CORRECT.

13. **Assertion:** Sodium chloride is used to clear snow on the roads. **[1]**
Reason: Sodium chloride depresses the freezing point of water.

a) Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
b) Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
c) Assertion is CORRECT but, reason is INCORRECT.
d) Assertion is INCORRECT but, reason is CORRECT.

14. **Assertion:** $HClO_4$ is stronger acid than $HClO_3$. **[1]**
Reason: Oxidation state of Cl in $HClO_4$ is +7 and in $HClO_3$ is +5.

a) Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
b) Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
c) Assertion is CORRECT but, reason is INCORRECT.
d) Assertion is INCORRECT but, reason is CORRECT.

15. **Assertion:** Alcohols have higher boiling points than ethers of comparable molecular masses. **[1]**
Reason: Alcohols and ethers are isomeric compounds.

a) Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
b) Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
c) Assertion is CORRECT but, reason is INCORRECT.
d) Assertion is INCORRECT but, reason is CORRECT.

16. **Assertion:** Aryl halogen undergoes nucleophilic substitution reactions with ease. **[1]**
Reason: The carbon halogen bond in aryl halides has partial double bond character.

a) Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
b) Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
c) Assertion is CORRECT but, reason is INCORRECT.
d) Assertion is INCORRECT but, reason is CORRECT.

Section B

17. Write the name and structure of one of the common initiators used in free radical addition polymerisation. **[2]**
18. Define activation energy of a reaction. **[2]**
19. 10 ml of liquid A was mixed with 10 ml of liquid B. The volume of the resulting solution was found to be 19.9 ml what do you conclude? **[2]**
20. When a coordination compound $CoCl_3 \cdot 6NH_3$ is mixed with $AgNO_3$, 3 moles of AgCl are **[2]**

precipitated per mole of the compound. Write

i. structural formula of the complex.

ii. IUPAC name of the complex.

21. Name a ligand which is bidentate and give an example of the complex formed by this ligand. **[2]**

OR

What type of hybrid orbital is associated with Ni atom in $[Ni(CN)_4]^{2-}$.

22. What are uses of Zinc? **[2]**

OR

When $FeCr_2O_4$ is fused with Na_2CO_3 in the presence of air it gives a yellow solution of compound (A). Compound (A) on acidification gives compound (B). Compound (B) on reaction with KCl forms an orange coloured compound (C). An acidified solution of compound (C) oxidises Na_2SO_3 to (D). Identify (A), (B), (C) and (D).

23. Predict the major product of acid catalysed dehydration of **[2]**

i. 1-Methylcyclohexanol and

ii. Butan-1-ol

Section C

24. A solution containing 1.9 g per 100 mL of KCl (M = 74.5 g mol^{-1}) is isotonic with a solution containing 3 g per 100 mL of urea (M = 60 g mol^{-1}). Calculate the degree of dissociation of KCl solution. Assume that both the solutions have same temperature. **[3]**

25. The half life for radioactive decay of ^{14}C is 5730 years. An archaeological artifact containing wood had only 80% of the ^{14}C found in a living tree. Estimate the age of the sample. **[3]**

OR

For the following reactions, write the rate of reaction expression in terms of reactants and products?

i. $4NH_3\,(g) + 5O_2\,(g) \rightarrow 4NO\,(g) + 6H_2O\,(g)$

ii. $2N_2O_5 \rightarrow 2NO_2 + O_2$

26. Calculate the emf of the cell Mg(s) $\|$ Mg^{2+}(0.1 M) || Cu^{2+} (1 $\times$ 10^{-3} M) | Cu(s) **[3]**

Given : $E^0(Cu^{2+}/Cu)$ = +0.34V

$E^0(Mg^{2+}/Mg)$ = -2.37V

27. Considering the parameters such as bond dissociation enthalpy, electron gain enthalpy and hydration enthalpy, compare the oxidising power of F_2 and Cl_2 . **[3]**

28. How will you effect the following conversions? **[3]**

i. Chlorobenzene to p-nitrophenoI.

ii. Bromobenzene to biphenyl.

iii. Propene to propan-1-ol

29. State reason for the following situations: **[3]**

i. Monochloroethanoic acid is a weaker acid than dichloro ethanoic acid.

ii. Benzoic acid is a stronger acid than ethanoic acid.

OR

Write short notes on:

i. Rosenmund reaction

ii. Cannizzaro's reaction

30. Define the following terms with a suitable example in each: **[3]**

i. Broad-spectrum antibiotics

ii. Cationic detergents

iii. Disinfectants

Section D

31. A strip of nickel metal is placed in a 1-molar solution of $Ni(NO_3)_2$ and a strip of silver metal is placed in a 1-molar solution of $AgNO_3$. An electrochemical cell is created when the two solutions are connected by a salt bridge and the two strips are connected by wires to a voltameter. **[5]**

Write the balanced equations for the overall reaction occurring in the cell and calculate the cell potential.

$(E^{\theta}_{Ni^2/Ni} = -0.25V;\ E^{\theta}_{Ag^+/Ag} = 0.80V)$

OR

The molar conductivity of 0.025 mol L^{-1} methanoic acid is 46.1 S cm^2 mol^{-1}. Calculate its degree of dissociation and dissociation constant.

Given $\lambda^{\circ}_{H^+} = 349.6\ S\ cm^2\ mol^{-1}$ and $\lambda^{\circ}_{HCOO^-} = 54.6\ S\ cm^2\ mol^{-1}$.

32. Write short notes on the following: **[5]**

i. Carbylamine reaction

ii. Diazotisation

iii. Hofmann's bromamide reaction

iv. Coupling reaction

v. Ammonolysis

OR

i. Write structures of different isomeric amines corresponding to the molecular formula, $C_4H_{11}N$.

ii. Write IUPAC names of all the isomers.

iii. What type of isomerism is exhibited by different pairs of amines?

33. a. Write one difference between transition elements and p-block elements with reference to variability of oxidation states. **[5]**

b. Why do transition metals exhibit higher enthalpies of atomization?

c. Name an element of lanthanoid series which is well known to shown +4 oxidation state. Is it a strong oxidising agent or reducing agent?

d. What is lanthanoid contraction? Write its one consequence.

e. Write the ionic equation showing the oxidation of Fe(II) salt by acidified dichromate solution.

OR

a. Complete the following chemical reaction equations:

a. $Fe^{2+}(aq) + MnO_4^-(aq) + H^+(aq) \rightarrow$

b. $Cr_2O_7^{2-}(aq) + I^-(aq) + H^+(aq) \rightarrow$

b. Explain the following observations:

i. Transition elements are known to form many interstitial compounds.

ii. With the same d^4 d-orbital configuration Cr^{2+} ion is reducing while Mn^{3+} ion is oxidizing.

iii. The enthalpies of atomization of transition elements are quite high.

Atomic Energy Central School No 4

Rawatbhata

CLASS 12 - MATHEMATICS

Confidence Examination - II (2019-20)

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

- All the questions are compulsory.
- The question paper consists of 36 questions divided into 4 sections A, B, C, and D. Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 6 questions of 4 marks each. Section D comprises of 4 questions of 6 marks each.
- There is no overall choice. However, an internal choice has been provided in three questions of 1 mark each, two questions of 2 marks each, two questions of 4 marks each, and two questions of 6 marks each. You have to attempt only one of the alternatives in all such questions.
- Use of calculators is not permitted.

Section A

1. Adj.(KA) = ... **[1]**

   a) K^{n-1} Adj. A

   b) None of these

   c) K Adj. A

   d) K^n Adj.A

2. If $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=0$, then $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} =$ **[1]**

   a) –abc

   b) None of these

   c) 0

   d) abc

3. If x sin (a + y) = sin y, then $\frac{dy}{dx}$ is equal to **[1]**

   a) $\frac{\sin a}{\sin(a+y)}$

   b) $\frac{\sin^2(a+y)}{\sin a}$

   c) $\frac{\sin a}{\sin^2(a+y)}$

   d) $\frac{\sin(a+y)}{\sin a}$

4. A pair of dice is thrown 4 times. If getting a doublet is considered a success, find the probability of two successes. **[1]**

   a) $\frac{25}{216}$

   b) $\frac{41}{216}$

   c) $\frac{37}{216}$

   d) $\frac{19}{216}$

5. Given that the events A and B are such that P(A) =$\frac{1}{2}$, P (A ∪ B) =$\frac{3}{5}$and P(B) = p. Find p if they independent. **[1]**

   a) $\frac{1}{4}$

   b) $\frac{1}{2}$

c) $\frac{1}{5}$ d) $\frac{1}{3}$

6. Corner points of the feasible region determined by the system of linear constraints are (0, 3), (1, 1) and (3, 0). Let Z = px+qy, where p, q > 0. Condition on p and q so that the minimum of Z occurs at (3, 0) and (1, 1) is **[1]**

a) p = 3q b) p = 2q

c) p = q d) $p = \frac{q}{2}$

7. Which of the following is different from $2\tan^{-1}x$? **[1]**

a) $\tan^{-1}\left(\frac{2x}{1-x^2}\right), |x| < 1.$ b) $\sin^{-1}\left(\frac{2x}{1-x^2}\right), |x| \leqslant 1$

c) None of these d) $\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right), |x| \geqslant 0$

8. If $\int_{-2}^{5} f(x)dx = 4, \int_{0}^{5}(1+f(x))dx = 7$, then the value of the integral $\int_{-2}^{0} f(x)$ dx is equal to **[1]**

a) –3 b) 2

c) 3 d) 5

9. Find the intercepts cut off by the plane 2x + y – z = 5. **[1]**

a) $\frac{5}{2}, -5, -5$ b) $-\frac{5}{2}, 5, -5$

c) $\frac{5}{2}, 5, -5$ d) $-\frac{5}{2}, 5, 5$

10. If θ is the angle between vectors $\vec{a}\ and\ \vec{b}$ then the cross product $\vec{a} \times \vec{b} =$ **[1]**

a) $2|a||b|\sin\theta\hat{n}$ b) $\left|\overrightarrow{a}\right|\left|\overrightarrow{b}\right|\sin\theta\hat{n}$

c) $|a||b|\sin\theta$ d) $|a||b|\cos\theta$

11. Fill in the blanks: **[1]**

If n(A) = p and n(B) = q, then n(A × B) = _____.

12. Fill in the blanks: **[1]**

If y = A sin x + B cos x, then $\frac{d^2y}{dx^2} + y =$ _____.

13. Fill in the blanks: **[1]**

Sum of two skew symmetric matrices is always _____ matrix.

14. Fill in the blanks: **[1]**

The cartesian equation of the plane $\vec{r}.(\hat{i}+\hat{j}-\hat{k}) = 2$

OR

Fill in the blanks:

Direction ratios of two _____ lines are proportional.

15. Fill in the blanks: **[1]**

The magnitude of the vector $6\hat{i}$ + $2\hat{j}$ + $3\hat{k}$ is _____.

OR

Fill in the blanks:

The projection of vector $\vec{a}$ = $2\hat{i} - \hat{j} + \hat{k}$ along $\vec{b}$ = $\hat{i} + 2\hat{j} + 2\hat{k}$ is _____.

16. Without expanding, prove that **[1]**

$$\begin{vmatrix} a & a^2 & bc \\ b & b^2 & ca \\ c & c^2 & ab \end{vmatrix} = \begin{vmatrix} 1 & a^2 & a^3 \\ 1 & b^2 & b^3 \\ 1 & c^2 & c^3 \end{vmatrix}$$

17. Find $\int \frac{dx}{x^2+4x+8}$. **[1]**

OR

Evaluate $\int_{-\pi/4}^{\pi/4} \sin^3 x dx$.

18. Evaluate the following integral $\int (2x - 3\cos x + e^x)\, dx$ **[1]**

19. Find the interval in which the function f(x) = x^2e^{-x} is increasing. **[1]**

20. Verify that the given function is a solution of the corresponding diff eq. y = cosx + c; y^1 + sinx = 0 **[1]**

Section B

21. Evaluate:- $\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right) + \cot^{-1}\left(\frac{1}{\sqrt{3}}\right) + \tan^{-1}\left(\sin\left(-\frac{\pi}{2}\right)\right)$ **[2]**

OR

Show that the relation R in R defined as R = {(a, b) : a $\leqslant$ b}, is reflexive and transitive but not symmetric.

22. Find the values of x for which the function , **[2]**
$f(x) = kx^3 - 9x^2 + 9x + 3$ is increasing in R

23. Find the values of k so that the function f is continuous at the indicated point: **[2]**
$f(x) = \begin{cases} kx + 1, & if\, x \leqslant 5 \\ 3x - 5, & if\, x > 5 \end{cases}$ at x = 5.

24. Find the direction cosines of the vector joining the points A(1,2, - 3) and B(-1, - 2,1) directed from A to B. **[2]**

OR

Find the value of x for which $x\left(\hat{i} + \hat{j} + \hat{k}\right)$ is a unit vector.

25. Find the angle between the lines **[2]**
$\overrightarrow{r} = \left(3\hat{i} + \hat{j} - 2\hat{k}\right) + \lambda\left(\hat{i} - \hat{j} - 2\hat{k}\right)$
$\overrightarrow{r} = \left(2\hat{i} - \hat{j} - 56\hat{k}\right) + \mu\left(3\hat{i} - 5\hat{j} - 4\hat{k}\right)$

26. Two cards are drawn at random & without replacement from a pack of 52 playing cards. Find the probability that both the cards are black. **[2]**

Section C

27. Functions f, g : R $\rightarrow$ R are defined, respectively, by f(x) = x^2 + 3x + 1 g(x) = 2x - 3, find **[4]**
    i. fog
    ii. gof
    iii. fof
    iv. gog

28. If x = $\sqrt{a^{\sin^{-1}t}}$ and y = $\sqrt{a^{\cos^{-1}t}}$, then show that $\frac{dy}{dx} = \frac{-y}{x}$. **[4]**

OR

If y = e^x sin x, then prove that $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 2y = 0$.

29. Find the general solution of $\frac{dy}{dx} + (\sec x)\, y = \tan x\, \left(0 \leqslant y < \frac{\pi}{2}\right)$ **[4]**

[4]

30. Evaluate $\int \frac{x^2+3x-1}{(x+1)^2} dx$

31. In a group of 400 people, 160 are smokers and non-vegetarian, 100 are smokers and vegetarian and the remaining are non-smokers and vegetarian. The probabilities of getting a special chest disease are 35%, 20% and 10%, respectively. A person is chosen from the group at random and is found to be suffering from the disease. What is the probability that the selected person is a smoker and non-vegetarian? **[4]**

OR

Assume that each born child is equally likely to be a boy or a girl. If a family has two children, then what is the conditional probability that both are girls? Given that

i. the youngest is a girl?

ii. at least one is a girl?

32. A manufacturer considers that men and women workers are equally efficient and so he pays them at the same rate. He has 30 and 17 units of workers (male and female) and capital respectively, which he uses to produce two types of goods A and B. To produce one unit of A, 2 workers and 3 units of capital are required while 3 workers and 1 unit of capital are required to produce one unit of B. If A and B are priced at Rs.100 and Rs.120 per unit respectively, how should he use his resources to maximise the total revenue? Form the above as an L.P.P. and solve graphically. **[4]**

Do you agree with this view of the manufacturer that men and women workers are equally efficient and so should be paid at the same rate?

Section D

33. Express the matrix $B = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$ as the sum of a symmetric and a skew symmetric matrix. **[6]**

OR

Given $A = \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$ find AB and use this result in solving the following system of equation.

x - y + z = 4

x - 2y - 2z = 9

2x + y + 3z = 1

34. Using integration, find the area of the circle $x^2 + y^2 = 16$, which is exterior to the parabola $y^2 = 6x$. **[6]**

35. Show that of all the rectangles with a given perimeter, the square has the largest area. **[6]**

OR

Show that the semi-vertical angle of the cone of the maximum volume and of given slant height is $\cos^{-1} \frac{1}{\sqrt{3}}$

36. Find the vector and cartesian forms of the equation of the plane passing through the point (1, 2, -4) and parallel to the lines $\vec{r} = \hat{i} + 2\hat{j} - 4\hat{k} + \lambda(2\hat{i} + 3\hat{j} + 6\hat{k})$ and **[6]**

$\vec{r} = \hat{i} - 3\hat{j} + 5\hat{k} + \mu(\hat{i} + \hat{j} - \hat{k})$ Also, find the distance of the point (9, -8, -10) from the plane thus obtained.

Atomic Energy Central School No 4

Rawatbhata

CLASS 12 - BIOLOGY

Confidence Examination- II (2019-20)

Time Allowed: 3 hours **Maximum Marks: 70**

General Instructions:

1. There are a total of 27 questions and five sections in the question paper. All questions are compulsory.
2. Section A contains question numbers 1 to 5, multiple choice questions of one mark each. Section B contains question numbers 6 to 12, short answer type I questions of two marks each. Section C contains question numbers 13 to 21, short answer type II questions of three marks each. Section D contains question number 22 to 24, case-based short answer type questions of three marks each. Section E contains question numbers 25 to 27, long answer type questions of five marks each.
3. There is no overall choice in the question paper. However, internal choices are provided in two questions of one mark, one question of two marks, two questions of three marks and all three questions of five marks. An examinee is to attempt any one of the questions out of the two given in the question paper with the same question number.

Section A

1. Which of the following group of hormones are produced during pregnancy? **[1]**

   a) Progestogenes, hPL and relaxin
   b) hCG, hPL and relaxin
   c) Estrogens, hPL and relaxin
   d) hCG, estrogens and relaxin

   OR

   Which one is not a natural methods birth control

   a) Coitus interrupts
   b) Tubectomy
   c) To abstain
   d) Rhythm period

2. The disease causing microorganisms are called **[1]**

   a) Fungi
   b) Microbes
   c) Pathogen
   d) Allotropes

   OR

   During organs transplantation, the organs cannot be taken from just anybody since the graft would be rejected sooner or later due to

   a) Passive immunity
   b) Cell mediated immune response
   c) Innate immunity
   d) Blood group

3. Restriction endonucleases are used in genetic engineering to form **[1]**

a) DNA Designing
b) Amplification of DNA fragment
c) Recombinant molecules of DNA
d) Joining two DNA segments

4. The property of Taq polymerase explored in PCR is **[1]**

a) Thermolabile nature
b) Exonuclease activity
c) High fidelity
d) Resistance to high temperature

5. Buffer zone in biosphere reserve is zore for **[1]**

a) Forestry
b) Agriculture
c) Tourism and restoration
d) Research and education

Section B

6. A list of three flowering plants is given below **[2]**
Date palm, Cucurbits, and Pea. Which ones out of them are
   i. Monoecious
   ii. Bearing pistillate flowers?

OR

Emasculation may not be necessary, yet bagging is necessary. Justify giving the condition when such a thing can happen.

7. Write the full form of the following: **[2]**
(i) MMR
(ii) IVF
(iii) GIFT
(iv) ART

8. What is point mutation? Give one example. **[2]**

9. A couple fights frequently for the paternity of their child. The husband thinks that he is not the father of this child. Name the technique you will suggest to solve the problem of paternity. **[2]**

10. Define SCP. How SCP can be better proteins than convention diet proteins. **[2]**

11. Name some techniques used for early molecular diagnosis of pathogens and genetic disorders. **[2]**

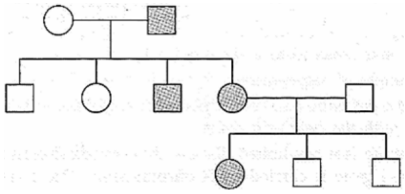
12. Mention four significant services that a healthy forest ecosystem provide. **[2]**

Section C

13. Draw a neat labelled sketch of L.S. of an endospermous monocot seed. **[3]**

14. Describe the development of a seed. **[3]**

15. Study the given pedigree chart and answer the questions that follow: **[3]**



   i. Is the trait recessive or dominant?
   ii. Is the trait sex-linked or autosomal?
   iii. Give the genotypes of the parents shown in generation I and their II child is shown in generation II and the first grandchild shown in generation III.

OR

A child has blood group O. If the father has blood group B, work out the genotypes of the parents and the possible genotypes of the other offsprings.

16. Identify the examples of convergent evolution from the following: **[3]**
    i. Flippers of penguins and dolphins
    ii. Eyes of octopus and mammals
17. Differentiate between the process of transcription in prokaryotes and eukaryotes. **[3]**
18. What is apicultural? How is it important in our lives? **[3]**
19. How did Eli Lilly synthesize the human insulin? Mention one difference between this insulin and the one produce by the human pancreas. **[3]**
20. What do you mean by conservation of biodiversity/wildlife? What are its objectives? **[3]**

OR

Since the origin of life on earth, there were five episodes of mass extinction of species.
    i. How is the 'Sixth Extinction', presently in progress, different from the previous episodes?
    ii. Who is mainly responsible for 'Sixth Extinction'?
    iii. List any four points that can help to overcome this disaster.
21. Explain briefly about Chitinase. **[3]**

Section D

22. Write the function of each of the following: **[3]**
    (a) Seminal vesicle
    (b) Acrosome of human sperm
    (c) Fimbriae
23. i. Why do farmers prefer bio fertilisers over chemical fertilisers these days? Explain. **[3]**
    ii. How do Anabaena and mycorrhiza act as bio fertilisers?
24. What measures do you suggest to control pollution from automobile exhaust? **[3]**

Section E

25. Compare in any three ways the chromosomal theory of inheritance as proposed by Sutton and Bovery with that of experimental results on pea plant presented by Mendel. **[5]**

OR

State the aim and describe Messelson and Stahl's experiment.

26. i. State the objective of animal breeding. **[5]**
    ii. List the importance and limitations of inbreeding. How can the limitations be overcome?
    iii. Give an example of a new breed each of cattle and poultry.

