ATOMIC ENERGY CENTRAL SCHOOL -4, RAWATBHATA
CONFIDENCE EXAMINATION III: 2018-19
PHYSICS (Theory) Class – XII

Time allowed: 3 hours   Maximum Marks: 70

General Instructions:

a) All the questions are compulsory.
b) There are 27 questions in total.
c) Questions 1 to 5 are very short answer type questions and carry one mark each.
d) Questions 6 to 12 carry two marks each.
e) Questions 13 to 24 carry three marks each.
f) Questions 25 to 27 carry five marks each.
g) There is no overall choice. However, an internal choice has been provided in one question of two marks, one question of three marks and all three questions in five marks each. You have to attempt only one of the choices in such questions.
h) Use of calculators is not permitted. However, you may use log tables if necessary.

SECTION A

1. State the SI unit of the electric polarization vector **P**

2. Define temperature coefficient of resistivity

3. Name the electromagnetic waves that are widely used as a diagnostic tool in medicine.

4. A ray of light is incident on a medium with angle of incidence 'i' and is refracted into a second medium with angle of refraction 'r'. The graph of sin i versus sin r is as shown. Find the ratio of the velocity of light in the first medium to the velocity of light in the second medium.
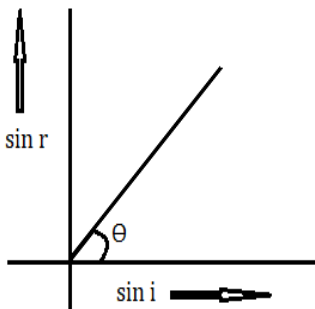
5. Two particles have equal momentum. What is the ratio of their de-Broglie wavelengths?

SECTION B

6. A network of resistors is connected to a 16 V battery with internal resistance of 1ohm, as shown in the following figure. Compute the equivalent resistance of the network.
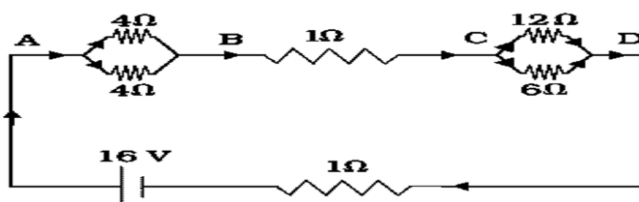

OR

A 9 V battery is connected in series with a resistor .The terminal voltage is found to be 8 V.   Current through the circuit is measured as 5 A. What is the internal resistance of the battery?

7. The diagram below shows a potentiometer set up. On touching the jockey near to the end X of the potentiometer wire, the galvanometer pointer deflects to left. On touching the jockey near to end Y of the potentiometer, the galvanometer pointer again deflects to left but now by a larger amount. Identify the fault in the circuit and explain, using appropriate equations or otherwise, how it leads to such a one-sided deflection.
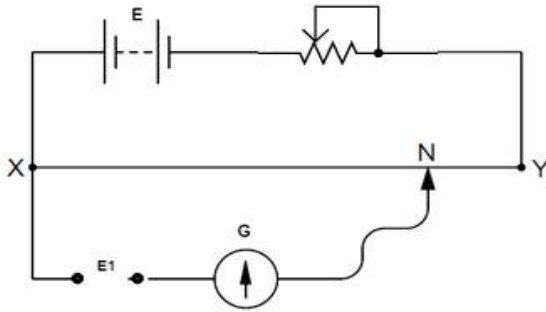
8. The figure shows two sinusoidal curves representing oscillating supply voltage and current in an ac circuit.
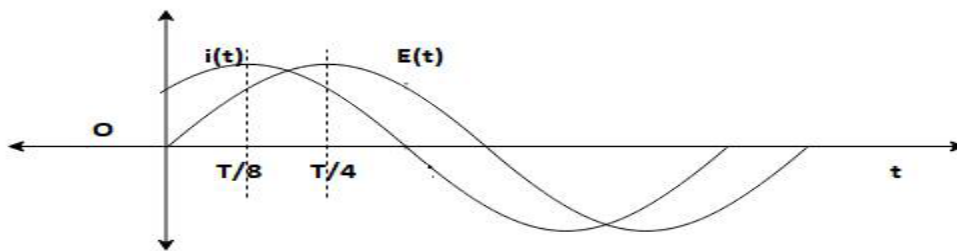
Draw a phasor diagram to represent the current and supply voltage appropriately as phasors. State the phase difference between the two quantities.

9. Compare the following
(i) Wavelengths of the incident solar radiation absorbed by the earth's surface and the
Radiation re-radiated by the earth.
(ii) Tanning effect produced on the skin by UV radiation incident directly on the skin and
That coming through glass window.

10. A narrow slit is illuminated by a parallel beam of monochromatic light of wavelength λ equals to 6000 Å and the angular width of the central maxima in the resulting diffraction pattern is measured. When the slit is next illuminated by light of wavelength λ', the angular width decreases by 30%. Calculate the value of the wavelength λ'.

11. What are universal gates? How can AND gate be realized using an appropriate combination of NOR gates?

12. A TV transmission tower antenna is at a height of 20 m. How much range can it cover if the receiving antenna is at a height of 25 m?