OR

    a. Differentiate between active and passive immunity.
    b. Comment on the role of vaccination and immunization in keeping the human population healthy.
27. Discuss the causes and effects of global warming. What measures need to be taken to control global warming? **[5]**

OR

    a. What is hydrarch succession?

b. Compare the pioneer species and climax communities of hydrarch and xerarch succession respectively.
c. List the factors upon which the type of invading pioneer species depend in secondary succession. Why is the rate of this succession faster than that of primary succession?

Atomic Energy Central School No-4, Rawatbhata
Confidence Examination – II (2019-20)
Time: 3 Hours Class: XII , Computer Science (Old) M.M.: 70

1. (a) What is the purpose of using a typedef command in c++. Explain with suitable example. 2

(b) Name the header files that shall be needed for the following code: 1

```
void main()
    {
     char Word[] = "Exam";
     cout<<setw(20)<<Word;
    }
```

(c) Rewrite the following program after removing the syntax error(s) , if any. Underline each correction. 2

```
#include<iostream.h>
void main()
{
 One = 10, Two = 20;
 Callme(One; Two);
 Callme(Two);
}
void  Callme(int Arg1, int Arg2 = 20)
{
  Arg1 = Arg1 + Arg2;
 Cout<<Arg1 >> Arg2;
}
```

(d) Find the out put of the following program: 3

```
#include<iostream.h>
#include<ctype.h>
void main()
{
 char Mystring [ ] = " What@OUTPUT!";
 for ( int I = 0; Mystring [I] ! = '\0' ; I++)
   {  if (!isalpha(Mystring [I]))
        Mystring [I] = '*' ;
     else if ( isupper (Mystring [I]) )
          Mystring [ I ] = Mystring [ I ] + 1;
        else
          Mystring [ I ] = Mystring [ I + 1 ];
   }
  cout<< Mystring;
  }
```

(e) Find the output of the following program: 2

```
 #include<iostream.h>
  void main()
{
 int a= 5, b =10;
 for(int i =1; i<2 ; i++)
 {    cout<< " Line 1 = "<<a++ <<" & "<< b-2 <<endl;
      cout<< " Line 2 = "<<++b <<" & "<< a+3 <<endl;
 }
```

(f) In the following program, find the correct possible output(s) from the options: 2

```
 #include<iostream.h>
void main()
    { randomize();
      char Area [] [10] = { "NORTH", "SOUTH", "EAST", "WEST"};
      int togo;
      for ( int i = 0; i<3 ; i++)
       {  togo = random (2) + 1;
```

```
            cout<< Area[togo] << " : ";
        }
    }
```

Outputs:

(i) SOUTH:EAST:SOUTH:
(ii) NORTH:SOUTH:EAST:
(iii) SOUTH:EAST:WEST:
(iv) SOUTH:EAST:EAST:

2.(a) Differentiate between **private** and **protected** visibility modes in context of object oriented programming giving a suitable example illustrating each. 2

(b) Answer the questions (i) and (ii) after going through the following program: 2

```
#include<iostream.h>
#include<string.h>
class Retail
{ char Category[20];
  char Item[20];
  int Qty;
  float Price;
  Retail()          //Function 1
  {
  strcpy(Category, "Cereal");
  strcpy(Item, "Rice");
  Qty=100;
  Price=25;
  }
 public:
  void Show()          //Function 2
  {
   cout<<Category<<" _ "<<Item<<" : :"<<Qty<<"@"<<Price<<endl;
   }
 };
 void main()
 {
    Retail R;          //Statement 1
    R.Show();          //Statement 2
  }
```

(i) Will Statement 1 initialize all the data members for the object R with the values given in the Function 1? (Yes or No). Justify your answer suggesting the correction(s) to be made in the above code.

(ii) What shall be the possible output when the program gets executed? (Assuming, if required-the suggested correction(s) are made in the program)

(c) Define a class Clothing in c++ with the following descriptions: 4

Private Member:

Code of type string
Type of type string
Size of type integer
Material of type string
Price of type float

A function Calc_Price() which calculates and assign the value of Price as follows:
for the value of Material as "COTTON":

Type	Price(Rs.)
TROUSER	1500
SHIRT	1200

For Material other than "COTTON" the above mentioned Price gets reduced by 25%.

Public Members:

- A constructor to assign initial values of Code, Type and Material with the word "NOT ASSIGNED" and Size and Price with 0.
- A function Enter() to input the values of the data members Code, Type, Size and

Material and invoke the Calc_Price() function.

- A function Show() which display the content of all the data members for a Clothing.

(d) Answer the questions (i) to (iv) based on the following code: 4

```
class Toys
{     char TCode;
   protected:
      float Price;
      void Assign(float);
   public:
            Toys( );
            void TEntry ( );
            void TDisplay( );
};
class SoftToys : public Toys
{           char STName[20];
            float Weight;
   public:
            SoftToys();
            void STEntry ( );
            void STDisplay ( );
};
class ElectronicToys : public Toys
{           char ETName[20];
            int no_of_Batteries;
   public:
            void ETEntry ();
            void ETDisplay();
};
```

(i) Which type of inheritance is shown in the above example?

(ii) How many bytes will be required by an object of the class SoftToys?

(iii) Write name of the entire data member, which are accessible from member functions of the class SoftToys.

(iv) Write name of all the member functions, which are accessible from an object of the class ElectronicToys.

3.(a) Write a function in C++, which accepts an integer array and its size as arguments and swap the elements of every even locations with its following odd location. 4

example: if an array of nine elements initially contains the elements as:

2, 4, 1, 6, 5, 7, 9, 23, 10

then the function should rearrange the array as:

4, 2, 6, 1, 7, 5, 23, 9, 10

(b) An array Arr[50][100] is stored in the memory along the row with each element occupying 2 bytes. Find out the address of the location Arr[20][50], if the location Arr[10][25] is stored at the address 10000. 4

(c) Write a function in C++ to Delete an element from a dynamically allocated Queue where each node contains a real number as data. 4

Assume the following definition of MYNODE for the same:

```
struct MYNODE
{           float NUM;
            MYNODE *Link;
};
```

(d) Write a function in c++ to print the product of each row of a two dimensional integer array as the argument for the function. Example: if the 2-D array contains: 2

20	40	10
40	50	30
60	30	20
40	20	30

Then the output should appear as:
Product of Row 1 = 8000
Product of Row 2 = 6000
Product of Row 3 = 3600
Product of Row 4 = 2400

(e) Evaluate the following postfix notations of expression (Show status of stack after execution of each operation) : 2

5, 20, 15, -, *, 25, 2, *, +

4.(a) Observe the program segment given below carefully, and answer the question that follows: 1

```
class Candidate
{       long CId;                       //Candidate's ID
        char CName[20];                 //Candidate's Name
        float Marks;                    //Candidate's Marks
public:
        void Enter();
        void Display();
        void MarksChange();
        long R_CId() { Return CId;}
};
void MarksUpdate(long Id)               //Function to change marks
{
 fstream File;
 File.open("CANDIDATE.DAT",ios::binary|ios::in|ios::out);
 Candidate C;
 int Record=0, Found=0;
 while(!Found && File.read((char *) & C, sizeof(C)))
 {
        if(Id==C.R_CId())
        {
        cout<<"Enter new marks:";
        C.MarksChange();
        ____________________            //Statement 1
        ____________________            //Statement 2
        Found = 1;
        }
  Record++;
 }
        if(Found==1)
          cout<<"Record Updated!";
 File.close();
 }
```

(b) Write the statement 1 to position the File pointer at the beginning of the record for which the candidate's Id matches with the argument passed and Statement 2 to write the updated record at the position. 2

(c) Write a function in C++ to count the number of uppercase alphabets present in a text file "ARTICLE.TxT". 3

Given a binary file "TELEPHON.DAT", containing records of the following class Directory:

```
class Directory
{
    char Name[20];
    char Address[30];
    char AreaCode[5];
    char Phone_No[15];
    public:
    void Register();
    void Show();
    int CheckCode(char AC[])
```

```
    { return strcmp(AreaCode, AC);
     }
};
```

Write a function COPYABC() in C++, that would copy only those records having AreaCode as "123" from TELEPHON.DAT to a new file "TELEBACK.DAT".

5.(a) Differentiate between Candidate Key and AlterNet Key in context of RDBMS. 2

(b) Consider the following tables Item and Customer. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii). 6

Table: Item

I_ID	ItemName	Manufacturer	Price
PC01	Personal Computer	ABC	35000
LC05	Laptop	ABC	55000
PC03	Personal Computer	XYZ	32000
PC06	Personal Computer	COMP	37000
LC03	Laptop	PQR	57000

Table: Customer

C_ID	CustomerName	City	I_ID
01	N Roy	Delhi	LC03
06	H Singh	Mumbai	PC03
12	R Pandey	Delhi	PC06
15	C Sharma	Delhi	LC03
16	K Agarwal	Banglore	Pc01

(i) To Display the Details of those Customers, whose City is Delhi.

(ii) To Display the details of Items, whose Price is in the range of 35000 to 55000 (Both values

(iii) included).

To Display the CustomerName, City from table Customer and ItemName and Price from

(iv) table Item, with their corresponding matching I_Id.

(v) To increase the Price of all Items by 1000 in the table Item.

(vi) SELECT DISTINCT City FROM Customer;

(vii) SELECT ItemName, MAX(Price), Count(*) FROM Item GROUP BY ItemName;

SELECT CustomerName, Manufacturer FROM Item, Customer WHERE Item.I_Id =

(viii) Customer.I_ID;

SELECT ItemName, Price*100 FROM Item WHERE Manufacturer = 'ABC';

6.(a) State and verify Absorption law in Boolean Algebra. 2

(b) Draw a Logical Circuit Diagram for the following Boolean Expression: 1
A . (B + C`) + B.C

(c) Convert the following Boolean expression into its equivalent Canonical Product of Sum Form(POS): 2
A . B` . C + A` . B . C +A` . B . C`

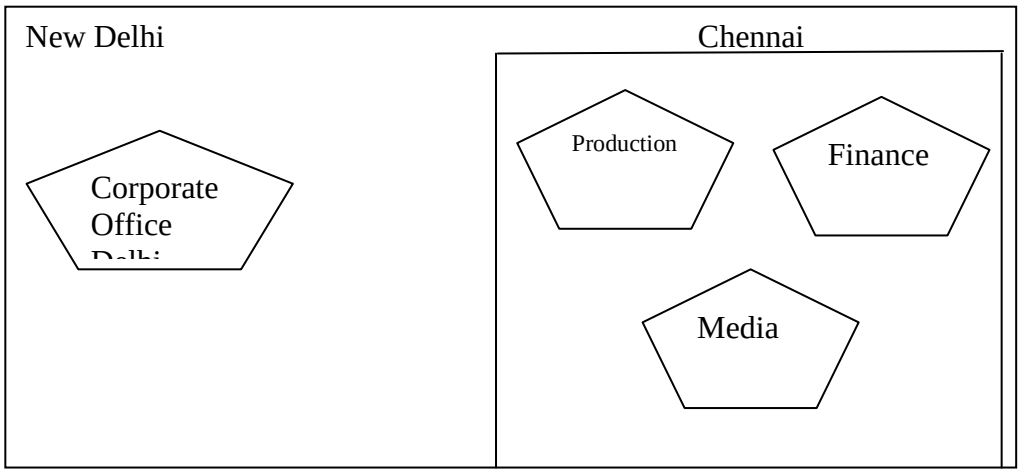
(d) Reduce the following Boolean Expression using K-Map: 3
$F(A,B,C,D) = \sum(0,1,2,4,5,8,9,10,11)$

7.(a) What is Modem? 1

(b) Expand the following terms with respect to Networking: 2
(i) PPP (ii) GSM (iii) XML (iv) HTTP

(c) How is a Hacker different from a Cracker? 1

(d) "China Middleton Fashion" is planning to expand their network in India, starting with two cities in India to provide infrastructure for distribution of their products. The company has planned to set up their main office units in Chennai at three different locations and have named their offices as "Production Unit", "Finance Unit" and "Media Unit". The company has its corporate unit in Delhi. The layout of the same is as below: 4



Approximate distance between these units is as follows:

From	To	Distance
Production Unit	Finance Unit	70 mtrs
Production Unit	Media Unit	15mtrs
Production Unit	Corporate Unit	2112 km
Finance Unit	Media Unit	15km

The no. of computers planned to install in these units are as follows:

Production Unit	150
Finance Unit	35
Media Unit	10
Corporate Unit	30

(i) Suggest the kind of network required for connecting each of the following units:

(1) Production Unit and Media Unit (2) Production Unit and Finance Unit

(ii) Which one of the following devices will you suggest for connecting all the computers within each of their office units?

(1) Switch/Hub (2) Modem (3) Telephone

(iii) Which of the following communication media, will you suggest to be procured by the company for connecting their local office units in Chennai for very effective (High Speed) communication?

(1) Telephone Cable (2) Optical Fiber (3) Ethernet Cable

(iv) Suggest a cable/wiring layout for connecting the company's local office units located in Chennai. Also suggest an effective efficient method/technology for connecting the company's office unit located in Delhi.

Atomic Energy Central School No 4

Rawatbhata

CLASS 12 - हिंदी कोर

Confidence Examination- II (2019-20)

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

- इस प्रश्न पत्र में तीन खंड हैं - क, ख, ग।
- तीनों खंडों के प्रश्नों के उत्तर देना अनिवार्य है।
- यथासंभव तीनों खंडों के प्रश्नों के उत्तर क्रम से लिखिए।
- एक अंक के प्रश्नों का उत्तर लगभग 15-20 शब्दों में लिखिए।
- दो अंक के प्रश्नों का उत्तर लगभग 30-40 शब्दों में लिखिए।
- तीन अंक के प्रश्नों का उत्तर लगभग 60-70 शब्दों में लिखिए।
- चार अंक के प्रश्नों का उत्तर लगभग 80-100 शब्दों में लिखिए।
- पाँच अंक के प्रश्नों का उत्तर लगभग 120-150 शब्दों में लिखिए।

Section A

1. **निम्नलिखित गद्यांश को पढ़कर पूछे गए प्रश्नों के उत्तर लिखिए: (12)** **[12]**

बीसवीं शताब्दी में भारत ने ब्रिटिश साम्राज्यवादी-उपनिवेशवादी व्यवस्था को अपने ऊपर से उतार फेंका। महात्मा गांधी की प्रेरणा से भारतीय जनता ने एक नए ढंग का संघर्ष कर अपनी स्वाधीनता प्राप्त की। गांधीजी ने राजनीतिक संघर्ष के साथ-साथ सामाजिक और सांस्कृतिक व्यवस्था के विरुद्ध संघर्ष को भी स्वाधीनता संग्राम से जोड़ दिया। उनके लिए राजनैतिक और प्रशासनिक भेदभाव के खिलाफ लड़ना जितना महत्त्वपूर्ण था उतना ही महत्वपूर्ण था सामाजिक और धार्मिक ढाँचे के भीतर के भेदभाव के विरुद्ध खड़ा होना। अपनी आत्मकथा' में गांधीजी लिखते हैं- “ऐसे व्यापक सत्यनारायण के प्रत्यक्ष दर्शन के लिए प्राणीमात्र के प्रति आत्मवत (अपने समान) प्रेम की भारी जरूरत है। इस सत्य को पाने की इच्छा करने वाला मनुष्य जीवन के एक भी क्षेत्र से बाहर नहीं रह सकता। यही कारण है कि मेरी सत्यपूजा मुझे राजनैतिक क्षेत्र में घसीट ले गई। जो कहते हैं कि राजनीति से धर्म का कोई सम्बन्ध नहीं है, मैं निस्संकोच होकर कहता हूँ कि ये धर्म को नहीं जानते और मेरा विश्वास है कि यह बात कह कर मैं किसी तरह विनय की सीमा को लाँघ नहीं रहा हूँ। आज राजनीति को धर्म से अलग मानने वालों को गांधीजी की यह बात जरूर सुननी चाहिए। अपने इसी विश्वास के कारण गांधीजी ने सामाजिक और धार्मिक ढाँचे के भीतर समानता के संघर्ष को प्रमुखता से आगे बढ़ाया क्योंकि वे जानते थे कि केवल राजनीतिक मुक्ति से उनके सपनों का भारत नहीं बनेगा। उनका मानना था कि करोड़ों वंचितों की सामाजिक-आर्थिक मुक्ति ही स्वाधीन भारत की पहचान होनी चाहिए।

i. गद्यांश को पढ़कर उपयुक्त शीर्षक लिखिए। **(1)**
ii. बीसवीं शताब्दी में भारत में क्या बड़ी घटना हुई? **(1)**
iii. महात्मा गांधी के लिए सामाजिक सुधारों के लिए संघर्ष क्यों महत्त्वपूर्ण था? **(2)**
iv. गांधीजी ने सत्यनारायण के दर्शन की पात्रता क्या मानी थी और क्यों? **(2)**
v. कौन लोग धर्म को नहीं जानते? उनके प्रति गांधीजी ने ऐसी धारणा क्यों बनाई? **(2)**
vi. गांधीजी के विचार से स्वाधीन भारत की पहचान क्या होनी चाहिए? **(2)**
vii. गद्यांश के आधार पर लिखिए कि स्वाधीनता की व्यापक पहचान क्या होनी चाहिए? क्यों? **(2)**

2. **निम्नलिखित काव्यांश को पढ़कर पूछे गए प्रश्नों के उत्तर दीजिए- (1 × 4)** **[4]**

यदि फूल नहीं बो सकते तो काँटे कम-से-कम मत बोओ।
है अगम चेतना की घाटी, कमज़ोर बड़ा मानव का मन

ममता की शीतल छाया में होता कटुता का स्वयं शमन
ज्वालाएँ जब घुल जाती हैं, खुल-खुल जाते हैं मूँदे नयन
होकर निर्मलता में प्रशांत, बहता प्राणों का क्षुब्ध पवन
संकट में यदि मुसका न सको, भय से कातर हो मत रोओ
यदि फूल नहीं बो सकते तो काँटे कम-से-कम मत बोओ।

i. फूल और कॉटे बोने का प्रतीकार्थ क्या है?
ii. मन किन स्थितियों में अशांत होता है और कैसी स्थितियाँ उसे शांत कर देती हैं?
iii. संकट आ पड़ने पर मनुष्य का व्यवहार कैसा होना चाहिए और क्यों?
iv. मन में कटुता कैसे आती है और वह कैसे दूर हो जाती है?

Section B

3. **मनोरंजन के आधुनिक साधन** विषय पर रचनात्मक लेख लिखिए। **[5]**

OR

विज्ञापन की बढ़ती हुई लोकप्रियता विषय पर एक अनुच्छेद लिखिए।

OR

कामकाजी महिलाओं की समस्याएँ विषय पर रचनात्मक लेख लिखिए।

4. निकट के शहर से आपके गाँव तक की सड़क का रख-रखाव संतोषजनक नहीं है। मुख्य अभियंता, लोक-निर्माण विभाग को एक पत्र लिखकर तुरंत कार्यवाही का अनुरोध कीजिए। समस्या के निदान के लिए एक सुझाव भी दीजिए। **[5]**

OR

किसी आपराधिक घटना की अपनी सनसनीखेज़ पड़ताल में कुछ समाचार चैनल जाँच में बाधा डालते हैं और न्यायालयों में मामला पहुँचने से पहले ही आरोपी को अपराधी ठहरा देते हैं। इस प्रवृत्ति पर अपने विचार किसी समाचार-पत्र के संपादक को लिखिए।

5. निम्नलिखित प्रश्नों का उत्तर 15-20 शब्दों में लिखिये: **[5]**
   a) पत्रकारीय लेखन किसे कहते हैं?
   b) स्तंभ लेखन का तात्पर्य समझाए।
   c) संपादन के दो सिद्धांत बताइए।
   d) मुद्रित माध्यम की दो विशेषताएँ बताइए।
   e) समेकित माध्यम किसे कहा जाता है?

6. **बढ़ते अपराध** विषय पर एक आलेख लिखिए। **[5]**

OR

सांप्रदायिकता का ज़हर पर एक फीचर लिखिए।

OR

वर्तमान युग में इंटरनेट की उपयोगिता पर प्रकाश डालिए।

Section C

7. **निम्नलिखित काव्यांश को पढ़कर पूछे गए प्रश्नों के उत्तर लिखिए- (2×3=6)** **[6]**

मैं और, और जुग और, कहाँ का नाता,
मैं बना-बना कितने जुग रोज मिटाता;
जग जिस पृथ्वी पर जोड़ा करता वैभव,
मैं प्रति पग से उस पृथ्वी को ठुकराता!
मैं निज रोदन में राग लिए फिरता हूँ,
शीतल वाणी मे आग लिए फिरता हूँ,
हो जिस पर भूपों के प्रासाद निछावर,
मैं वह खंडहर का भाग लिए फिरता हूँ

i. कविता के आधार पर कवि और जगत के संबंधों को स्पष्ट कीजिए।

ii. सांसारिक वैभव के प्रति कवि का क्या दृष्टिकोण है? इसका क्या कारण है?

iii. 'रोदन में राग' और 'शीतल वाणी में आग' विपरीत से लगने वाले कथनों का आशय समझाइए।

OR

निम्नलिखित काव्यांश को पढ़कर पूछे गए प्रश्नों के उत्तर लिखिए- (2×3=6)

धूत कहो अवधूत कहों, रजपूतु कहीं, जोलहा कहों कोऊ।
कहू की बेटीसों बेटा न ब्याहब, काहूकी जाति बिगार न सौऊ।
तुलसी सरनाम गुलामु हैं राम को, जाको रुच सो कहें कछु ओऊ।
माँग के खैबो, मसीत को सोइबो, लेबोको एकु न दैबको दोऊ।।

i. कवि किन पर व्यंग्य करता है और क्यों?

ii. कवि अपने किस रूप पर गर्व करता है?

iii. कवि समाज से क्या चाहता हैं?

8. **निम्नलिखित काव्यांश को पढ़कर पूछे गए प्रश्नों के उत्तर लिखिए- (2×4=4)** **[4]**

सबसे तेज़ बौछारें गई भादों गया
सवेरा हुआ
खरगोश की आँखों जैसा लाल सवेरा
शरद आया पुलों को पार करते हुए
अपनी नई चमकीली साइकिल तेज़ चलाते हुए

i. शरतकालीन सुबह की उपमा किससे की गई है? क्यों?

ii. मानवीकरण अलंकार किस पंक्ति में प्रयुक्त हुआ है? उसका सौंदर्य स्पष्ट कीजिए।

OR

निम्नलिखित काव्यांश को पढ़कर पूछे गए प्रश्नों के उत्तर लिखिए: (2x2=4)

नभ में पाँती-बँधे बगुलों के पंख,
चुराए लिए जाती वे मेरी आँखें।
कजरारे बादलों की छाई नभ छाया,
तैरती साँझ की सतेज श्वेत काया।

i. काव्यांश के शिल्प-सौंदर्य पर प्रकाश डालिए।

ii. काव्यांश का भाव-सौंदर्य लिखिए।

9. निम्नलिखित प्रश्नों में से किन्ही दो के उत्तर 60-70 शब्दों में दीजिये: **[6]**

a) **बात सीधी थी पर** कविता का प्रतिपाद्य स्पष्ट कीजिए।

b) **उषा** कविता के आधार पर गाँव की सुबह का वर्णन अपने शब्दों में कीजिए।

c) गोरखपुरी की रुबाइयों के कला पक्ष के बारे में बताएँ।

10. **निम्नलिखित गद्यांश को ध्यानपूर्वक पढ़कर पूछे गए प्रश्नों के उत्तर दीजिए- (2×3=6)** **[6]**

सचमुच ऐसे दिन होते जब गली-मुहल्ला, गाँव-शहर हर जगह लोग गरमी में भुन-भुन कर त्राहिमाम कर रहे होते, जेठ के दसतपा बीतकर आषाढ़ का पहला पखवारा भी बीत चुका होता, पर क्षितिज पर कहीं बादल की रेख भी नहीं दिखती होती, कुएँ सूखने लगते, नलों में एक तो बहुत कम पानी आता और आता भी तो आधी रात को भी मानो खौलता हुआ पानी हो। शहरों की तुलना में गाँव में और भी हालत खराब होती थी। जहाँ जुताई होनी चाहिए वहाँ खेतों की मिट्टी सूख कर पत्थर हो जाती, फिर उसमें पपड़ी पड़कर जमीन फटने लगती, लू ऐसी कि चलते-चलते आदमी आधे रास्ते में लू खाकर गिर पड़े। ढोर-ढंगर प्यास के मारे मरने लगते लेकिन बारिश का कहीं नाम निशान नहीं, ऐसे में पूजा-पाठ कथा-विधान सब करके लोग जब हार जाते तब अंतिम उपाय के रूप में निकलती यह इंदर सेना। वर्षा के बादलों के स्वामी हैं इंद्र और इंद्र की सेना टोली बाँधकर कीचड़ में लथपथ निकलती, पुकारते हुए मेघों को, पानी माँगते हुए प्यासे गलों और सूखे खेतों के लिए।

i. लोगों की परेशानी का क्या कारण था?

ii. गाँव में लोगों की क्या दशा होती थी?

iii. इंदर सेना क्या है? वह क्या करती हैं?

OR

निम्नलिखित गद्यांश को ध्यानपूर्वक पढ़कर पूछे गए प्रश्नों के उत्तर दीजिए- (2×3=6)

शिरीष का फूल संस्कृत-साहित्य में बहुत कोमल माना गया है। मेरा अनुमान है कि कालिदास ने यह बात शुरू-शुरू में प्रचार की होगी। उनका इस पुष्प पर कुछ पक्षपात था (मेरा भी है)। कह गए है, शिरीष पुष्प केवल भौंरों के पदों का कोमल दबाव सहन कर सकता है, पक्षियों का बिल्कुल नहीं–"पदं सहेत भ्रमरस्य पेलवं शिरीष पुष्पं न पुनः पतत्रिणाम्।" अब मैं इतने बड़े कवि की बात का विरोध कैसे करूँ? सिर्फ विरोध करने की हिम्मत न होती तो भी कुछ कम बुरा नहीं था, यहाँ तो इच्छा भी नहीं है।

खैर, मै दूसरी बात कह रहा था। शिरीष के फूलों की कोमलता देखकर परवर्ती कवियों ने समझा कि उसका सब कुछ कोमल है। यह भूल है। इसके फल इतने मज़बूत होते हैं कि नए फूलों के निकल आने पर भी स्थान नहीं छोड़ते।

जब तक नए फल-पत्ते मिलकर, धकियाकर उन्हें बाहर नहीं कर देते तब तक वे डटे रहते हैं। वसंत के आगमन के समय जब सारी वनस्थली पुष्प-पत्र से मर्मरित होती रहती है, शिरीष के पुराने फल बुरी तरह खड़खड़ाते रहते हैं। मुझे इनको देखकर उन नेताओं की बात याद आती है, जो किसी प्रकार जमाने का रुख नहीं पहचानते और जब तक नई पौध के लोग उन्हे धक्का मारकर निकाल नहीं देते तब तक जमे रहते हैं।

i. प्रस्तुत गद्यांश के पाठ तथा लेखक का नाम लिखिए।

ii. शिरीष के पुष्प की कोमलता के बारे में कालिदास का क्या कहना था?

iii. लेखक कालिदास की बात का विरोध क्यों नहीं कर पा रहा था?

11. निम्नलिखित A, B, C प्रश्नों में से किन्हीं दो प्रश्नों का उत्तर दीजिये, प्रश्न D अनिवार्य है : (4+4+2) **[10]**

a) बाज़ार दर्शन निबंध उपभोक्तावाद एवं बाज़ारवाद की अंतर्वस्तु को समझाने में बेजोड़ है।-उदाहरण देकर इस कथन पर अपने विचार प्रस्तुत कीजिए।

b) **नमक** कहानी में क्या संदेश छिपा हुआ है? स्पष्ट कीजिए।

c) दो कन्या-रत्न पैदा करने पर भक्तिन पुत्र-महिमा में अंधी अपनी जिठानियों द्वारा घृणा व उपेक्षा का शिकार बनी। ऐसी घटनाओं से ही अकसर यह धारणा चलती है कि स्त्री ही स्त्री की दुश्मन होती है। क्या इससे आप सहमत हैं?

d) चार्ली चैप्लिन की सावभौमिकता का क्या कारण है?

12. निम्नलिखित प्रश्नों में से किन्हीं तीन के उत्तर 80-100 शब्दों में दीजिये: **[12]**

a) **समहाउ इंप्रापर** वाक्यांश का प्रयोग यशोधर बाबू लगभग हर वाक्य के प्रांरभ में तकिया कलाम की तरह करते हैं। इस वाक्यांश का उनके व्यक्तित्व और कहानी के कथ्य से क्या संबंध बनता है?

b) **सिल्वर वैडिंग** वर्तमान युग में बदलते जीवन-मूल्यों की कहानी है। सोदाहरण स्पष्ट कीजिए।

c) श्री सौंदलगेकर के अध्यापन की उन विशेषताओं को रेखांकित करें जिन्होंने कविताओं के प्रति लेखक आनंद यादव के मन में रूचि जगाई।

d) लेखक ने मुअनजो-दड़ो शहर के टूटने या उजड़ने के बारे में क्या कल्पना की है?

e) अतीत में दबे पाँव के आधार पर सिंधु घाटी सभ्यता की प्रमुख विशेषताओं की चर्चा कीजिए।

Atomic Energy Central School No. 4 Rawatbhata

Confidence Examination – II (2019-20)

CLASS XII, Physical Education (048)

Time Allowed: 3 Hrs Max. Marks: 70

GENERAL INSTRUCTIONS:

1) The question paper consists of 34 questions

2) All questions are compulsory.

3) Question 1-20 carry 1 mark and are multiple choice questions.

4) Question 21-30 carry 3 marks each and should not exceed 80 -100 words each.

5) Question 31-34 carry 5 marks and should not exceed 150-200 words.

Q.1.Extramural sports organized by

a) SGFI b) CBSE c) Khelo India d) All of these 1

Q.2.Which of the following is not a Specific Sports program?

a) Sports Day b) Health Run c) Run for Fun d) Olympics 1

Q.3.Which disease is caused due to the deficiency of Vit B?

a) Pellagra b) Scurvy c) Osteomalacia d) Mental Retardation 1

Q.4.Which is not a Food Intolerance chemicals?

a) Antioxidants b) Amine c) Salicylates d) Chromium 1

Q.5.In which year,Indian Woman participated in the Olympics for the first time?

a) 1896 b) 1947 c) 1952 d)None 1

Q.6.Who is associated with Weight Lifting.

a)Sakshi Malik b) Mary Kom c) Karnam Malleshwari d) Anju Bobby George 1

Q.7.In which of the following disorder, Sensory stimulation is recommended?

a) ADHD b) ODD c) SPD d) OCD 1

Q.8.The possible cause of Down syndrome and Fragile X syndrome is

a) Accidents b) Genetics c) Infection d) Malnutrition 1

Q.9.Menarche means

a) First pregnancy b) Absence of menses c) First menses d) Miscarriage 1

Q.10.Which of the following is not the corrective measure for round shoulders?

a) Hanging on wall bars b) Dhanur asana c) Chakra asana d) Horse riding 1

Q.11.Six minutes walk test is conducted to measure

a) Speed b) Cardiovascular fitness c) Motor fitness d) Endurance 1

Q.12.Which test is used to measure agility in senior citizens?

a) Eight feet up & go test b) Chair Stand Test c) Back Stretch d) None of these 1

Q.13.Which of the is a external injury?

a) Contusion b) Joint Dislocation c) Sprain d) Strain 1

Q.14.This is the amount of blood pumped out by each ventricle per minute.

a) Stroke volume b) Cardiac output c) Tidal volume d) None of these 1

Q.15.The angle at a joint decreases during

a) Adduction b) Abduction. c) Flexion d) Extension 1

Q.16.Newton's first law of motion is also known as

a) Law of Acceleration b) Law of Inertia c) Law of Learning d) None 1

Q.17.The philosopher who divided personality into four types :i.e type A,B,C and D is

a) Friedman & Rosenman b) William Sheldon c) Spranger d) Watson & Mayer 1

Q.18.Which type of motivation includes biological motivation?

a) Secondary motivation b) Extrinsic motivation c) Intrinsic motivation d) None 1

Q.19.Which of the following is not an Endurance developing method?

a) Continuous training b) Interval training c) Circuit training d) Fartlek method 1

Q.20.Which of the following is not a type of Coordinative ability?

a) Coupling ability b) Reaction ability c) Orientation ability d) understanding ability 1

Q.21.Explain any three types of Combination tournament with example. 3

Or

Discuss the objectives of Planning.

Q.22.Define Balance Diet. Explain Nutritive and Non-Nutritive components of Diet. 3

Q.23.Define and Classify Asanas. Explain how asanas act as a preventive measures in curing health problems. 3

Q.24.Differentiate between Disability and Disorder with example. 3

Q.25.Explain the factors responsible for less participation of women in sports. 3

Q.26.Describe Harward Step test.Write its advantages and disadvantages. 3

Q.27.Explain the physiological factors determining Strength. 3

Or

What are the changes occur due to Ageing.

Q.28.What is Friction. Explain the advantages and disadvantages of friction in the field of sports. 3

Q.29.What is Aggression? Explain its causes and types. 3

Or

Differentiate between Fartlek training and Circuit training.

Q.30.Exercises is important means to build great health, improve fitness and ensure longevity.Justify. 3

Q.31.Draw a Knockout cum league fixture of 17 teams. Explain all the steps. 5

Q.32.Describe the types of Motor development in Children. Explain the factors affecting motor development. 5

Q.33.What do you mean by Motivation? Describe its techniques that can be applied for promotion of sports. 5

Q.34.Deine Speed. Explain its types and methods to develop speed. 5

Or

Explain the effects of exercises on the Cardiovascular system

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Solution

Class 12 - Chemistry

Confidence Examination- II (2019-20)

Section A

1. i. The passage of current liberates H_2 at cathode & Cl_2 at the anode. The solution is (b) NaCl in water.

   ii. Oxygen is obtained at the anode on electrolysis of dilute H_2SO_4 using platinum electrodes as a product.

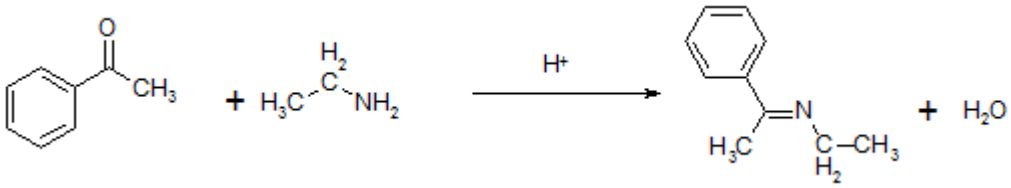
   iii. Sulphuric acid

   iv. $V = \frac{ItV_e}{96500} = \frac{1 \times 965 \times 5.6 \times 10^3}{96500} = 56mL$

   v. For a galvanic cell, Free energy change decreases i.e., $\Delta G < O$.

2. The iron which is obtained from blast furnace and contains about 4% carbon and many other impurities like S, P, Si, Mn etc. in smaller amounts, is called pig iron.
3. Monosaccharides: Ribose, 2-deoxyribose, galactose, fructose
   Disaccharides: Maltose, lactose
4. Uracil, cytosine, guanine and adenine are present in RNA. Among these, uracil is not present in DNA.
5.

Homopolymer	Copolymer
PVC	Buna – S
Polystyrene	Buna – N
Neoprene	
Teflon	

6. 

7. **(d)** elimination competes over substitution and alkenes are easily formed

   Explanation: The formation of ethers by dehydration of the alcohol is a bimolecular reaction (S_N2) involving the attack of an alcohol molecule on a protonated alcohol molecule. In the method, the alkyl group should be unhindered. In case of secondary or tertiary alcohols, the alkyl group is hindered. As a result, elimination dominates substitution as 3° carbocation is more stable.
   Hence, in place of ethers, alkenes are formed.

8. **(c)** Cu + SO_2

   Explanation: This auto reduction reaction gives metallic copper and sulphur dioxide.
   $2Cu_2O + Cu_2S \rightarrow 6\ Cu + SO_2$

9. **(b)** Mn^{2+}

   Explanation: For Manganese, +2 is most stable oxidation state because of d^5 configuration.

10. **(a)** Linkage isomerism

    Explanation: SCN^- is an ambidentate ligand i.e it can bind through two different donor atoms, either through S in SCN^- or through N in NCS^- . So it shows linkage isomerism which arises when an ambidentate ligand is present in the complex.

11. **(d)** Both Nylon and Polyesters
    Explanation: Nylon and polyesters are fibres and have strong intermolecular forces. Fibres are the thread forming solids which possess high tensile strength and high modulus. These characteristics can be attributed to the strong intermolecular forces like hydrogen bonding.

12. **(b)** Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
    Explanation: Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the

assertion.

13. **(a)** Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
Explanation: Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.

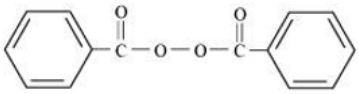
14. **(b)** Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
Explanation: Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

15. **(b)** Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
Explanation: Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

16. **(d)** Assertion is INCORRECT but, reason is CORRECT.
Explanation: Assertion is INCORRECT but, reason is CORRECT.

Section B

17. One common initiator used in free radical addition polymerization is benzoyl peroxide $(C_6H_5O)_2O_2$. Its structure is given below.



18. The minimum extra energy over and above the average potential energy of the reactants which must be supplied to the reactants to enable them to cross over the energy barrier between reactants and products is called activation energy.

19. A...B interaction is more than A...A and B....B interaction. So there is increased attractive forces between molecules of A and B. Hence there is a sight reduction in volume and so the mixture shows negative deviation from Raoult's law.

20. i. When one mole of $CoCl_3.6NH_3$ is mixed with $AgNO_3$, three moles of AgCl are precipitated which indicates that three ionisable chloride ions in the complex are present. Hence, its structural formula is $[Co(NH_3)_6]Cl_3$.
ii. IUPAC name of the complex $[Co(NH_3)_6]Cl_3$ is Hexa ammine cobalt (III) chloride.

21. Ethylene diamine (en) is bidentate ligand $[Co(en)_3]^{3+}$. Its IUPAC name is tris (ethylene diamine) cobalt (III) ion.

OR

dsp^2

22. **Uses:**
i. Zinc is used for galvanizing iron.
ii. Zinc dust is used as a reducing agent in the manufacture of dye-stuffs, paints, etc.

OR

$FeCr_2O_4$ is fused with Na_2CO_3 in the presence of air it gives a yellow solution of compound (A).

$$4FeCr_2O_4 + 8Na_2CO_3 + 7O_2 \rightarrow \underset{(A)}{8Na_2CrO_4} + 2Fe_2O_3 + 8CO_2$$

Compound (A) on acidification gives compound (B).

$$2Na_2CrO_4 + 2H^+ \longrightarrow \underset{(B)}{Na_2Cr_2O_7} + 2Na^+ + H_2O$$

Compound (B) on reaction with KCl forms an orange coloured compound (C).

$$Na_2Cr_2O_7 + 2KCl \longrightarrow \underset{(C)}{K_2Cr_2O_7} + 2NaCl$$

An acidified solution of compound (C) oxidises Na_2SO_3 to (D).

$$K_2Cr_2O_7 + 3Na_2SO_3 + 4H_2SO_4 \longrightarrow \underset{(D)}{3Na_2SO_4} + K_2SO_4 + Cr_2(SO_4)_3 + 4H_2O$$

Therefore,

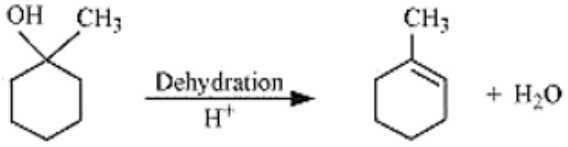
A = Na_2CrO_4 = Sodium chromate,

B= $Na_2Cr_2O_7$ = Sodium dichromate,

C= $K_2Cr_2O_7$ = Potassium dichromate,

D= Na_2SO_4 = Sodium sulfate

23. i.



1 – Methylcyclohexanol — 1 – Methylcyclohexene (Major product)

ii. $CH_3CH_2CH_2CH_2OH \xrightarrow[H^+]{\text{Dehydration}} CH_3CH=CHCH_3 + H_2O$

Butan-1-ol — But-2-ene (Major product)

Section C

24. According to the question, a solution containing 1.9 g per 100 mL of KCl (M = 74.5 g mol^{-1}) is isotonic with a solution containing 3 g per 100 mL of urea (M = 60 g mol^{-1}).

As solution is isotonic,

π_1 (urea) = π_2 (KCI)

$\Rightarrow C_1RT = iC_2RT$

$\Rightarrow \frac{n_1}{V1} = i\frac{n_2}{V2}$ ($\because V_1 = V_2$)

$\Rightarrow \frac{3}{60} = i \times \frac{1.9}{74.5}$

$\Rightarrow$ i = 1.96

We know that, $\alpha = \frac{i-1}{n-1}$

$= \frac{1.96-1}{2-1}$

$= 0.96$

= 96%

25. Radioactive decay follows first order kinetics,

Decay constant (K) $= \frac{0.693}{t_{1/2}}$

$= \frac{0.693}{5730} year^{-1}$

$t = \frac{2.303}{k} \log \frac{[R]_0}{[R]}$

$= \frac{2.303}{0.693/5730\ year^{-1}} \log \frac{100}{80}$

$= \frac{2.303 \times 5730}{0.693} \times 0.0969\ year$

= 1845 years

OR

i)

In terms of reactant	In terms of products
i) $R_1 = \frac{-1}{4}\frac{\Delta[NH_3]}{\Delta t}$	i) $R_3 = \frac{1}{4}\frac{\Delta[NO]}{\Delta t}$
ii) $R_2 = \frac{-1}{5}\frac{\Delta[O_2]}{\Delta t}$	ii) $R_4 = \frac{1}{6}\frac{\Delta[H_2O]}{\Delta t}$

$Rate = -\frac{1}{4}\frac{\Delta[NH_3]}{\Delta t} = -\frac{1}{5}\frac{\Delta[O_2]}{\Delta t} = \frac{1}{4}\frac{\Delta[NO]}{\Delta t} = \frac{1}{6}\frac{\Delta[H_2O]}{\Delta t}$

ii)

In terms of reactant	In terms of product
$R_1 = -\frac{1}{2}\frac{\Delta[N_2O_5]}{\Delta t}$	$R_2 = \frac{1}{2}\frac{\Delta[NO_2]}{\Delta t}$

	$R_3 = \frac{\Delta[O_2]}{\Delta t}$

$$Rate = -\frac{1}{2}\frac{\Delta[N_2O_5]}{\Delta t} = \frac{1}{2}\frac{\Delta[NO_2]}{\Delta t} = \frac{\Delta[O_2]}{\Delta t}$$

26. $Mg(s) \longrightarrow Mg^{2+}(aq) + 2e^-$

$Cu^{2+}(aq) + 2e^- \longrightarrow Cu(s)$

$Mg(s) + Cu^{2+}(aq) \longrightarrow Mg^{2+}(aq) + Cu(s)$

$$E_{cell} = E^0_{cell} - \frac{0.0591}{2}\log\frac{[Mg^{2+}]}{[Cu^{2+}]}$$

$$E^0_{cell} = \left[E^0\frac{(Cu^{2+})}{(Cu)} - E^0(Mg^{2+}/Mg)\right]$$

$$E_{cell} = [+0.34V - (-2.37V)] - \frac{0.0591}{2}\log 10^2$$

= (0.271 V - 0.0591)V

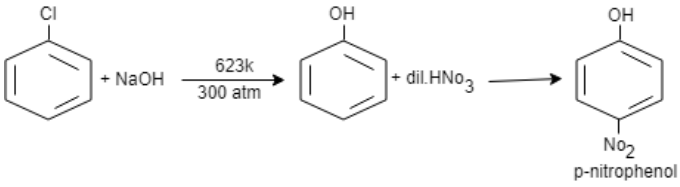
= 2.65 V

27. Fluorine is a much stronger oxidizing agent than chlorine. The oxidizing power depends on three factors.
    1. Bond dissociation energy
    2. Electron gain enthalpy
    3. Hydration enthalpy

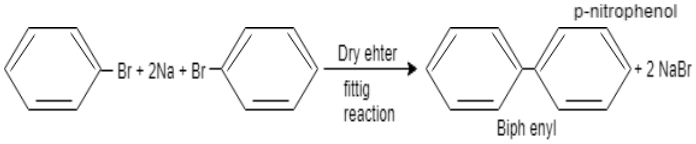
    The electron gain enthalpy of chlorine is more negative than that of fluorine. However, the bond dissociation energy of fluorine is much lesser than that of chlorine. Also, because of its small size, the hydration energy of fluorine is much higher than that of chlorine. Therefore, the latter two factors more than compensate for the less negative electron gain enthalpy of fluorine. Thus, fluorine is a much stronger oxidizing agent than chlorine.

28. Steps involved in the following conversions are as under:

    i.

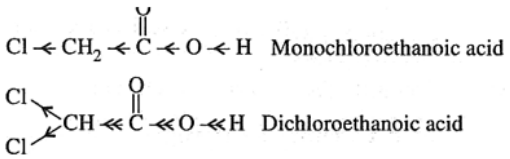


    ii.



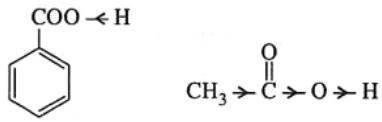
    iii. $CH_3 - CH = CH_2 \xrightarrow[Peroxide]{HBr} CH_3CH_2CH_2Br \xrightarrow[\Delta]{ar\cdot KOH} \underset{\text{Propan-1-ol}}{CH_3CH_2CH_2OH}$

29. i.

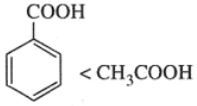


    Chlorine atom exerts -I Inductive effect. This helps in the release of protons. There is one chlorine atom in monochloroethanoic acid and two chlorine atoms in dichloroethanoic acid. Due to smaller -I Inductive effect in monochloroethanoic acid than dichloroethanoic acid, the former (Monochloroethanoic acid) is weaker acid than the latter.

    ii.

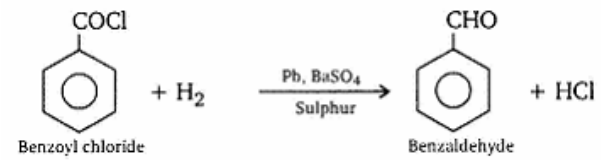


    Benzene ring withdraws electrons towards itself due to resonance. On the other hand, $-CH_3$ group is electron donating group. Therefore, the release of protons in benzoic acid will be increased while it will be decreased in the case of ethanoic acid. Thus, benzoic acid is a stronger acid than ethanoic acid:



OR

i. **Rosenmund reaction:** Rosenmund reduction is a hydrogenation process in which an acyl chloride is selectively reduced to an aldehyde. The reaction is catalysed by palladium on barium sulfate, which is sometimes called the Rosenmund catalyst. Suphur is added as a poison, to control the activity of reactive acyl chlorides. For example, benzoyl chloride is treated with hydrogen in presence of palladium and $BaSO_4$ with sulphur to form benzaldehyde.



ii. **Cannizzaro's reaction:** Aldehydes which do not contain any α-hydrogen atom such as methanal (HCHO) and benzaldehyde (C_6H_5CHO) undergo self oxidation and reduction reaction on treatment with concentrated alkali. In this reaction, one molecule of the aldehyde is reduced to alcohol while another is oxidised to carboxylic acid salt.

$$\underset{Methanal}{HCHO} + \ HCHO \xrightarrow{NaOH} \underset{Methanol}{CH_3OH} + \underset{Sodium\ Formula}{HCOONa}$$

$$\underset{Benzaldehyde}{C_6H_5CHO} + \ C_6H_5CHO \xrightarrow{NaOH} \underset{Benzylalcohol}{C_6H_5CH_2OH} + \underset{Sodium\ Benzoate}{C_6H_5COONa}$$

30. i. **Broad-spectrum antibiotics:** Antibiotics which kill or inhibit a wide range of Gram-positive and Gram-negative bacteria.
Example- Chloramphenicol

ii. **Cationic detergents:** Cationic detergents are quarternary ammonium salts of amines with acetates, chlorides or bromides as anions where cationic part is involved in cleansing action.
Example – Cetyltrimethylammonium bromide.

iii. **Disinfectants:** The chemicals which either kill or prevent the growth of microorganisms when applied to inanimate objects such as floors, drainage system, instruments, etc.
Example – 1% Phenol solution.

Section D

31. Reactions involved for the electrochemical cells are

At anode:

$Ni(s) \rightarrow Ni^{2+}(1M) + 2e^-$

At Cathode:

$Ag^+(1M) + 2e^- \rightarrow 2Ag(s)$

Net cell reaction:

$Ni(s) + 2Ag^+(aq) \rightarrow Ni^{2+}(aq) + 2Ag(s)$

For this reaction, n=-2 moles of electrons.

For standard emf of the cell, we have

$E^{\Theta}_{cell} = E^{\Theta}_{cathode} - E^{\Theta}_{anode}$

= 0.80 - (-0.25)

= 1.05 V

To find the emf of the cell, we use Nernst equation.

$E_{cell} = E^{\Theta}_{cell} - \frac{0.059}{n}\log\frac{[Ni^{2+}]}{[Ag^+]^2}$

$E_{Cell} = 1.05 - \frac{0.059}{2}\log(\frac{1}{1})$

$= 1.05 - \frac{0.059}{2}(0)$

= 1.05V

$\therefore E_{cell} = 1.05\ V$

OR

We have,

C = 0.025 mol L^{-1}

$\Lambda_m = 46.1\ S\,cm^2\ mol^{-1}$

$\lambda^{\circ}\left(H^+\right) = 349.6\ S\,cm^2\ mol^{-1}$

$\lambda^{\circ}(HCOO^{-}) = 54.6\, S\, cm^2\, mol^{-1}$

From Kohlraush law of independent migration of ions,

$\Lambda_m^o(HCOOH) = \lambda^{\circ}(H^+) + \lambda^{\circ}(HCOO^-)$

= 349.6 + 54.6 = 404.2 S cm^2 mol^{-1}

Now;

$$\underset{c-a_\alpha}{HCOOH} + \underset{0}{H_2O} \rightleftharpoons \underset{+c_a}{HCOO^-} + \underset{+c_\alpha}{H_3O^+} \quad \begin{matrix} at\ t{=}0s \\ at\ t{=}1s \end{matrix}$$

$$K_a = \frac{(c\alpha)\,(c\alpha)}{(c-c\alpha)} = \frac{c\alpha^2}{1-\alpha}$$

Now, degree of dissociation:

$$\alpha = \frac{A_m(HCOOH)}{A_m^0(HCOOH)} = \frac{46.1}{404.2}$$

= 0.114 (approximately)

Thus, dissociation constant:

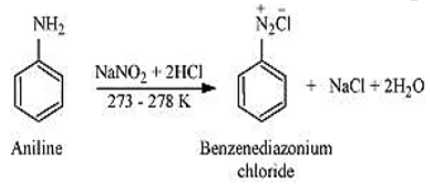
$$K_a = \frac{c\alpha^2}{(1-\alpha)}$$

$$= \frac{(0.025\ mol\ L^{-1})(0.114)^2}{(1-0.114)} = 3.67 \times 10^{-4}\ mol\ L^{-1}$$

32. i. **Carbylamine reaction:** Carbylamine reaction is used as a test for the identification of primary amines. When aliphatic and aromatic primary amines are heated with chloroform and ethanolic potassium hydroxide, carbylamines (or isocyanides) are formed. These carbylamines have very unpleasant odours. Secondary and tertiary amines do not respond to this test. For example,

$$\underset{Methana\,\min e}{CH_3-NH_2} + CHCl_3 + 3KOH(alc.) \xrightarrow{\Delta} \underset{Methyl\ carbyla\,\min e}{CH_3-NC} + 3KCl + 3H_2O$$

ii. **Diazotisation:** Aromatic primary amines react with nitrous acid (prepared in situ from $NaNO_2$ and HCl) at 273 - 278 K to form diazonium salts. This conversion of aromatic primary amines into diazonium salts is known as diazotization. For example,

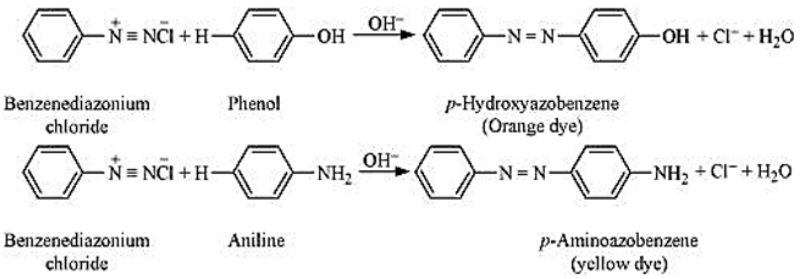


iii. **Hoffmann bromamide reaction:** When an amide is treated with bromine in an aqueous or ethanolic solution of sodium hydroxide, a primary amine with one carbon atom less than the original amide is produced. This degradation reaction is known as Hoffmann bromamide reaction. This reaction involves the migration of an alkyl or aryl group from the carbonyl carbon atom of the amide to the nitrogen atom. For example,

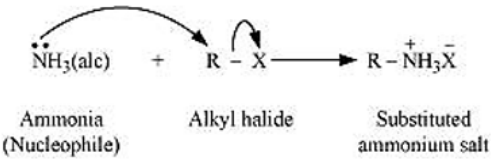
$$\underset{Ethanamide}{CH_3-\overset{\overset{O}{\|}}{C}-NH_2} + Br_2 + 4NaOH \rightarrow \underset{Methana\,\min e}{CH_3-NH_2} + Na_2CO_3 + 2NaBr + 2H_2O$$

$$\underset{Benzamide}{C_6H_5-\overset{\overset{O}{\|}}{C}-NH_2} + Br_2 + 4NaOH \rightarrow \underset{Aniline}{C_6H_5-NH_2} + Na_2CO_3 + 2NaBr + 2H_2O$$

iv. **Coupling reaction:** The reaction of joining two aromatic rings through the - N = N - bond is known as coupling reaction. Benzene diazonium salt reacts with phenol or aromatic amines to form coloured azo compounds.



v. **Ammonolysis:** When an alkyl or benzyl halide is allowed to react with an ethanolic solution of ammonia, it undergoes nucleophilic substitution reaction in which the halogen atom is replaced by an amino $(-NH_2)$ (-NH_2) group. This process of cleavage of the carbon-halogen bond is known as ammonolysis.



When this substituted ammonium salt is treated with a strong base such as sodium hydroxide, amine is obtained.

$$R-\overset{+}{N}H_3\overset{-}{X}\ +\ NaOH \rightarrow \underset{A\,\min e}{R-NH_2}+\ H_2O\ +\ NaX$$

Though primary amine is produced as the major product, this process produces a mixture of primary, secondary and tertiary amines, and also a quaternary ammonium salt as shown.

$$\underset{(1^\circ)}{RNH_2} \xrightarrow{RX} \underset{(2^\circ)}{R_2NH} \xrightarrow{RX} \underset{(3^\circ)}{R_3N} \xrightarrow{RX} \underset{Quaternary\ ammonium\ salt}{R_4\overset{+}{N}\overset{-}{X}}$$

OR

(i), (ii) The structures and IUPAC names of different isomeric amines corresponding to the molecular formula, $C_4H_{11}N$ are given below:

a. $CH_3-CH_2-CH_2-CH_2-NH_2$
Butanamine(1°)

b. $CH_3-CH_2-\underset{|}{\overset{NH_2}{C}}H-CH_3$
Butan-2-amine (1°)

c. $CH_3-\underset{|}{\overset{CH_3}{C}}H-CH_2-NH_2$
2-Methylpropanamine (1°)

d. $CH_3-\underset{|}{\overset{CH_3}{\underset{|}{C}}}-NH_2$
2-Methylpropan-2-amine (1^o)

e. $CH_3-CH_2-CH_2-NH-CH_3$
N-Methylpropanamine (2°)

f. $CH_3-CH_2-NH-CH_2-CH_3$
N-Ethylethanamine (2°)

g. $CH_3-\underset{|}{\overset{CH_3}{C}}H-NH-CH_3$
N-Methylpropan-2-amine (2°)

h. $CH_3-CH_2-\underset{|}{\overset{CH_3}{N}}-CH_3$
N, N- Dimethylethanamine (3°)

(iii) The pairs (a) and (b) and (e) and (g) exhibit position isomerism.
The pairs (a) and (c); (a) and (d); (b) and (c); (b) and (d) exhibit chain isomerism.
The pairs (e) and (f) and (f) and (g) exhibit metamerism.
All primary amines exhibit functional isomerism with secondary and tertiary amines and vice-versa.

33. a. Transition elements show variable oxidation states that differ by 1 unit. p-block elements show variable oxidation states that differ by 2 units.
Heavier transition elements are stable in higher oxidation state whereas p-block elements are stable in lower oxidation state.

b. Transition metals exhibit higher enthalpies of atomization because of strong interatomic interactions and strong metallic bonding between atoms.

c. Element: Cerium or Terbium.
It is a strong oxidizing agent.

d. The steady decrease in atomic radii with an increase in the atomic number due to the poor shielding effect of 4f orbital electrons is known as lanthanoid contraction.
Consequence: 5d series have almost same size as 4d series.

e. Ionic equation:
$Cr_2O_7^{2-} + 14\ H^+ + 6\ Fe^{2+} \rightarrow 2\ Cr^{3+} + 6\ Fe^{3+} + 7\ H_2O$

OR

a. i. $5Fe^{2+}\ (aq) + MnO_4^-\ (aq) + 8H^+\ (aq) \rightarrow Mn^{2+}\ (aq) + 4H_2O(l) + 5Fe^{3+}\ (aq)$

ii. $Cr_2O_7^{2-}\ (aq) + 6I^-\ (aq) + 14H^+\ (aq) \rightarrow 2Cr^{3+}\ (aq) + 7H_2O(l) + 3I_2\ (g)$

b. i. The transition metals have voids in their crystal lattice into which small atoms like H, C, N are trapped inside resulting in the formation of interstitial compounds.

ii. Cr^{2+} ion is reducing as its configuration changes from d^4 (in Cr^{+2}) to d^3 (in Cr^{+3}), the latter +3 oxidation state is stable because it has half filled t_{2g} configuration. While Mn^{+3} is oxidizing as its configuration changes from d^4 (in Mn^{+3}) to d^5 (in Mn^{+2}), the latter +2 oxidation state is stable due to half filled d^5 configuration.

iii. Because of large number of unpaired electrons in their atoms they have stronger interatomic interaction and hence stronger bonding between atoms resulting in higher enthalpies of atomization.

Solution

Class 12 - Mathematics

Confidence Examination - II (2019-20)

Section A

1. **(a)** K^{n-1} Adj. A

   Explanation: Adj. (KA) = K^{n-1} Adj.A, where K is a scalar and A is a n $\times$ n matrix.

2. **(d)** abc

   Explanation: $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix}$

   $\Rightarrow abc\begin{vmatrix} 1+\frac{1}{a} & \frac{1}{a} & \frac{1}{a} \\ \frac{1}{b} & 1+\frac{1}{b} & \frac{1}{b} \\ \frac{1}{c} & \frac{1}{c} & 1+\frac{1}{c} \end{vmatrix}$

   Apply, $R_1 \rightarrow R_1 + R_2 + R_3$

   $abc\begin{vmatrix} 1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c} & 1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c} & 1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c} \\ \frac{1}{b} & 1+\frac{1}{b} & \frac{1}{b} \\ \frac{1}{c} & \frac{1}{c} & 1+\frac{1}{c} \end{vmatrix} \left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=0\right)$

   $\Rightarrow abc\begin{vmatrix} 1 & 1 & 1 \\ \frac{1}{b} & 1+\frac{1}{b} & \frac{1}{b} \\ \frac{1}{c} & \frac{1}{c} & 1+\frac{1}{c} \end{vmatrix}$

   Apply $C_2 \rightarrow C_2 - C_1$, $C_3 \rightarrow C_3 - C_1$

   $\Rightarrow abc\begin{vmatrix} 1 & 0 & 0 \\ \frac{1}{b} & 1 & 0 \\ \frac{1}{c} & 0 & 1 \end{vmatrix}$

   expanding along R_1

   $\Rightarrow$(abc)(1) (1 - 0) =abc

3. **(b)** $\frac{\sin^2(a+y)}{\sin a}$

   Explanation: $x\sin(a+y)=\sin y \Rightarrow x=\frac{\sin y}{\sin(a+y)}$

   $\Rightarrow \frac{dx}{dy}=\frac{\sin(a+y)\cos y-\sin y\cos(a+y)}{\sin^2(a+y)}$

   $=\frac{\sin(a+y-y)}{\sin^2(a+y)}=\frac{\sin a}{\sin^2(a+y)}$

   $\Rightarrow \frac{dy}{dx}=\frac{\sin^2(a+y)}{\sin a}$

4. **(a)** $\frac{25}{216}$

   Explanation: When a die is tossed , then the doublets are { (1,1),(2,2),(3,3),(4,4),(5,5),(6,6)}. Therefore,probability of getting doublet= p= $\frac{6}{36} = \frac{1}{6}$ and q = 1 – $\frac{1}{6} = \frac{5}{6}$. Let x be the number of successes , then x has the binomial distribution with : n = 4 , p = $\frac{1}{6}$, q = $\frac{5}{6}$ $\therefore p(x=r)={}^nC_r q^{n-r}p^r$. P (2 successes) = P (x = 2) = ${}^4C_2\left(\frac{5}{6}\right)^{4-2}\left(\frac{1}{6}\right)^2=\frac{25}{216}$.

5. **(c)** $\frac{1}{5}$

   Explanation: Since A and B are independent events. Therefore,

   P(A $\cap$ B) = P(A).P(B)

   P(A $\cup$ B)=P(A) + P(B) - P(A $\cap$ B)

   $\Rightarrow \frac{3}{5}=\frac{1}{2}+$p - P(A).P(B) $\Rightarrow \frac{1}{10}=p-\frac{1}{2}p \Rightarrow p=\frac{1}{5}$

6. **(d)** $p = \frac{q}{2}$

   Explanation: We have Z = px + qy , At (3, 0) Z = 3p .....(1)
   At (1 , 1) Z = p + q .....(2) Therefore , from (1) and (2) : We have : p = q/2 .

7. **(c)** None of these

   Explanation: we know that, $\sin 2\theta = \frac{2\tan\theta}{1+\tan^2\theta}$, $\cos 2\theta = \frac{1-\tan^2\theta}{1+\tan^2\theta}$ and $\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta}$

8. **(b)** 2

   Explanation: $\because \int_0^5 (1 + f(x))dx = 7$

   $\therefore \int_0^5 dx + \int_0^5 f(x)dx = 7$

   $\Rightarrow [x]_0^5 + \int_0^5 f(x)dx = 7$

   $\Rightarrow \int_0^5 f(x)dx = 7 - 5 = 2,$

   Also, $\int_{-2}^5 f(x)dx = 4$

   $\Rightarrow \int_{-2}^0 f(x)dx + \int_0^5 f(x)dx = 4$

   $\Rightarrow \int_{-2}^0 f(x)dx = 2$

9. **(c)** $\frac{5}{2},\ 5,\ -5$

   Explanation: The given equation of plane is 2x + y – z = 5. To find X- intercept , put y = 0 and z = 0 , we get : 2x = 5 $\Rightarrow$ x = 5/2.
   To find Y- intercept, put x = 0 and z = 0 , we get : y = 5. To find Z- intercept, put x = 0 and y = 0 , we get : z = -5 .

10. **(b)** $\left|\overrightarrow{a}\right|\left|\overrightarrow{b}\right|\sin\theta\hat{n}$

    Explanation: If θ is the angle between vectors $\vec{a}\ and\ \vec{b}$ then, the cross product : $\vec{a} \times \vec{b} = \left|\overrightarrow{a}\right|\left|\overrightarrow{b}\right|\sin\theta\hat{n}$.

11. pq
12. 0
13. skew symmetric
14. x + y - z = 2

    OR

    Parallel
15. 7

    OR

    $\frac{2}{3}$
16. Multiplying R_1 by a, R_2 by b, R_3 by c and dividing by abc, we get

    L.H.S $= \frac{1}{abc}\begin{vmatrix} a^2 & a^3 & abc \\ b^2 & b^3 & abc \\ c^2 & c^3 & abc \end{vmatrix}$

    Taking abc common from C_3

    $= \frac{abc}{abc}\begin{vmatrix} a^2 & a^3 & 1 \\ b^2 & b^3 & 1 \\ c^2 & c^3 & 1 \end{vmatrix}$

$= \begin{vmatrix} 1 & a^2 & a^3 \\ 1 & b^2 & b^3 \\ 1 & c^2 & c^3 \end{vmatrix} \begin{bmatrix} C_1 \leftrightarrow C_2 \\ C_2 \leftrightarrow C_2 \end{bmatrix}$

Hence Prove

17. Here, $x^2 + 4x + 8 = x^2 + 4x + 4 + 4$

$= (x + 2)^2 + (2)^2$

Now, $\int \frac{dx}{x^2+4x+8} = \int \frac{dx}{(x+2)^2+(2)^2}$

$= \frac{1}{2}\tan^{-1}\left(\frac{x+2}{2}\right) + c \left[\because \int \frac{dx}{x^2+a^2} = \frac{1}{a}\tan^{-1}\frac{x}{a} + c\right]$

OR

Let $I = \int_{-\pi/4}^{\pi/4} \sin^3 x dx$

Consider, $f(x) = \sin^3 x$. Then, $f(-x) = \sin^3(x)$

$= (-\sin x)^3 = -\sin^3 x = -f(x)$

$\Rightarrow$ f(x) is an odd function.

Thus, the given integral is an odd function.

$\therefore I = 0 \left[\int_{-a}^{a} f(x)dx = 0, \text{if} f(x) \text{is an odd function}\right]$

18. $\int (2x - 3\cos x + e^x)\, dx$

$= \int 2x dx - \int 3\cos x dx + \int e^x dx$

$= 2\int x dx - 3\int \cos x dx + \int e^x dx$

$= 2\frac{x^2}{2} - 3\sin x + e^x + c$

$= x^2 - 3 \sin x + e^x + c$

19. $f(x) = x^2e^{-x}$

Differentiating w.r.t x, we get,

$f'(x) = -x^2e^{-x} + 2xe^{-x} = xe^{-x}(2 - x)$

For increasing function, $f'(x) \geq 0$

$xe^{-x}(2 - x) \geq 0$

$x(2 - x) \geq 0$ [$\because$ e^{-x} is always positive]

$x(x - 2) \leq 0$ [since - (x - 2) will change the inequality)

$Here\ x < 0\ \&\ (x - 2) > 0 \Rightarrow x < 0\ \&\ x > 2 \Rightarrow 0 < x < 2$

$But\ when\ x > 0\ \&\ (x - 2) < 0 \Rightarrow x > 0\ \&\ x < 2$

$0 \leq x \leq 2$

20. $y = \cos x + c$

$y^1 = -\sin x$

$y^1 + \sin x = 0$

Section B

21. $\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right) + \cot^{-1}\left(\frac{1}{\sqrt{3}}\right) + \tan^{-1}\left(\sin\left(-\frac{\pi}{2}\right)\right)$

$= -\frac{\pi}{6} + \frac{\pi}{3} + \tan^{-1}(-1)$

$= -\frac{\pi}{6} + \frac{\pi}{3} - \frac{\pi}{4}$

$= -\frac{\pi}{12}$

OR

i. $a \leqslant a$ which is true, so $(a, a) \in R$, $\therefore$ R is reflexive.

ii. $a \leqslant b$ but $b \leqslant a$ which is false. $\therefore$ R is not symmetric.

iii. $a \leqslant b$ and $b \leqslant c \Rightarrow a \leqslant c$ which is true. $\therefore$ R is transitive.

Therefore, R is reflexive and transitive but not symmetric.

22. we have, $f(x) = kx^3 - 9x^2 + 9x + 3$

$\Rightarrow f'(x) = 3kx^2 - 18x + 9$

Since f(x) is increasing on R, therefore , $f'(x) > 0\ \forall\ x \in R$

$\Rightarrow\ 3kx^2-18x+9>0, \forall\ x\in\ R$

$\Rightarrow\ kx^2-6x+3>0, \forall\ x\in\ R$

$\Rightarrow$ k>0 and 36-12k<0 $[\because\ ax^2+bx+c>0, \forall\ x\in\ R \Rightarrow\ a>0\ and\ discriminant<0]$

$\Rightarrow\ k>3$

Hence,f(x) is increasing on R, if k>3.

23. When x < 5 we have f(x) = kx + 1 which being a polynomial is continuous at each point x < 5.

And, when x > 5, we have f(x) = 3x - 5 which being a polynomial is continuous at each point x > 5.

Now $f(5)=5k+1$

$\lim\limits_{x\to5^+} f(x)=\lim\limits_{h\to0} f(5+h)=3(5+h)-5=\lim\limits_{h\to0}(3h+10)=10$

Since function is continuous at x=5, therefore,

$\lim\limits_{x\to5^+}$ f(x)=f(5)

$\Rightarrow 10=5k+1$

$\Rightarrow 5k=9$

$\Rightarrow k=\frac{9}{5}$

24. Given: Points A(1, 2, -3) and B(-1, - 2,1)

$\therefore$ Position vector of point $A=\overrightarrow{OA}=\hat{i}+2\hat{j}-3\hat{k}$

And Position vector of point $B=\overrightarrow{OB}=-\hat{i}-2\hat{j}+\hat{k}$

$\therefore$ Vector $\overrightarrow{AB}=\overrightarrow{OB}-\overrightarrow{OA}=-\hat{i}-2\hat{j}+\hat{k}-\hat{i}-2\hat{j}+3\hat{k}=-2\hat{i}-4\hat{j}+4\hat{k}$

Now $\left|\overrightarrow{AB}\right|=\sqrt{(-2)^2+(-4)^2+(4)^2}=\sqrt{4+16+16}=\sqrt{36}=6$

$\therefore$ A unit vector along $\overrightarrow{AB}=\frac{\overrightarrow{AB}}{\left|\overrightarrow{AB}\right|}=\frac{-2\hat{i}-4\hat{j}+4\hat{k}}{6}$

$=\frac{-2}{6}\hat{i}-\frac{4}{6}\hat{j}+\frac{4}{6}\hat{k}=\frac{-1}{3}\hat{i}-\frac{2}{3}\hat{j}+\frac{2}{3}\hat{k}$

Therefore, the direction cosines of vector $\overrightarrow{AB}=\frac{-1}{3},\frac{-2}{3},\frac{2}{3}$

OR

Since $x\left(\hat{i}+\hat{j}+\hat{k}\right)=x\hat{i}+x\hat{j}+x\hat{k}$ is a unit vector,

Therefore, $\left|x\hat{i}+x\hat{j}+x\hat{k}\right|=1$

$\therefore\sqrt{x^2+x^2+x^2}=1\Rightarrow\sqrt{3x^2}=1$

Squaring both sides, $3x^2=1$

$\Rightarrow x^2=\frac{1}{3}$

$\Rightarrow x=\pm\frac{1}{\sqrt{3}}$

25. Let θ is the angle between the given lines

$\overrightarrow{b}_1=\hat{i}-\hat{j}-2\hat{k}$

and

$\overrightarrow{b}_2=3\hat{i}-5\hat{j}-4\hat{k}$

$\cos\theta=\left|\frac{\overrightarrow{b}_1\cdot\overrightarrow{b}_2}{\left|\overrightarrow{b}_1\right|\left|\overrightarrow{b}_2\right|}\right|$

$=\left|\frac{\left(\hat{i}-\hat{j}-2\hat{k}\right)\cdot\left(3\hat{i}-5\hat{j}-4\hat{k}\right)}{\left|\hat{i}-\hat{j}-2\hat{k}\right|\left|3\hat{i}-5\hat{j}-4\hat{k}\right|}\right|$

$=\left|\frac{3+5+8}{\sqrt{6}\sqrt{50}}\right|=\frac{16}{\sqrt{6}\sqrt{50}}$

$=\frac{16}{\sqrt{6}\ 5\sqrt{2}}$

$=\frac{16}{\sqrt{2}\times\sqrt{3}\times\ 5\times\sqrt{2}}\times\frac{\sqrt{3}}{\sqrt{3}}$

$= \frac{16\sqrt{3}}{2\times3\times5}$

$\cos\theta = \frac{8\sqrt{3}}{15}$

$\theta = \cos^{-1}\left(\frac{8\sqrt{3}}{15}\right)$

26. S = 52 cards$\Rightarrow$ n(s) = 52

Two cards are drawn without replacement.

A = {26 black cards} $\Rightarrow$ n(A) = 26

P (A) = $\frac{26}{52}$

And P (B) i.e., probability that second card is black known that first card is black = $\frac{25}{51}$

P (A and B) = P (A). P (B) = $\frac{26}{52} \times \frac{25}{51} = \frac{1}{2} \times \frac{25}{51} = \frac{25}{102}$

Section C

27. Given that f(x) = x^2 + 3x + 1, g(x) = 2x - 3,

i. fog(x) = f(g(x)) = f(2x-3)

= $(2x - 3)^2$ + 3(2x - 3) + 1

= $4x^2$ + 9 - 12x + 6x - 9x + 1 = $4x^2$ - 6x + 1

= $4x^2$ + 9 - 12x + 6x - 9 + 1

= $4x^2$ - 6x + 1

ii. gof(x) = g(f(x)) = g(x^2+3x+1)

= 2(x^2 + 3x + 1) - 3

= 2x^2 + 6x + 2 - 3

= 2x^2 + 6x - 1

iii. fof(x)=f(f(x))=f(x^2+3x+1)

= $(x^2 + 3x + 1)^2$ + 3(x^2 + 3x + 1) + 1

= x^4 + 9x^2 + 1 + 6x^3 + 6x + 2x^2 + 3x^2 + 9x + 3 + 1

= x^4 + 6x^3 + 14x^2 + 15x + 5

iv. gog(x)=g(g(x))=g(2x-3)

= 2(2x - 3) - 3

= 4x - 6 - 3 = 4x - 9

28. According to the question, x = $\sqrt{a^{\sin^{-1}t}}$ and y = $\sqrt{a^{\cos^{-1}t}}$

Consider, $x = \left(a^{\sin^{-1}t}\right)^{1/2}$

Differentiating both sides w.r.t x,

$\Rightarrow \frac{dx}{dt} = \frac{1}{2}\left(a^{\sin^{-1}t}\right)^{-1/2}\frac{d}{dt}\left(a^{\sin^{-1}t}\right)$ [Using chain rule of derivative]

$= \frac{1}{2}\left(a^{\sin^{-1}t}\right)^{-1/2} a^{\sin^{-1}t}\log a\frac{d}{dt}\left(\sin^{-1}t\right)$

$= \frac{1}{2}\left(a^{\sin^{-1}t}\right)^{-1/2} a^{\sin^{-1}t}\log a\cdot\frac{1}{\sqrt{1-t^2}}$

$= \frac{1}{2}\left(a^{\sin^{-1}t}\right)^{1/2}\log a\cdot\frac{1}{\sqrt{1-t^2}}$

$\Rightarrow \frac{dx}{dt} = \frac{\frac{1}{2}\sqrt{a^{\sin^{-1}t}}\cdot\log a}{\sqrt{1-t^2}}$.....(i)

Consider , $y = \left(a^{\cos^{-1}t}\right)^{1/2}$

Differentiating both sides w.r.t x,

$\frac{dy}{dt} = \frac{1}{2}\left(a^{\cos^{-1}t}\right)^{-1/2}\frac{d}{dt}\left(a^{\cos^{-1}t}\right)$ [Using chain rule of derivative]

$= \frac{1}{2}\left(a^{\cos^{-1}t}\right)^{-1/2} a^{\cos^{-1}t}\log a\frac{d}{dt}\left(\cos^{-1}t\right)$

$= \frac{1}{2}\left(a^{\cos^{-1}t}\right)^{1/2}\log a \cdot \frac{(-1)}{\sqrt{1-t^2}}$

$\Rightarrow \frac{dy}{dt} = \frac{-\frac{1}{2}\sqrt{a^{\cos^{-1}t}}.\log a}{\sqrt{1-t^2}}$.....(ii)

Dividing Eq.(ii) by Eq.(i),

$\Rightarrow \frac{dy}{dx} = \frac{\left(\frac{dy}{dt}\right)}{\left(\frac{dx}{dt}\right)} = \frac{\left(\frac{-\frac{1}{2}\sqrt{a^{\cos^{-1}t}}\log a}{\sqrt{1-t^2}}\right)}{\left(\frac{\frac{1}{2}\sqrt{a^{\sin^{-1}t}}\log a}{\sqrt{1-t^2}}\right)}$

$= -\frac{\sqrt{a^{\cos^{-1}t}}}{\sqrt{a^{\sin^{-1}t}}} = -\frac{y}{x}$

Hence proved

OR

According to the question, if y = e^x sin x, then,we have to prove that $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 2y = 0$

We shall use product rule of differentiation to prove the required result.

Now,we have, y = e^x sin x.....(i)

Therefore,on differentiating both sides w.r.t x, we get,

$\frac{dy}{dx} = e^x \cdot \frac{d}{dx}(\sin x) + \sin x \cdot \frac{d}{dx}(e^x)$[by using product rule of derivative]

$\Rightarrow \quad \frac{dy}{dx}$= e^x.cos x + sin x.e^x

$\Rightarrow \quad \frac{dy}{dx}$ =e^x(cos x + sin x).....(ii)

Again, differentiating both sides w.r.t x, we get,

$\frac{d^2y}{dx^2} = e^x \cdot \frac{d}{dx}$(cos x + sin x) + (cos x + sin x). $\frac{d}{dx}(e^x)$[by using product rule of derivative]

$\Rightarrow \quad \frac{d^2y}{dx^2}$ = e^x(- sin x + cos x) + (cos x+ sin x). e^x

= e^x[-sin x + cos x + cos x + sin x]

$\Rightarrow \quad \frac{d^2y}{dx^2}$ = 2 cos xe^x.....(iii)

Now, consider,

LHS = $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 2y$

= 2e^x cos x - 2e^x(cos x + sin x) + 2e^x sin x [From Eqs.(i), (ii) and (iii)]

= 2e^x cos x - 2e^xcos x- 2e^x sin x + 2e^x sin x

= 0 = RHS

29. Given: Differential equation $\frac{dy}{dx} + (\sec x)y = \tan x$

Comparing with $\frac{dy}{dx} + Py = Q$, we have P = sec x and Q = tan x

$\therefore \int Pdx = \int \sec x dx = \log(\sec x + \tan x)$

$I.F = e^{\int Pdx} = e^{\log(\sec x + \tan x)} = \sec x + \tan x$

Solution is

$= y(I.F) = \int Q(I.F)dx + c$

$\Rightarrow y(\sec x + \tan x) = \int \tan x(\sec x + \tan x)dx + c$

$\Rightarrow y(\sec x + \tan x) = \int (\sec x \tan x + \tan^2 x)dx + c$

$\Rightarrow y(\sec x + \tan x) = \int (\sec x.\tan x + \sec^2 x - 1)dx + c$

$\Rightarrow y(\sec x + \tan x) = \sec x + \tan x - x + c$

30. Let $I = \int \frac{x^2+3x-1}{(x+1)^2}$dx. Then,

$I = \int \frac{x^2+x+2x-1}{(x+1)^2}$dx

$= \int \frac{x(x+1)+2x-1}{(x+1)^2}$dx

$= \int \frac{x(x+1)}{(x+1)^2}dx + \int \frac{2x-1}{(x+1)^2}dx$

$= \int \frac{x}{x+1}dx + \int \frac{2x+2-2-1}{(x+1)^2}dx$

$= \int \frac{x+1-1}{x+1}dx + \int \frac{2(x+1)-3}{(x+1)^2}dx$

$= \int \frac{x+1}{x+1}dx - \int \frac{1}{x+1}dx + \int \frac{2(x+1)}{(x+1)^2}dx - 3\int \frac{1}{(x+1)^2}dx$

$= \int dx - \int \frac{1}{x+1}dx + 2\int \frac{1}{x+1}dx - 3\int \frac{1}{(x+1)^2}dx$

= x - log |x + 1| + 2 log |x + 1| + $\frac{3}{x+1}$ + c

= x + log |x + 1| + $\frac{3}{x+1}$ + c

31. In a group of 400 people, 160 are smokers and non-vegetarian, 100 are smokers and vegetarian and the remaining are non-smokers and vegetarian. The probabilities of getting a special chest disease are 35%, 20% and 10%, respectively.

Total number of people in a group, n(S) = 400

Let E_1: Event of getting a person who is smoker and non-vegetarian

E_2: Event of getting a person who is smoker and vegetarian

E_3: Event of getting a person who is non-smoker and vegetarian

and A: Event of getting a chest disease

Then, $n(E_1) = 160, n(E_2) = 100$

and n(E_3) = 400 - (160 + 100) = 140

$\therefore P(E_1) = P$(a person who is smoker and non-vegetarian)

$= \frac{n(E_1)}{n(S)} = \frac{160}{400} = \frac{2}{5}$

P(E_2) = P (a person having smoker and vegetarian)

$= \frac{n(E_2)}{n(S)} = \frac{100}{400} = \frac{2}{8}$

and P (E_3) = P (a person having non-smoker and vegetarian)

$= \frac{n(E_3)}{n(S)} = \frac{140}{400} = \frac{7}{20}$

Also, $P\left(\frac{A}{E_1}\right) = P$(smoker and non-vegetarian person getting a chest disease)

$= 35\% = \frac{35}{100} = \frac{7}{20}$

$P\left(\frac{A}{E_2}\right) = P$(a smoker and vegetarian person getting a chest disease)

$= 20\% = \frac{20}{100} = \frac{1}{5}$

and $P\left(\frac{A}{E_3}\right) = P$(a non-smoker and vegetarian person getting a chest disease)

$= 10\% = \frac{10}{100} = \frac{1}{10}$

$\therefore$ The probability that the selected person suffers from chest disease, is smoker and non-vegetarian,

$P\left(\frac{E_1}{A}\right) = \frac{P(E_1)P\left(\frac{A}{E_1}\right)}{\left[P(E_1)\left(\frac{A}{E_1}\right)+P(E_2)\left(\frac{A}{E_2}\right)+P(E_3)P\left(\frac{A}{E_3}\right)\right]}$ [by Baye's theorem]

$= \frac{\frac{2}{5}\times\frac{7}{20}}{\frac{2}{5}\times\frac{7}{20}+\frac{2}{8}\times\frac{1}{5}+\frac{7}{20}\times\frac{1}{10}}$

$= \frac{\frac{7}{50}}{\frac{7}{50}+\frac{1}{20}+\frac{7}{200}}$

$= \frac{\frac{7}{50}}{\frac{28+10+7}{200}} = \frac{\frac{7}{50}}{\frac{45}{200}}$

$= \frac{7}{45} \times \frac{200}{50} = \frac{28}{45}$

OR

Let B and b represent elder and younger boy child. Also, G and g represent elder and younger girl child. If a family has two children, then all possible cases are

S = {Bb, Bg, Gg, Gb}

$\therefore$ n(S) = 4

Let us define event A: Both children are girls,

then A = {Gg}

$\Rightarrow$ n(A) = 1

i. **Let E_1: The event that youngest child is a girl.**

Then, E_1 = {Bg, Gg} and n(E_1) = 2

so $P(E_1) = \frac{n(E_1)}{nS)} = \frac{2}{4} = \frac{1}{2}$

and A $\cap$ E_1 = {Gg}

$\Rightarrow$ n(A $\cap$ E_1) = 1

so $P(A \cap E_1) = \frac{n(A \cap E_1)}{n(S)} = \frac{1}{4}$

Now, $P\left(\frac{A}{E_1}\right) = \frac{P(A \cap E_1)}{P(E_1)} = \frac{1/4}{1/2} = \frac{1}{2}$

$\therefore$ Required probability $= \frac{1}{2}$

ii. Let E_2: The event that at least one is girl

Then, E_2 = {Bg, Gg, Gb}$\Rightarrow$n(E_2) = 3,

so $P(E_2) = \frac{n(E_2)}{n(S)} = \frac{3}{4}$

and (A $\cap$ E_2) = {Gg}

$\Rightarrow$ n(A $\cap$ E_1) = 1

so $P(A \cap E_1) = \frac{n(A \cap E_1)}{n(S)} = \frac{1}{4}$

Now, $P\left(\frac{A}{E_2}\right) = \frac{P(A \cap E_2)}{P(E_2)} = \frac{1/4}{3/4} = \frac{1}{3}$

$\therefore$ Required probability $= \frac{1}{3}$

32. Let x and y be the number of goods of type A and of type B respectively.

$\therefore$ No. of units of labour = $2x + 3y$

As 30 units of labour are available

$\therefore \quad 2x + 3y \leq 30$

Similarly, constraint for capital is

$3x + y \leq 17$

and non-zero constraints are

$x \geq 0, y \geq 0$

Objective function

$Z = 100x + 120y$

Consider

$2x + 3y = 30$

When x = 0, then y = 10

When x = 15, then y = 0

$\therefore 2x + 3y = 30$

passes through A(0, 10) and B(15, 0)

Consider

$3x + y = 17$

When $x = 0$, then $y = 17$

When $y = 0$, then $x = \frac{17}{3}$

$\therefore 3x + y = 17$ passes through $C(0,17)$and $\mathrm{D}\left(\frac{17}{3}, 0\right)$.

Further above two equations intersect at $E(3,8)$, vertices of the feasible region are $A(0,10)$,

O(0, 0), $\mathrm{D}\left(\frac{17}{3}, 0\right)$ and E (3, 8).

At $A(0,10), Z = 100(0) + 120(10) = Rs.1200$

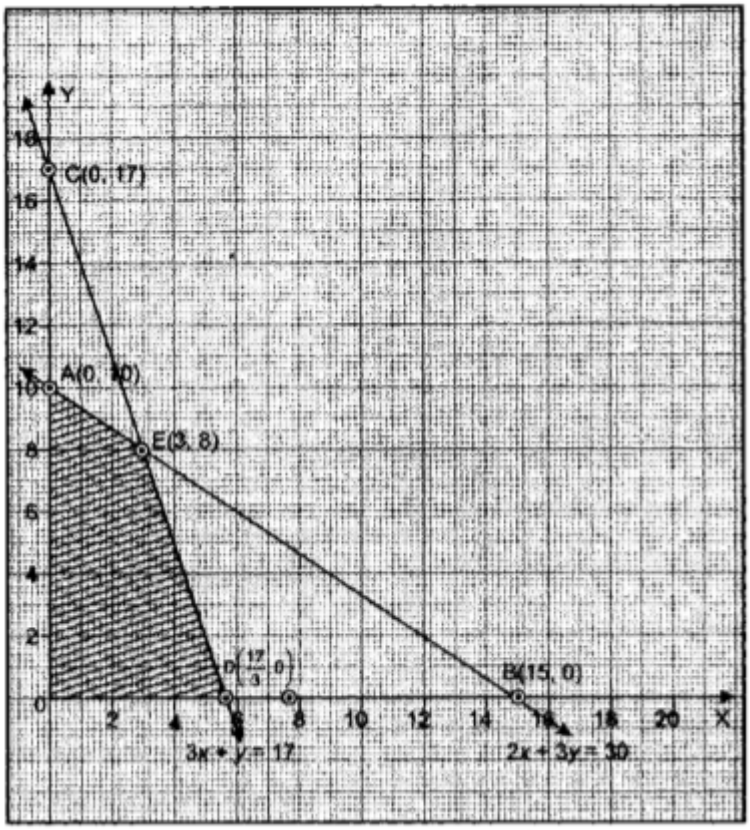
At $O(0,0), Z = 100(0) + 120(0) = Rs.0$

At $\mathrm{D}\left(\frac{17}{3}, 0\right), \mathrm{Z} = 100\left(\frac{17}{3}\right) + 120(0)$= Rs.566.67

At $E(3,8), Z = 100(3) + 120(8) = Rs.1260$

Thus, maximum value of $Z = Rs.1260$ at x = 3 and y = 8.

Yes, the view of manufacturer that men and women workers are equally efficient is correct and so they should be paid at the same rate.



Section D

33. $B' = \begin{bmatrix} 2 & -1 & 1 \\ -2 & 3 & -2 \\ -4 & 4 & -3 \end{bmatrix}$

Let $P = \frac{1}{2}(B + B') = \begin{bmatrix} 2 & \frac{-3}{2} & \frac{-3}{2} \\ \frac{-3}{2} & 3 & 1 \\ \frac{-3}{2} & 1 & -3 \end{bmatrix}$

$P' = \begin{bmatrix} 2 & \frac{-3}{2} & \frac{-3}{2} \\ \frac{-3}{2} & 3 & 1 \\ \frac{-3}{2} & 1 & -3 \end{bmatrix} = P$

Thus $P = \frac{1}{2}(B + B')$ is a symmetric matrix

Let $Q = \frac{1}{2}(B - B') = \begin{bmatrix} 0 & -\frac{1}{2} & -\frac{5}{2} \\ \frac{1}{2} & 0 & 3 \\ \frac{5}{2} & -3 & 0 \end{bmatrix}$

$Q' = \begin{bmatrix} 0 & \frac{1}{2} & \frac{5}{2} \\ -\frac{1}{2} & 0 & -3 \\ -\frac{5}{2} & 3 & 0 \end{bmatrix}$

$Q' = -\begin{bmatrix} 0 & -\frac{1}{2} & -\frac{5}{2} \\ \frac{1}{2} & 0 & 3 \\ \frac{5}{2} & -3 & 0 \end{bmatrix}$

Q' = - Q

Thus $Q = \frac{1}{2}(B - B')$ is a skew symmetric matrix

$$P+Q=\begin{bmatrix} 2 & \frac{-3}{2} & \frac{-3}{2} \\ \frac{-3}{2} & 3 & 1 \\ \frac{-3}{2} & 1 & -3 \end{bmatrix}+\begin{bmatrix} 0 & \frac{-1}{2} & \frac{-5}{2} \\ \frac{1}{2} & 0 & 3 \\ \frac{5}{2} & -3 & 0 \end{bmatrix}$$

$$=\begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$$

= A

Hence proved.

OR

x - y + z = 4

x - 2y - 2z = 9

2x + y + 3z = 1

Let $A=\begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix} X=\begin{bmatrix} x \\ y \\ z \end{bmatrix} C=\begin{bmatrix} 4 \\ 9 \\ 1 \end{bmatrix}$

AX = C

$$AB=\begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}\begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$$

$$=\begin{bmatrix} 8 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & 8 \end{bmatrix}$$

AB = 8I

$$A^{-1}=\frac{1}{8}B\begin{bmatrix} \because A^{-1}AB=8A^{-1}I \\ B=8A^{-1} \end{bmatrix}$$

$$=\frac{1}{8}\begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$$

$X = A^{-1}C$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix}=\begin{bmatrix} 3 \\ -2 \\ -1 \end{bmatrix}$$

x = 3, y = -2. z = -1

34. According to the Given question,

equation of circle is

$x^2+y^2=16$...(i)

and equation of parabola is

$y^2=6x$...(ii)

The given circle has centre (0, 0) and

Radius = 4 units

The given parabola has vertex (0, 0) and

Axis of parabola lies parallel to X-axis.

On substituting $y^2 = 6x$ in Eq. (i), we get

$x^2 + 6x - 16 = 0$

$(x + 8)(x - 2) = 0$

x = - 8 or 2

from Eq. (ii),

when x = -8, then $y^2 = -48$, which is not possible , because square root of negative terms does not exist.

So, $x \neq -8$

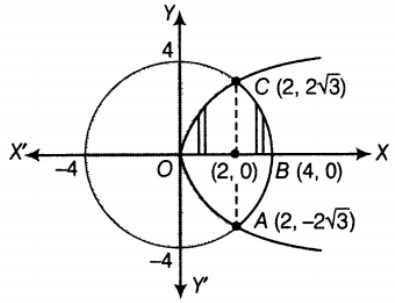
when x = 2 , then

$y^2 = 12$

$y = \pm 2\sqrt{3}$

Thus, the points of intersection are $(2, 2\sqrt{3})$ and $(2, -2\sqrt{3})$

Now, let us sketch the graph of given curves.



Required area= Area of shaded region

= Area of circle - Area of region OABCO

$= \pi(4)^2$ - 2(Area of region OBCO)

$= 16\pi - 2\left[\int_0^2 y_{\text{(parabola)}}\, dx + \int_2^4 y_{\text{(circle)}}\, dx\right]$

$= 16\pi - 2\left[\int_0^2 \sqrt{6x}dx + \int_2^4 \sqrt{16 - x^2}dx\right]$

$= 16\pi - 2\left[\sqrt{6}\int_0^2 x^{1/2}dx + \int_2^4 \sqrt{4^2 - x^2}dx\right]$

$= 16\pi - 2\left\{\sqrt{6} \times \frac{2}{3}\left[x^{3/2}\right]_0^2 + \left[\frac{x}{2}\sqrt{4^2 - x^2} + \frac{16}{2}\sin^{-1}\left(\frac{x}{4}\right)\right]_2^4\right\}$

$= 16\pi - 2\left\{\frac{2\sqrt{6}}{3} \times 2\sqrt{2} + \left[8\sin^{-1}(1) - \left(\sqrt{4^2 - 2^2} + 8\sin^{-1}\left(\frac{1}{2}\right)\right)\right]\right\}$

$= 16\pi - 2\left\{\frac{8\sqrt{3}}{3} + \left[8 \cdot \frac{\pi}{2} - \left(2\sqrt{3} + 8 \cdot \frac{\pi}{6}\right)\right]\right\}$

$= 16\pi - \frac{16\sqrt{3}}{3} - 8\pi + 4\sqrt{3} + \frac{8\pi}{3}$

$= 8\pi + \frac{8\pi}{3} - \frac{4\sqrt{3}}{3}$

$= \frac{32\pi}{3} - \frac{4\sqrt{3}}{3}$

$= \frac{4}{3}(8\pi - \sqrt{3})$sq.units.

35. Let x and y be the lengths of two sides of a rectangle. Again, let P denotes its perimeter and 'A' be the area of rectangle

Then, P = 2 (x + y) [$\because$ perimeter of rectangle = 2 (l + b)]

$\Rightarrow \quad P = 2x + 2y$

$\Rightarrow \quad y = \frac{P-2x}{2}$ ...(i)

We know that, area of rectangle is given by

A = xy

$\Rightarrow \quad A = x\left(\frac{P-2x}{2}\right)$ [by using Eq. (i)]

On differentiating both sides w.r.t. x, we get

$\frac{dA}{dx} = \frac{P-4x}{2}$

For maxima or minima put $\frac{dA}{dx} = 0$

$\Rightarrow \quad \frac{P-4x}{2} = 0 \Rightarrow P = 4x$

$\Rightarrow \quad 2x + 2y = 4x \quad [\because P = 2x + 2y]$

$\Rightarrow \quad x = y$

So, the rectangle is a square.

Also, $\frac{d^2A}{dx^2} = \frac{d}{dx}\left(\frac{P-4x}{2}\right)$

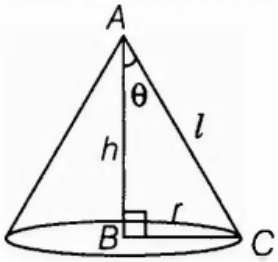
$= -\frac{4}{2} = -2 < 0$

$\Rightarrow$ A is maximum.

Hence, area is maximum, when rectangle is a square.

OR

Let θ be the semi-vertical angle of the cone.
It is clear that $\theta \in \left(0, \frac{\pi}{2}\right)$
Let r, h and l be the radius, height and the slant height of the cone, respectively.



Since, slant height of the cone is given, so consider it as constant.
Now, in ΔABC, r=l sin $\theta$and h=l cos θ
Let V be the volume of the cone.
Then, $V = \frac{\pi}{3} r^2 h$
$\Rightarrow \quad V = \frac{1}{3}\pi \left(l^2 \sin^2\theta\right)(l\cos\theta)$
$\Rightarrow \quad V = \frac{1}{3}\pi l^3 \sin^2\theta\cos\theta$
On differentiating both sides w.r.t. θ , we get,
$\frac{dV}{d\theta} = \frac{l^3\pi}{3}\left[\sin^2\theta(-\sin\theta) + \cos\theta(2\sin\theta\cos\theta)\right]$
$= \frac{l^3\pi}{3}\left(-\sin^3\theta + 2\sin\theta\cos^2\theta\right)$
Again,differentiating both sides w.r.t θ,we get,
$\frac{d^2V}{d\theta^2} = \frac{l^3\pi}{3}(-3\sin^2\theta\cos\theta + 2\cos^3\theta - 4\sin^2\theta\cos\theta)$
$\Rightarrow \frac{d^2V}{d\theta^2} = \frac{l^3\pi}{3}\left(2\cos^3\theta - 7\sin^2\theta\cos\theta\right)$
For maxima or minima, put $\frac{dV}{d\theta} = 0$
$\Rightarrow \quad \sin^3\theta = 2\sin\theta\cos^2\theta$
$\Rightarrow \quad \tan^2\theta = 2$
$\Rightarrow \quad \tan\theta = \sqrt{2} \Rightarrow \theta = \tan^{-1}\sqrt{2}$
Now, when $\theta = \tan^{-1}\sqrt{2}$ then $\tan^2\theta = 2$
$\Rightarrow \quad \sin^2\theta = 2\cos^2\theta$
Now, we have
$\frac{d^2V}{d\theta^2} = \frac{l^3\pi}{3}(2\cos^3\theta - 14\cos^3\theta)$
$= -4\pi l^3\cos^3\theta < \theta, \text{ for } \theta \in \left(0, \frac{\pi}{2}\right)$
$\therefore$ V is maximum, when $\theta = \tan^{-1}\sqrt{2}$
or $\theta = \cos^{-1}\frac{1}{\sqrt{3}}$ $\left[\because \cos\theta = \frac{1}{\sqrt{1+\tan^2\theta}} = \frac{1}{\sqrt{1+2}} = \frac{1}{\sqrt{3}}\right]$
Hence, for given slant height, the semi-vertical angle of the cone of maximum volume is $\cos^{-1}\frac{1}{\sqrt{3}}$.

36. Let equation of plane through (1, 2, -4) be
a (x - 1) + b (y - 2) + c (z + 4) = 0
Given lines are
$\vec{r} = \hat{i} + 2\hat{j} - 4\hat{k} + \lambda(2\hat{i} + 3\hat{j} + 6\hat{k})$
and $\vec{r} = \hat{i} - 3\hat{j} + 5\hat{k} + \mu(\hat{i} + \hat{j} - \hat{k})$
The cartesian equations of given lines are,
$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z+4}{6}$ and $\frac{x-1}{1} = \frac{y+3}{1} = \frac{z-5}{-1}$
Since, the required plane (i) is parallel to the given lines, so normal to the plane is perpendicular to the given lines.
2a + 3b + 6c = 0
and a + b - c = 0
On solving these two equations by cross-multiplication, we get
$\frac{a}{-3-6} = \frac{b}{6+2} = \frac{c}{2-3} \Rightarrow \frac{a}{-9} = \frac{b}{8} = \frac{c}{-1} = \lambda(\text{ say })$
$\therefore \quad a = -9\lambda, b = 8\lambda, c = -\lambda$

On putting values of a, b and c in Eq. (i), we get,

$-9\lambda(x-1)+8\lambda(y-2)-\lambda(z+4)=0$

$\therefore$ Equation of plane in cartesian form is

$-9\lambda(x-1)+8\lambda(y-2)-\lambda(z+4)=0$

$\Rightarrow$ -9x + 9 + 8y - 16 - z - 4 = 0

$\Rightarrow$ 9x - 8y + z + 11 = 0

Now, vector form of plane is

$\vec{r}.(9\hat{i}-8\hat{j}+\hat{k})=-11$

Also, distance of (9, -8, -10) from the above plane

$=\left|\frac{9(9)-8(-8)+1(-10)+11}{\sqrt{9^2+(-8)^2+1^2}}\right|=\left|\frac{81+64-10+11}{\sqrt{81+64+1}}\right|\left[\because D=\left|\frac{Ax_1+by_1+Cz_1+D}{\sqrt{A^2+B^2+C^2}}\right|\right]$

$=\frac{146}{\sqrt{146}}=\sqrt{146}$ units

Solution

Class 12 - Biology

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Section A

1. **(b)** hCG, hPL and relaxin
   Explanation: Human chorionic gonadotropin (hCG), human placental lactogens (hCL) and relaxin are produced in human females only during pregnancy.

   OR

   (b) Tubectomy
   Explanation: Tubectomy is not a natural method of birth control. In tubectomy method fallopian tube of female is cut and tide to prevent ovulation. To abstain, coitus interrupts and rhythm period is natural method of birth control.

2. **(c)** Pathogen
   Explanation: A number of bacteria, fungi, virus etc. cause disease in human beings. These disease causing microbes are called pathogens.

   OR

   (b) Cell mediated immune response
   Explanation: Since the body is able to differentiate self and nonself and cell mediated immune response is responsible for graft rejection. Tissue matching and blood matching are essential before undertaking and graft or transplant.

3. **(c)** Recombinant molecules of DNA
   Explanation: Restriction enzymes, or restriction endonucleases, are enzymes specialized in the cutting of DNA fragments, which each have an effect on specific sites of the DNA molecule.
   Restriction enzymes are used in recombinant DNA technology to obtain with pieces of DNA molecules with precision, which will later be inserted into other DNA molecules cut by the same enzymes.

4. **(d)** Resistance to high temperature
   Explanation: Taq polymerase is a thermostable DNA polymerase. Taq polymerase is an enzyme that copies DNA. It is isolated from a heat-loving bacterium that is naturally found in hot springs, so the enzyme doesn't break down at the high temperatures necessary for copying DNA using a polymerase chain reaction.

5. **(d)** Research and education
   Explanation: Buffer zone is managed to accommodate variety of resources for restoration of degraded ecosystems and habitats, conservation of genetic resources, species and ecosystem and monitoring of development and conservation programme. It is mainly for research and education.

Section B

6. i. Cucurbits and pea plants are monoecious.
   ii. Date palm, cucurbits, and pea bear pistillate flowers.

   OR

   When the flower chosen is unisexual (female), there is no need for emasculation. Yet bagging is necessary to prevent contamination of the stigma with unwanted pollen grains.

7. (i) Maternal mortality rate
   (ii) In vitro fertilization
   (iii) Gamete intra fallopian transfer
   (iv) Assisted reproductive technologies.

8. A gene mutation involving a change in single nucleotide or nitrogenous base of DNA is called point of mutation.

   Example: Sickle cell anaemia (The defect is caused by the substitution of Glutamic acid by valine at the sixth position of the beta globin chain of the haemoglobin.

9. DNA Fingerprinting

   Values

   • Compassion.

   • Empathy.

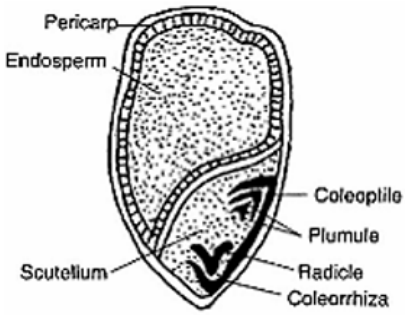
10. The cell from microorganisms such as bacteria, yeasts, filamentous algae treated in various ways and used as food, are called SCP.

    SCP provides a protein rich supplement in human diet e.g. 250 kg cow produces 200 g of protein per day. In same time 250 g of microorganism like Methylophilus methylotrophus can produce 25 tonnes of protein because of its high rate of biomass production and growth.

11. Recombinant DNA technology, polymerase chain reaction (PCR) and enzyme Linked Immuno Sorbent Assay (ELISA).

12. Ecosystem services are the products of ecosystem processes. Healthy forest ecosystem provides the following ecosystem services:
    - Purification of air and water
    - Cycling of nutrients
    - Generation of fertile soil
    - Provision of habitat to wildlife

Section C

13. 

Maize Seed

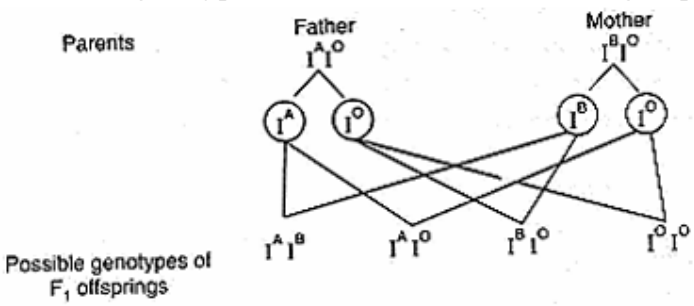
14. A seed develops after fertilization of female gamete. Pollination and fertilization provide stimulation in the form of hormones (chemicals) which result in the formation of the seeds and fruits from ovule and ovary respectively. Seeds are the final product of sexual reproduction formed inside the fruits.

    A seed typically consists of seed coat(s), stored food materials in cotyledon(s) or endosperm and an embryo axis. A seed may be endospermic/ albuminous such as castor, coconut, cereals, etc. or non-endospermic/ non-albuminous such as pulses, pea, bean, mustard, etc. In some seeds, such as black pepper and beet, remnants of persistent nucellus called perisperm is also present.

15. i. Dominant
    ii. Autosomal
    iii. Parents Mother -aa
    Father - Aa
    Third child - Aa
    First grandchild - Aa

OR

The parents of the child will be heterozygous for their blood groups. Therefore, his father with blood group A must have genotype (I^AI^O) and mother with blood group B must have genotype (I^BI^O)



16. Convergent evolution results in analogous structures which are different structures performing a similar function but different origin.

i. Flippers of penguins (wings modification) and dolphin (forearm modification) both help in swimming but are of different origin.
ii. The eyes of octopus and mammals perform the same function i.e. photoreception. They are similar in position. However, the entire eyes of octopus (a mollusc) develop from the skin while in mammals (vertebrate) the retina of eye has different origin.

17.

Transcription in Prokaryotes	**Transcription in Eukaryotes**
(i) Products of transcription become effective in situ.	(i) Products of transcription come out of the nucleus for functioning in cytoplasm.
(ii) There is only one RNA-polymerase.	(ii) Three RNA polymerases take part in it.
(iii) mRNA is polycistronic.	(iii) mRNA is monocistronic.
(iv) Splicing is not required.	(iv) Splicing is required for removing introns.

18. **Apiculture :**Apiculture is the practice of bee-keeping for the commercial production of various products such as honey, bee's wax, etc.
Honey is a highly nutritious food source and is used as an indigenous system of medicines. It is useful in the treatment of many disorders such as cold, flu, and dysentery. Other commercial products obtained from honey bees include bee's wax and bee pollen. Bee's wax is used for making cosmetics, polishes, and is even used in several medicinal preparations. Therefore, to meet the increasing demand of honey, people have started practicing bee-keeping on a large scale. It has become an income generating activity for farmers since it requires a low investment and is labour intensive.
19. Eli Lilly company prepares proinsulin chain A and B using separate DNA sequences corresponding to A and B, chains of human insulin and introduced them in the plasmid of E. coli to prepare insulin chains, chains A and B produced separately, extracted and combined by disulphide bond produces mature insulin.
The one important difference between the insulin produced by human pancreas and the one produced by Eli Lilly is that human insulin has an additional C peptide.
20. Conservation may be defined as a technique of deriving maximum advantage from the biosphere without degrading in any way it; Conservation of biodiversity/wildlife has three specific objectives:
i. To maintain essential ecological processes and life-supporting systems like air, water and soil.
ii. To preserve the diversity of species and the range of genetic material of the world's organisms.
iii. To ensure continuous use of species and ecosystems which will support the rural communities and urban industries.

OR

i. The current species extinction rate is estimated to be 100-1000 time faster than in the pre-human era
ii. All activities performed by living beings for survival and maintenance of their lifestyle
iii. The point that can help to overcome this disaster is as follows:
a. Preventing habitat loss and fragmentation.
b. Checking overexploiting.
c. Preventing alien species invasion.
d. Preventing coextinction.
e. Conservation/protection of species.

21. **Chitinase:** Chitinase is an enzyme extracted from the fungus and is used along with other enzymes such as lysozyme (bacteria), cellulase (plant cells), etc. for treating the bacterial cells/plant or animal tissue, for the isolation of DNA. After the removal of other macromolecules such as RNA, proteins, polysaccharides and lipid etc., the purified DNA ultimately precipitates out after the addition of chilled ethanol. DNA can be seen as collection of fine threads in the suspension.

Section D

22. **(a) Seminal Vesicle:** They are one pair male accessory glands which secrete seminal fluid which is alkaline and rich in fructose, citrate, prostaglandins and several proteins.
(b) Acrosome: It is sperm cap which contains sperm lysine, necessary for ovum penetration.
(c) Fimbriae: They are terminal fingure-like projections of the oviduct which help in collection of the ovum after ovulation.
23. i. A farmer relies on bio fertilisers over chemical fertilisers because

a. Chemical fertilisers significantly increase the soil pollution and reduce the quality of soil, cause water pollution, when it drains into nearby water bodies, after rain.
b. Overuse of chemical fertiliser makes the soil infertile.

ii. Anabaena fixes atmospheric nitrogen, thus enriching the nitrogen content of the soil, as well as the organic matter.
In mycorrhiza, the fungal symbiont absorbs phosphorus from the soil and passes it to the plant and provides resistance to root borne diseases. Since they fulfil the nitrogen and phosphorus requirement, they act as bio-fertilisers.

24. Following are some of the steps to control pollution from automobile exhaust:
i. The use of catalytic converters filter in the motor vehicle can convert NO_2 to a nitrogen reducing hazards of NO_2.
ii. The use of efficient engines can reduce the unburnt hydrocarbons in auto exhaust.
iii. Unleaded petrol can reduce lead in the exhaust.
iv. The use of good quality of desulphurized fuel.
v. The use of good quality of desulfurized fuel.
vi. The use of CNG (compressed natural gas) lowers the emission of toxic contaminants.

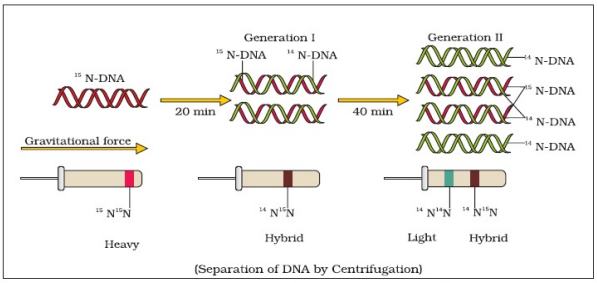
Section E

25. Gregor Mendel, through his work on pea plants, discovered the fundamental laws of inheritance. He deduced that genes come in pairs and are inherited as distinct units, one from each parent. Mendel tracked the segregation of parental genes and their appearance in the offspring as dominant or recessive traits. He recognized the mathematical patterns of inheritance from one generation to the next.
Mendel did not investigate how characteristics are sorted and combined on the cellular level. Sutton and Boveri, working independently, suggested that chromosomes could be shown to bear the materials of heredity.
They noted that the behaviour of chromosomes was parallel to the behaviour of the gene and used chromosomes movement to explain Mendel's laws.
Sutton and Boveri argued that the pairing and separation of pair of chromosomes would lead to segregation of a pair of factors they carry. Sutton united the knowledge of chromosomal segregation with Mendelian principle and called it " chromosomal theory of inheritance".

OR

- **AIM-** To demonstrate that DNA replication is semi-conservative.
- **EXPERIMENT**-

i. Mathew Messelson and Franklin Stahl in 1958 grew *E. coli* in a medium containing $^{15}NH_4Cl$ (^{15}N is a heavy isotope of nitrogen) as the only nitrogen source for many generations. As a result, ^{15}N was incorporated into newly synthesized DNA (as well as other nitrogen-containing compounds). This heavy DNA molecule could be distinguished from the normal DNA by caesium chloride (CsCl) density gradient centrifugation.
ii. They then transferred the cells into a medium with normal $^{14}NH_4Cl$ and collected the samples at various definite time intervals as the cells multiplied, and extracted the DNA that remained as double-stranded helices. The various samples were separated independently as CsCl gradients to measure the densities of DNA.
iii. Thus, the DNA that was extracted from the culture one generation after the transfer from ^{15}N to ^{14}N medium; had a hybrid or intermediate density. DNA extracted from the culture after another generation (that is after 40 minutes, II generation) was composed of equal amounts of hybrid DNA and of light DNA.
iv. This proved the nature of DNA replication to be semi-conservative.



26. i. The main objective of animal breeding is to increase the yield of animals and improve the desirable and superior qualities in both the animals and their products.

ii. **Importance of Inbreeding**:

a. It increases homozygosity and evolves a pure line.

b. Accumulation of superior genes and the elimination of less desirable genes by selection.

Limitations of Inbreeding: The continued inbreeding in animals for subsequent generations reduces their fertility and productivity, resulting in a condition called inbreeding depression.

The inbreeding depression can be overcome by a single outcross, i.e mating between animals of the same breed have no common ancestors up to 4-6 generations.

iii. An example, of a new breed of cattle, is Hisardale and that of poultry is New Hampshire.

OR

a.

Active immunity	Passive immunity
Production of antibodies on exposure to antigen in the host body	Introduction of readymade antibodies to protect against the pathogen
Slow process and takes time to give a fully effective response	T lymphocyte production is fast and responds quickly by checking the growth of the pathogen
Natural infection induces active immunity	Inoculation of a pathogen in other organisms synthesizes antibodies which are isolated and used for vaccination

b. Vaccination and immunization keep the human population healthy as it helps in neutralizing the effect of pathogenic agents by producing a massive response against the particular pathogen. They do so because-

- Vaccines generate memory cell (B and T cells) that recognize quickly on subsequent exposure and controls growth of pathogen with massive production of antibodies.
- Preformed antibodies/ antitoxin protect our body from deadly microbes like tetanus and against snake venom.

27. The increases in the atmospheric temperature of the earth due to the increase in the concentration of green house gases $(CO_2, CH_4 CFC)$ is called Global warming .

Causes:

(i) Burning of fossil in automobiles and industries.

(ii) Deforestation

Effects:

(i) Due to the rise in temperature the polar ice caps will melt resulting in the rise of sea water level.

(ii) Global warming will lead to explosive growth of weeds, increased incidence of plant diseases and pests. All these factors will decrease crop production in tropical and subtropical regions.

(iii) Effect on weather and climate leading to chances of cyclones and flood.

Control measures:

(i) Deforestation should be reduced.

(ii) Plantation of trees.

(iii) Limiting use of fossil fuels by developing and using alternate sources of energy.

(iv) Reduction in human population.

OR

a. Hydrarch succession is succession of plants which take place in wetter areas and the successional series progress from hydric (excessive wet) to the mesic condition (medium water condition).

b. **Pioneer species** are these are the species that invade a bare area while the **climax community** is a community which it is in near equilibrium with the environment. The pioneer species of hydrarch

succession are phytoplankton while of xerarch succession are lichens. The climax community of both hydrarch and xerarch succession is a forest although the species involved during the process are different for both types of successions.

c. In secondary succession, the species that invade depend on the condition of the soil, availability of water, the environment and the seeds and propagules already present.
   The rate of secondary succession is faster than the primary succession because the soil is present for secondary successions which is absent for primary succession.

Solution

Class 12 - हिंदी कोर

Confidence Examination- II (2019-20)

Section A

1. i. प्रस्तुत गद्यांश का उपयुक्त शीर्षक है- 'स्वतंत्रता और समानता'
   ii. अहिंसक/नए ढंग के संघर्ष से स्वाधीनता की प्राप्ति ही भारत में बीसवीं सदी की सबसे बड़ी घटना है।
   iii. महात्मा गांधी के लिए सामाजिक सुधारों के लिए संघर्ष महत्वपूर्ण था क्योंकि सामाजिक ढाँचे के भीतर समानता से ही स्वाधीनता बोध की सच्ची अनुभूति संभव है।
   iv. गाँधीजी ने सत्यनारायण दर्शन की पात्रता सभी प्राणियों के प्रति आत्मवत प्रेम भाव को माना था क्योंकि सत्य को पाने का यही मार्ग है।
   v. जो राजनीति और धर्म के संबंध को नहीं मानते हैं, वे लोग धर्म को नहीं जानते। उनके प्रति गाँधीजी ने ऐसी धारणा बनाई क्योंकि गांधीजी धर्म के कल्याणकारी व्यापक स्वरूप को जानते थे।
   vi. जहाँ सामाजिक-आर्थिक स्तर पर अब तक दबे हुए, कमज़ोर और वंचितों की मुक्ति संभव हो।
   vii. प्रस्तुत गद्यांश के आधार पर स्वाधीनता की व्यापक पहचान राजनीतिक मुक्ति के साथ-साथ सामाजिक, आर्थिक और सांस्कृतिक संदर्भो में भी मुक्ति होनी चाहिए ताकि सबको स्वाधीनता का संपूर्ण बोध हो सके।
2. i. फूल बोने का प्रतीकार्थ है- मानव मात्र की भलाई के कार्य करते हुए मानवता के प्रतीकों का पोषण एवं संरक्षण करना, जबकि काँटे बोने का प्रतीकार्थ है-मानव और मानवता के विरूद्ध कार्य करना।
   ii. मन जीवनविरोधी अर्थात् त्रासद और दु:खद स्थितियों में अशांत होता है, लेकिन वो ममता, प्रेम एवं सहयोग और सकारात्मक भाव की स्थितियों का सहारा पाकर शांत हो जाता है।
   iii. संकट आ पड़ने पर मनुष्य का व्यवहार धैर्यपूर्ण होना चाहिए क्योंकि धैर्यपूर्वक संकट का सामना करने पर वह अंततः टल जाता है, लेकिन यदि हम उससे भयभीत होने लगते है, तो वह निरंतर बढ़ता ही जाता है।
   iv. अनुकूल स्थितियाँ न होने पर या दूसरों की प्रगति देखकर मनुष्य के मन में कटुता आ जाती है, लेकिन जब वह दूसरों के बारे में भी सोचता है और सहयोगपूर्ण सह-अस्तित्व में विश्वास करता है, तब उसके मन की कटुता दूर हो जाती है।

Section B

3. **मनोरंजन के आधुनिक साधन**

प्राचीन काल में मनोरंजन के साधन प्राकृतिक वस्तुएँ और मनुष्य के निकट रहने वाले जीव-जंतु थे। इसके अलावा वह पत्थर के टुकड़ों, कपड़े की गेंद, गुल्ली-डंडा, दौड़, घुड़दौड़ आदि से भी अपना मनोरंजन करता था। किंतु मनुष्य ने ज्यों-ज्यों सभ्यता की दिशा में कदम बढ़ाए, त्यों-त्यों उसके मनोरंजन के साधनों में भी बढ़ोत्तरी और बदलाव आता गया। आज प्रत्येक आयुवर्ग की रुचि के अनुसार मनोरंजन के साधन उपलब्ध हैं, जिनका प्रयोग करके लोग आनंदित हो रहे हैं।लेकिन जैसे-जैसे मनोरंजन के साधनों में बढ़ोतरी हुई है, वैसे-वैसे हमारे मानवीय मूल्यों में गिरावट आई है।

मनोरंजन के आधुनिक साधनों में रेडियो सबसे लोकप्रिय सिद्ध हुआ। आकाशवाणी के विभिन्न केंद्रों की स्थापना और उन पर प्रसारित क्षेत्रीय भाषाओं के कार्यक्रमों ने इसकी आवाज को घर-घर तक पहुँचाया।रेडियो के पश्चात टीवी ने भी मनोरंजन के क्षेत्र में एक आवश्यक भूमिका निभाई।

शिक्षित वर्ग के मनोरंजन के अन्य साधन हैं-पुस्तकालय में विभिन्न प्रकार की पुस्तकें पढ़ना तथा उनसे आनंद प्राप्त करना या कवि-सम्मेलन, नाट्यमंचन, मुशायरे के आयोजन में भाग लेना आदि। वर्तमान काल में विज्ञान की प्रगति के कारण मोबाइल फोन में ऐसी तकनीक आ गई है, जिससे गीत-संगीत सुनने, फ़िल्में देखने का काम अपनी इच्छानुसार किया जा सकता है। इस प्रकार मनोरंजन की दुनिया सिमटकर मनुष्य की जेब में समा गई है। निष्कर्षत: आज अपनी आय के अनुसार व्यक्ति अपना मनोरंजन कर सकता है क्योंकि मनोरंजन की दुनिया बहुत विस्तृत हो चुकी है।

OR

विज्ञापन की बढ़ती हुई लोकप्रियता

आज के युग को विज्ञापनों का युग कहा जा सकता है। आज सभी जगह विज्ञापन-ही-विज्ञापन नज़र आते हैं। बड़ी-बड़ी कंपनियाँ एवं उत्पादक अपने उत्पाद एवं सेवा से संबंधित लुभावने विज्ञापन देकर उसे लोकप्रिय बनाने का हर संभव प्रयास करते हैं। किसी नए उत्पाद के विषय में जानकारी देने, उसकी विशेषता एवं प्राप्ति स्थान आदि बताने के लिए विज्ञापन की आवश्यकता पड़ती है। इसके अतिरिक्त आज के समय में बिना विज्ञापन के उत्पादों का बिकना अत्यंत मुश्किल है।

विज्ञापनों के द्वारा किसी भी सूचना तथा उत्पाद की जानकारी, पूर्व में प्रचलित किसी उत्पाद में आने वाले बदलाव आदि की जानकारी सामान्य जनता को दी जा सकती है।

विज्ञापन का उद्देश्य जनता को किसी भी उत्पाद एवं सेवा की सही सूचना देना है, लेकिन आज विज्ञापनों में अपने उत्पाद को सर्वोत्तम तथा दूसरों के उत्पादों को निकृष्ट कोटि का बताया जाता है। आजकल के विज्ञापन भ्रामक होते हैं तथा मनुष्य को अनावश्यक खरीदारी करने के लिए प्रेरित करते हैं। विज्ञापनों का यह दायित्व बनता है कि वे ग्राहकों को लुभावने दृश्य दिखाकर गुमराह नहीं करें, बल्कि अपने उत्पाद के सही गुणों से परिचित कराएँ। तभी उचित सामान ग्राहकों तक पहुँचेगा और विज्ञापन अपने लक्ष्य में सफल होगा।

OR

कामकाजी महिलाओं की समस्याएँ

20वीं सदी के प्रारंभ में विश्व में महिलाओं का स्थान घर-परिवार की जिम्मेदारियाँ तक ही सीमित था। किंतु आधुनिकीकरण के साथ-साथ समाज के संरचनात्मक स्तर में भी परिवर्तन आया। महिलाओं के लिए शिक्षा के द्वार खुले और महिलाओं ने आजादी के संघर्ष में बढ़-चढ़कर भाग लिया। यही नहीं आजादी के बाद बदलते सामाजिक परिदृष्य की उपज अभाव और महँगाई से दो-चार होने के लिए महिलाओं को घर की जिम्मेदारियाँ निभाने के अलावा

नौकरी व अन्य व्यवसाय भी करने पड़े,जो तत्कालीन समय के अनुसार सही भी है और आवश्यक भी। इन सबके बावजूद, उन्हें हीन दृष्टि से देखा जाता है। दूसरे, यदि महिलाकर्मी कुंवारी है तब सहकर्मी पुरुषों की ही नहीं, राह चलतों की गिद्ध दृष्टि भी उसे निगलने को तत्पर रहती है। उसे अनुचित संवाद सुनने पड़ते हैं तथा अनचाहे स्पर्श व संकेत झेलने पड़ते हैं।

अधिकारी भी उन्हें अधिक समय तक रुकने के लिए मजबूर करते हैं। इसका कारण भारतीय पुरुष की गुलाम मानसिकता है। विवाहित कामकाजी महिलाओं की समस्या भी कम नहीं होती। उन्हें नौकरी करने के साथ-साथ घर के पूर्वनिर्धारित सभी कार्य करने पड़ते हैं। पुरुष-प्रधान समाज में उसके कार्यों को दूसरा कोई नहीं करता। उसका व्यक्तित्व घर-बाहर में बँटा रहता है। अधिक कमाने वाला पति स्वयं को महत्वपूर्ण समझता है तथा कम कमाने वाला हीनग्रंथि का शिकार हो जाता है। ऐसी स्थिति में पति-पत्नी के संबंध तनावपूर्ण हो जाते हैं।आज हमें अपनी मानसिकता को बदलना होगा, तभी हम अपने देश के आगे बढ़ने में सहायक हो सकते हैं।

4. सेवा में
मुख्य अभियंता,
लोक निर्माण विभाग,
दिल्ली।
15 अप्रैल, 2019

विषय - सड़कों के रख-रखाव हेतु।

महोदय,

सविनय निवेदन यह है कि मैं गोविन्द प्रसाद, बसई गाँव का निवासी हूँ। निकट के शहर से हमारे गाँव को जो सड़क जोड़ती है ,उसका अभी कुछ ही दिनों पूर्व लोक निर्माण विभाग की ओर से निर्माण करवाया गया था। सड़क का उचित रख-रखाव न करने के कारण सड़क पर दोनों ओर गंदगी फैली रहती है, लोग अपने घर का कूड़ा वहाँ डालने लगे हैं। इसके अतिरिक्त सड़क भी बीच-बीच में कई जगह से टूट गई है,और सड़क पर जगह-जगह गढ्ढे बन गए हैं, जिससे आने-जाने में बड़ी कठिनाई का सामना करना पड़ता है।

अतः महोदय मेरा आपसे अनुरोध है कि सड़क पर कूड़ा डालने वाले लोगों को चेतावनी देकर वहाँ पर कूड़ा न डालने का निर्देश दिया जाए और सड़क को पुनः निर्माण करके उसे उपयोग करने के लायक बनाया जाए।

आशा है कि आप मेरे इस पत्र द्वारा प्राप्त सूचना पर शीघ्रातिशीघ्र कदम उठाएँगे।

धन्यवाद

भवदीय

गोविन्दप्रसाद

बसई गाँव

OR

4/41, आज़ादपुर, दिल्ली।
17 अप्रैल, 2019
सेवा में,
संपादक,
हिंदुस्तान टाइम्स,
मथुरा रोड, दिल्ली।

विषय- आपराधिक घटनाओं को समाचार चैनल द्वारा सनसनीखेज़ बनाए जाने के संबंध में।

महोदय,

इस पत्र के माध्यम से मैं आपका ध्यान आपराधिक घटनाओं को समाचार चैनलों द्वारा सनसनीखेज़ बनाए जाने तथा न्यायालय के निर्णय से पूर्व स्वयं निर्णय लेने की प्रवृत्ति की ओर आकर्षित कराना चाहती हूँ।

पत्रकारिता को भारतीय समाज में लोकतंत्र का चौथा आधार स्तंभ माना जाता है। लोकतंत्र को सुचारु रूप से चलाने में इसकी महत्त्वपूर्ण भूमिका रही है। वर्तमान समय में कई बार देखा गया है कि विभिन्न समाचार चैनलों ने अपनी सनसनीखेज़ पड़ताल के द्वारा न्यायालयों के निर्णय से पूर्व ही आरोपी को अपराधी ठहरा कर जाँच की प्रक्रिया में बाधा उत्पन्न की है। 'आरूषि हत्याकांड' इसका उपयुक्त उदाहरण है। समाचार चैनलों की यह प्रवृत्ति जन सामान्य की भावनाओं को आंदोलित करने के साथ ही न्यायिक प्रणाली को भी प्रभावित करती है। किसी भी समाचार चैनल को कार्य केवल उस घटना से संबंधित तथ्यों से जनता को अवगत कराना होता है। किसी भी आरोपी को अपराधी घोषित करना या न करना केवल न्यायालय का कार्य होता है।

अतः मेरा आपके माध्यम से ऐसे समाचार चैनलों से अनुरोध है कि उन्हें अपनी ऐसी प्रवृत्ति को त्याग देना चाहिए। मैं आपसे निवेदन करती हूँ कि आप अपने समाचारपत्र के माध्यम से इन चैनलों के इस रवैये के खिलाफ कोई ठोस कदम उठाए।

धन्यवाद।

भवदीया

ज्योति मेहरा

5. निम्नलिखित प्रश्नों का उत्तर 15-20 शब्दों में लिखिये:
   a) समाचार माध्यमों के लिए पत्रकारों द्वारा किया गया लेखन पत्रकारीय लेखन कहलाता है।
   b) कुछ विशिष्ट लेखक अपने मनचाहे विषय को चुनकर एक विशेष शैली में नियमित स्तंभ लिखते हैं। इसे स्तंभ लेखन कहा जाता है। इसमें लेखक के अपने विचार अभिव्यक्त होते हैं।
   c) **संपादन के दो सिद्धांत निम्नलिखित हैं -**
      1. **निष्पक्षता -** संपादन में निष्पक्षता का तात्पर्य है बिना किसी का पक्ष लिए अपना कार्य करना।

2. **वस्तुपरकता -** संपादन में वस्तुपरकता का तात्पर्य है कि जो हम संपादित कर रहे हैं, वो विषय से जुड़ा है या नहीं ।

d) मुद्रित माध्यम की दो विशेषताएँ हैं -
- अपनी गति, समय एवं स्थान के अनुसार पढ़ने की सुविधा
- विश्वसनीयता

e) समेकित माध्यम इंटरनेट को कहा जाता है।

6. **बढ़ते अपराध**

वर्तमान दौर में अपराध की दिनोंदिन बढ़ोतरी हो रही है। खासकर आजकल दिल्ली विविध प्रकार के अपराधों का केंद्र बनती जा रही है। दिल्ली में आजकल गुंडागर्दी, बलात्कार, हत्याएँ, लूटपाट, अपहरण जैसी आपराधिक घटनाएँ लगातार बढ़ रही हैं। देश की राजधानी में ये सब घटनाएँ आम हो चुकी हैं। दिल्ली शिक्षा एवं जीविका की सुविधाओं का केंद्र है। सभी छोटे-बड़े शहरों से लड़कियाँ इस केंद्र (दिल्ली) की ओर अपना जीवन सँवारने के उद्देश्य से आती रहती हैं। अब लड़कियाँ यहाँ पर अपने को सुरक्षित महसूस नहीं कर पा रही हैं, न तो उनके माता-पिता ही आश्वस्त हो पाते हैं। दिनों-दिन जिस तरह से यहाँ अपराधों की संख्या बढ़ती जा रही है, छेड़खानी की घटनाएँ तो आम बात हो गई है। देश की राजधानी दिल्ली 'अमन चैन की राजधानी' न रहकर असामाजिक तत्वों व अपराधियों द्वारा 'भय व आतंक के वातावरण की राजधानी' बनकर रह गई है। दिन-दहाड़े दुकानदारों से लूट, घरों में चोरी, छोटे बच्चों का अपहरण, लड़कियों से छेड़छाड़ व बलात्कार तो जैसे आम बात हो गई है।

सुबह-सुबह समाचार-पत्र देखने पर ऐसा लगता है जैसे दिल्ली में पुलिस का नहीं, बल्कि अपराधियों का बोलबाला है। सड़क पर दुर्घटना होती है, पर लोग आँख बंद करके निकल जाते हैं। कोई किसी की मदद करता भी है, तो पुलिस और राजनीति के चक्र में ऐसा फँसता है कि आगे से मदद करने लायक ही नहीं बचता।

इन बढ़ते अपराधों से दिल्ली की छवि विश्व के मानचित्र पर धूमिल हो रही है और विदेशी सैलानी आने से कतराने लगे हैं। अगर जल्द ही इन सब पर अंकुश नहीं लगाया गया, तो भविष्य और भी भयावह बनता जाएगा।।

OR

सांप्रदायिकता का ज़हर

अपने धर्म अथवा सम्प्रदाय के अतिरिक्त किसी और धर्म अथवा सम्प्रदाय के प्रति बिना किसी उचित कारण के घृणा और नफ़रत के भाव का होना,सम्प्रदायिकता कहलाता है। वर्तमान समय में देश में सांप्रदायिक सद्भावना की अत्यंत आवश्यकता है। देश में स्वतंत्रता से पूर्व ही सांप्रदायिक दंगों ने भयावह रूप धारण कर लिया था। उस समय अनेक हिंदुओं एवं मुसलमानों को मौत के घाट उतार दिया गया था। देश आज़ाद तो हुआ, परंतु दो टुकड़ों में बँट गया। हमारे शासकों ने भारत को धर्मनिरपेक्ष राष्ट्र की संज्ञा दी और पाकिस्तान बनने के बावजूद करोड़ो बार सांप्रदायिक दंगे हुए। इन दंगों में लाखों निरीह लोगों को जान से हाथ धोना पड़ा।

वर्ष 2002 में गुजरात के गोधरा में ट्रेन के दरवाज़े बंद कर पेट्रोल से आग लगाकर लगभग 250 लोगों को जिंदा जला दिया गया। इसके पश्चात् गुजरात में सांप्रदायिक दंगों की आग फैल गई और हज़ारों लोगों को जान से हाथ धोना पड़ा। सितंबर, 2012 में सांप्रदायिक दंगा करने वाले कुछ लोगों को आजीवन कारावास की सजा दी गई।

वास्तव में, सरकार किसी भी मूल्य पर अपना शासन बनाए रखना चाहती है। अतः वह अल्पसंख्यकों के हितों की रक्षा के नाम पर कभी मुसलमानों के लिए आरक्षण की बात करती है और कभी ईसाई अल्पसंख्यकों को संतुष्ट करती है। यदि सरकार सत्ता की लिप्सा में अंधी न हो, तो देश में तत्काल सांप्रदायिक सद्भावना स्थापित हो सकती है। सांप्रदायिकता का संबंध जितना धर्म से जुड़ता है, उससे अधिक राजनीति से जुड़ता है।सही मायने में सम्प्रदायिकता का विष राजनीति द्वारा ही फैलाया जाता रहा है, लेकिन इसे धर्म पर थोप दिया जाता आ रहा है।

स्वार्थी राजनीतिक तत्त्वों द्वारा अपने हितों की पूर्ति के लिए जनसामान्य के बीच धार्मिक उन्माद पैदा किया जाता है और फिर भड़की सांप्रदायिकता की आग पर वे अपनी रोटियाँ सेंकते हैं। जब तक राजनीति की इच्छाशक्ति सुदृढ़ नहीं होगी, तब तक सांप्रदायिकता का दानव हर समाज को लीलता रहेगा।

OR

वर्तमान युग में इंटरनेट के महत्व से कौन अपरिचित है। आज यह लेखन अभिव्यक्ति का सबसे सशक्त तथा सर्वव्यापी माध्यम बन चुका है। आज के 10 साल पूर्व जो भी रचनात्मक लेखन होता उसके प्रकाशन के लिए समाचार पत्र या पत्रिकाओं पर ही निर्भर रहना पड़ता था। पर आज इंटरनेट ने चमत्कारी रूप से इस समस्या का निराकरण कर दिया है। यदि कोई व्यक्ति कविता, कहानी, लेख या फीचर लिखने में सक्षम है तो इसे टाइप कर इंटरनेट के माध्यम से अपने ब्लाग पर या सोशल नेटवर्किंग साइट्स पर अपने अकाउंट पर पोस्ट कर सकता है। पलक झपकते ही इस सामग्री को संसार के किसी भी कोने में बैठा व्यक्ति पढ़ सकता है। आज के युग में इंटरनेट सबसे सस्ती और विश्वव्यापी संचार प्रणाली बन गया है। अब तो 4 जी कनेक्टिविटी ने इसकी गति को दस गुना अधिक कर दिया है।

Section C

7. i. कवि स्वयं को संसार से अलग मानता है क्योकि वह संसार में रहने वाले अन्य लोगों की भाँति धन-संग्रह या वैभव के पीछे नहीं भागता बल्कि वह संसार में प्रेम का स्वरूप स्थापित करना चाहता है।

ii. कवि सांसारिक वैभव की परवाह नहीं करता, इसलिए वह कहता है कि मैं अपने भीतर कितने ही संसार रोज बनाता-मिटाता रहता हूँ। संसार के लोग वैभव जोड़ना ही अपना एकमात्र लक्ष्य समझते हैं किंतु कवि भौतिक वैभव को तुच्छ समझता है।

iii. कवि का हृदय व्याकुल होकर रोता है पीड़ा की मनोस्थिति में वह गीत लिखता है। इस प्रकार उसके रोदन मे राग छिपा रहता है। वह मन के उत्कट भावों को भी शांत भाव से प्रकट करता है। इस प्रकार उसकी शीतल वाणी में भावों की चिंगारी छिपी रहती है,जिनसे संसार को परिवर्तित करना चाहता है।

OR

i. कवि धर्म, जाति, संप्रदाय के नाम पर राजनीति करने वाले ठेकेदारों पर व्यंग्य करता है क्योंकि समाज के इन ठेकेदारों के व्यवहार से ऊँच-नीच, जाति-पाँति आदि के द्वारा समाज की सामाजिक समरसता कहीं खो गई है।

ii. कवि स्वयं को रामभक्त कहने में गर्व का अनुभव करता है। वह स्वयं को उनका गुलाम कहता है तथा समाज की हँसी का उस पर कोई प्रभाव नहीं पड़ता।

iii. कवि समाज से कहता है कि समाज के लोग उसके बारे में जो कुछ कहना चाहें, कह सकते हैं। कवि पर उनका कोई प्रभाव नहीं पड़ता। वह किसी से कोई संबंध नहीं रखता।

8. i. शरतकालीन सुबह की उपमा खरगोश की लाल आँखों के समान की गई है क्योंकि जिस प्रकार प्रातःकालीन सूर्य रक्तिम आभा लिए हुए होता है उसी प्रकार खरगोश की आँखे भी लाल होती हैं।

ii. प्रस्तुत अंश में कवि ने मानवीकरण अलंकार का बहुत सुंदर प्रयोग किया है, जो इन पंक्तियों में देखने लायक है; जैसे-'भादो गया', 'शरद आया, पुलों को पार करते हुए, अपनी नई चमकीली साइकिल तेज चलाते हुए शरद रूपी बालक का आगमन होता है।

OR

i.
- भाषा मधुर एवं कोमलकांत
- सरल, सुबोध, खड़ी बोली, प्रवाहमय
- मुक्तक छंद
- "तैरती साँझ की -------काया" मानवीकरण अलंकार
- 'आँखें चुराना' मुहावरे का सुंदर प्रयोग
- हौले-हौले- पुनरुक्ति प्रकाश
- मनोरम दृश्य बिंब
  तुकबंदी के कारण गेय

ii.
- आकाश में पंक्ति बनाकर उड़ते हुए सफेद बगुले काले बादलों के ऊपर साँझ की श्वेत काया के समान प्रतीत
- कवि की आँखों का इस नयनाभिराम दृश्य में उलझना
- संध्या का सुन्दर, सजीव एवं मनोहारी चित्रण

9. निम्नलिखित प्रश्नों में से किन्ही दो के उत्तर 60-70 शब्दों में दीजिये:

a) इस कविता में कवि ने कथ्य और माध्यम के द्वंद्व को उकेरा है तथा भाषा की सहजता की बात कही है। हर बात के लिए कुछ ख़ास शब्द नियत होते हैं, ठीक वैसे ही जैसे हर पेंच के लिए एक निश्चित खाँचा होता है। इसलिए कवि का कहना है कि भाषा का प्रदर्शन नहीं करना चाहिये। घूमा-फिरा कर आलंकारिक रूप से कही गयी बात साधारण लोगों को एक बार में समझ नहीं होती।

b) उषा कविता के माध्यम से कवि ने प्रात: कालीन सौन्दर्य का वर्णन सरल एवं सहज भाव से किया है। नए तथा ग्रामीण जीवन के प्रतीकों का प्रयोग करते हुए जीवंत एवं गतिशील चित्रण किया गया है। भोर के समय आकाश शंख के समान नीला लगता है ,सूर्य के आगमन के साथ ही उसकी नीलिमा कम होने लगती है। भोर का आकाश कभी राख से लीपे हुये गीले चौके के समान प्रतीत होने लगता है तो कभी खड़िया चाक लगे हुए स्लेट के समान तो कभी केसर से लीपी हुई सिल जैसा लग रहा है है किन्तु सूर्योदय से उषा का जादू टूटने लगता है। सूर्य की लालिमा के सामने भोर के बदलते रूप-रंग विलीन हो जाते हैं।

c) गोरखपुरी की रूबाइयाँ कलापक्ष की दृष्टि से बेहतरीन बन पड़ी हैं। भाषा सहज, सरल और प्रभावी हैं। भावानुकूल शैली का प्रयोग हुआ है। उर्दू शब्दावली के साथ-साथ शायर ने देशज संस्कृत के शब्दों का प्रयोग भी स्वाभाविक ढंग से किया है। लोका, पिन्हाती, पुते, लावे आदि शब्दों के प्रयोग से उनकी रुबाइयाँ अधिक प्रभावी बन पड़ी हैं।

10. i. जब आषाढ़ के पंद्रह दिन बीत जाने के बाद भी बादलों का नामोनिशान नहीं होता था। कुओं का पानी सूख जाता था। नलों में पानी नहीं आता था। यदि आता भी था तो वह बेहद गरम होता था इसी कारण लोगों को परेशानी होती थी।

ii. गाँव में बारिश न होने से हालत अधिक खराब होती थी। खेतों में जहाँ जुताई होनी थी, वहाँ मिट्टी सूखकर पत्थर बन जाती थी, फिर उसमें पपड़ी पड़ जाती थी और जमीन फटने लगती थी। लू के कारण लोग चलते-चलते गिर जाते थे। पशु-पक्षी प्यास के कारण मरने लगे थे।

iii. इंदर सेना उन किशोरों का झुंड होता था जो भगवान इंद्र से वर्षा माँगने के लिए गली-गली घूमकर लोगों से पानी माँगते थे। वे लोगों से मिले पानी में नहाते, उछलते-कूदते थे तथा कीचड़ में लथपथ होकर मेघों से पानी माँगते थे।

OR

i. प्रस्तुत गद्यांश 'शिरीष के फूल' पाठ से लिया गया है तथा इसके लेखक हजारी प्रसाद द्विवेदी हैं।

ii. कालिदास के अनुसार, शिरीष के पुष्प केवल भौंरों के पदों के कोमल दबाव को ही सहन कर सकते हैं, पक्षियों के पदों का नहीं। ऐसा कवि का अनुमान है कि इस बात का प्रचार कालिदास ने ही किया होगा।

iii. कालिदास उच्च कोटि के कवियों में से एक हैं। लेखक कहता है कि इतने बड़े कवि की बात का विरोध करने की हिम्मत नहीं है और उसकी ऐसी इच्छा भी नहीं है।

11. निम्नलिखित A, B, C प्रश्नों में से किन्हीं दो प्रश्नों का उत्तर दीजिये, प्रश्न D अनिवार्य है : (4+4+2)

a) यह निबंध उपभोक्तावाद एवं बाजारवाद की अंतर्वस्तु को समझाने में बेजोड़ है। लेखक बताता है कि बाजार का आकर्षण मानव मन को भटका देता है। वह उसे ऐशोआराम की वस्तुएँ खरीदने की तरह आकर्षित करता है। लेखक ने भगत जी के माध्यम से नियंत्रित खरीददारी का महत्त्व भी प्रतिपादित किया है। बाजार मनुष्य की ज़रूरतें पूरी करें। इसी में उसकी सार्थकता है, अन्यथा यह समाज में ईर्ष्या, तृष्णा, असंतोष, लूटखसोट को बढ़ावा देता है।

b) नमक कहानी में छिपा संदेश यह है कि मानचित्र पर एक लकीर मात्र खींच देने से वहाँ रहने वाले लोगों के दिल नहीं बँट जाते हैं। जमीन बँटने से लोगों के आवागमन पर प्रतिबंध और पाबंदियाँ लग जाती हैं परंतु लोगो का लगाव अपने जन्मस्थान से बना रहता है। पाकिस्तानी कस्टम अधिकारी द्वारा दिल्ली को तथा भारतीय कस्टम अधिकारी द्वारा ढाका को अपना वतन मानना इसका प्रमाण है।जमीन का बंटवारा हो सकता है दिल का नहीं।

c) हाँ, हम इस बात से पूरी तरह सहमत हैं क्योंकि भक्तिन के पुत्र न होने पर उसे उपेक्षा अपने ही घर की स्त्रियों अर्थात सास और जिठानियों से मिली। सास और जिठानियाँ चौकी पर बैठ कर आराम फरमाती थी क्योंकि उन्होंने लड़कों को जन्म दिया था भले ही वे किसी लायक नहीं थे

और भक्तिन तथा उसकी नन्हीं बेटियों को घर और खेतों का सारा काम करना पड़ता था। यहाँ तक कि उनके खाने पीने में भी अन्तर था जेठानियों के लड़के दूध-मलाई खाते और लड़कियाँ मोटा अनाज।लड़कियाँ होने के बावजूद उसके पति का भक्तिन के प्रति स्नेह कभी भी कम नहीं हुआ।

मेरे हिसाब से किसी भी घर में बिना स्त्री की सहमति के भ्रूणहत्या, दहेज़ की माँग, परिवार में बेटा-बेटी में अंतर, बेटी-बहुओं पर अत्याचार आदि नहीं किया जा सकता।

d) चार्ली चैप्लिन की कला की सार्वभौमिकता के कारणों की जाँच अभी होनी है, परंतु कुछ कारण स्पष्ट हैं, जैसे वे सदैव युवा जैसे दिखते हैं तथा दूसरों को अपने लगते हैं।

12. निम्नलिखित प्रश्नों में से किन्हीं तीन के उत्तर 80-100 शब्दों में दीजिये:

a) यशोधर बाबू लगभग हर वाक्य के प्रारंभ में 'समहाउ इंप्रापर' शब्द का उपयोग तकिया कलाम की तरह करते हैं। उन्हें जो अनुचित लगता है, तब अचानक यह वाक्य कहते हैं।

पाठ में 'समहाउ इंप्रापर' वाक्यांश का प्रयोग निम्नलिखित संदर्भों में हुआ है-

- दफ़्तर में सिल्वर वैडिंग की पार्टी देने की मांग पर
- साधारण पुत्र को असाधारण वेतन मिलने पर
- स्कूटर की सवारी पर
- पत्नी एवं पुत्री के पहनावे पर
- डीडीए फ्लैट का पैसा न भरने पर
- खुशहाली में रिश्तेदारों की उपेक्षा करने पर
- छोटे साले के ओछेपन पर
- केक काटने की विदेशी परंपरा पर आदि

इन सन्दर्भों से यह स्पष्ट हो जाता है कि यशोधर बाबू सिद्धांतवादी हैं। यशोधर बाबू आधुनिक परिवेश में बदलते हुए जीवन-मूल्यों और संस्कारों के विरूद्ध हैं। वे उन्हें अपनाना नहीं चाहते, इसी आदत के कारण प्रायः परिवार से उनका मनमुटाव बना रहता है और असहजता एवं अस्वाभाविक स्थिति में यह वाक्यांश उनके मुँह से निकल पड़ता है।

b) **सिल्वर वैडिंग** कहानी वर्तमान युग में बदलते जीवन-मूल्यों की कहानी है। इस कहानी में यशोधर पंत प्राचीन मूल्यों के प्रतीक हैं। इसके विपरीत उनकी संतान नए युग का प्रतिनिधित्व करती है। दोनों पीढ़ियों के अपने-अपने जीवन मूल्य हैं। यशोधर के बच्चे वर्तमान समय के बदलते जीवन-मूल्यों की झलक दिखलाते हैं। नई पीढ़ी जन्म-दिन, सालगीरह आदि पर केक काटने में विश्वास रखती है। नई पीढ़ी तेज़ी से आगे बढ़ना चाहती है। इसके लिए वे परंपरागत व्यवस्था को छोड़ने में संकोच नहीं करते।

यशोधर बाबू परंपरा से जुड़े हुए हैं। वे सादगी का जीवन जीना चाहते हैं। संग्रह वृत्ति, भौतिक चकाचौंध से दूर, वे आत्मीयता, सामूहिकता के बोध से युक्त हैं। इन सबके कारण वे भौतिक संसाधन नहीं एकत्र कर पाते। फलतः वे घर में ही अप्रासांगिक हो जाते हैं। उनकी पत्नी बाहरी आवरण को बदल पाती है, परंतु मूल संस्कारों को नहीं छोड़ पाती। बच्चों की हठ के सम्मुख वह मॉडर्न बन जाती है। समय के साथ-साथ मूल्य भी बदलते जा रहे हैं।

c) मास्टर सौंदलगेकर कुशल अध्यापक, मराठी भाषा के ज्ञाता व कवि थे। वे सुरीले ढंग से स्वयं की व दूसरों की कविताएँ गाते थे। पुरानी-नयी मराठी कविताओं के साथ-साथ उन्हें अनेक अंग्रेजी कविताएँ भी कंठस्थ थीं। पहले वे एकाध गाकर सुनाते थे - फिर बैठे-बैठे अभिनय के साथ कविता का भाव ग्रहण कराते। वे अन्य कवियों से जुड़े संस्मरण सुनाते। बीच -बीच में अपनी कविताएँ भी पूरे हाव-भाव के साथ इतनी तन्मयता से सुनाते थे कि लेखक भावविभोर हो जाता था। आनन्दा को कविता या तुकबन्दी लिखने के प्रारम्भिक काल में उन्होंने उसका मार्गदर्शन व सुधार किया, उन्हें अलंकार छंद का ज्ञान कराया। अलग-अलग कविता संग्रह देकर काव्य विधा से परिचित कराया तथा साथ ही साथ उसे यह विश्वास दिलाया की कवि भी साधारण मनुष्य के जैसा होता है। इस प्रकार उसका आत्मविश्वास बढ़ाया जिससे वह धीरे-धीरे कविताएँ लिखने में कुशल होकर प्रतिष्ठित कवि बन गया।

d) लेखक का मानना है कि सिंधु घाटी सभ्यता में कहीं भी नहरों के प्रमाण नहीं मिले हैं। लोग कुओं के जल का प्रयोग करते थे। वर्षा भी पर्याप्त होती थी क्योंकि यहाँ खेती के भी खूब प्रमाण मिले हैं। लेखक का अनुमान है कि धीरे-धीरे वर्षा कम होने लगी होगी तथा यहाँ रेगिस्तान बनना प्रारंभ हुआ होगा। इसके साथ ही भूमिगत जल के अत्यधिक प्रयोग से पानी की कमी होनी शुरू हो गई होगी।

जल की निकासी, सामूहिक स्नानागार आदि के आधार पर यह कहा जा सकता है कि यहाँ के लोग जल का प्रचुर मात्रा में उपयोग करते होंगे। प्राकृतिक परिवर्तनों के कारण जल की कमी हो गई और सिंधु घाटी सभ्यता उजड़ गई।

e) सामाजिक एवं सांस्कृतिक दृष्टि से सिंधु सभ्यता के सामाजिक वातावरण को बहुत अनुशासित होने का अनुमान लगाया गया है। वहाँ का अनुशासन ताकत के बल पर नहीं था बल्कि आपसी समझ से अनुशासित सभ्यता थी। नगर योजना, वास्तुशिल्प, मुहर, पानी या साफ़-सफ़ाई जैसी सामाजिक व्यवस्था में एकरूपता से यह अनुशासन प्रकट होता है। सिंधु सभ्यता में सुनियोजित नगर थे, पानी की निकासी की व्यवस्था अच्छी थी। सड़कें लंबी व चौड़ी थी, कृषि भी की जाती थी, यातायात के साधन के रूप मे बैलगाड़ी भी थी। हर नगर में मुद्रा, अनाज भंडार, स्नानगृह आदि थे तथा पक्की ईंटों का प्रयोग होता था। सिंधु सभ्यता संपन्न सभ्यता थी किन्तु इसमें प्रदर्शन या दिखावे की प्रवृत्ति नहीं थी। यही विशेषता इसको अलग सांस्कृतिक धरातल पर खड़ा करती है। यह धरातल संसार की दूसरी सभी सभ्यताओं से पृथक है।