SECTION C

13. A particle, having a charge +5 µC, is initially at rest at the point x = 30 cm on the x axis. The particle begins to move due to the presence of a charge Q that is kept fixed at the origin. Find the kinetic energy of the particle at the instant it has moved 15 cm from its initial position if (a) Q =+15µC and (b) Q = -15µC

14. (a) An electric dipole is kept first to the left and then to the right of a negatively charged infinite plane sheet having a uniform surface charge density. The arrows p1 and p2 show the directions of its electric dipole moment in the two cases.
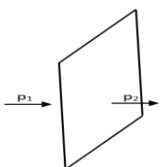

Identify for each case, whether the dipole is in stable or unstable equilibrium. Justify each answer. (b) Next, the dipole is kept in a similar way (as shown), near an infinitely long straight wire having uniform negative linear charge density.
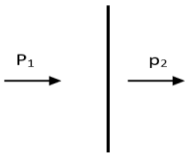
Will the dipole be in equilibrium at these two positions? Justify your answer**.**

15. Two material bars A and B of equal area of cross-section, are connected in series to a DC supply. A is made of usual resistance wire and B of an n-type semiconductor.
    (a) In which bar is drift speed of free electrons greater?
    (b) If the same constant current continues to flow for a long time, how will the voltage
        Drop across A and B be affected? Justify each answer.

16. Derive an expression for the velocity v_c of a positive ions passing undeflected through a region where crossed and uniform electric field E and magnetic field B are simultaneously present. Draw and justify the trajectory of identical positive ions whose velocity has a magnitude less than |v_c|.

17. A sinusoidal voltage of peak value 10 V is applied to a series LCR circuit in which resistance, capacitance and inductance have values of 10 Ω, 1µF and 1H respectively. Find (i) the peak voltage across the inductor at resonance (ii) quality factor of the circuit.

18. a) What is the principle of transformer?
    b) Explain how laminating the core of a transformer helps to reduce eddy current
       Losses in it (c) Why the primary and secondary coils of a transformer are preferably
  wound on the same core.

19. Draw a labelled ray diagram to show the image formation in a refracting type astronomical telescope in the normal adjustment position. Write two drawbacks of refracting type telescopes.

20. A jar of height h is filled with a transparent liquid of refractive index µ. At the centre of the jar on the bottom surface is a dot. Find the minimum diameter of a disc, such that when it is placed on the top surface symmetrically about the centre, the dot is invisible.
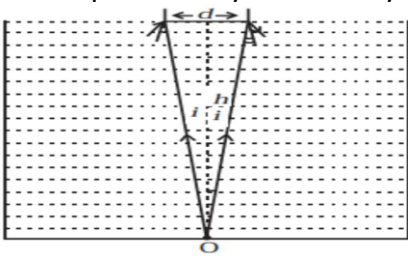
21. (a) In photoelectric effect, do all the electrons that absorb a photon come out as photoelectrons irrespective of their location? Explain.
    (b) A source of light, of frequency greater than the threshold frequency, is placed at a distance 'd' from the cathode of a photocell. The stopping potential is found to be V. If the distance of the light source is reduced to d/n (where n>1), explain the changes that are likely to be observed in the (i) photoelectric current and (ii) stopping potential.

22. A monochromatic radiation of wavelength 975 Å excites the hydrogen atom from its ground state to a higher state. How many different spectral lines are possible in the resulting spectrum? Which transition corresponds to the longest wavelength amongst them?

23. How are protons, which are positively charged, held together inside a nucleus? Explain the variation of potential energy of a pair of nucleons as a function of their separation. State the significance of negative potential energy in this region?

24. A sinusoidal carrier wave of amplitude Ac and angular frequency ωc is modulated in Accordance with a sinusoidal information signal of amplitude Am and angular frequency ω_m. Show that the amplitude modulated signal contains three frequencies centered around ω_c. Draw the frequency spectrum of the resulting modulated signal.

SECTION D

25. Draw a graph to show the variation of angle of deviation (δ) with the angle of incidence (i) for a monochromatic light passing through a prism of refracting angle A and deduce the relation for refracting index of the material of the prism.

$$n = \frac{Sin\ (A+\delta m)/2}{Sin\ A/2}$$

OR

(a) Derive the refraction formula at spherical refracting convex surface when object is placed in rarer medium.   (b) Use this relation to derive thin lens formula for thin lens.

26. Explain the use of pnp transistor as a common emitter amplifier. Discuss phase relationship between input and output voltages. Write expression for the current gain and voltage gain.

OR

(a) Show that NAND gate is a universal gate.

(b) Identify the logic gates marked P and Q in the given logic circuit. Write down the output   at X for the inputs (i) A = 0, B = 0 and (ii) A = 1, B = 1
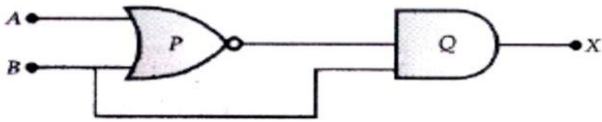
27. With the help of a labelled diagram, explain the principle and working of a cyclotron. Derive an expression for the period of revolution and cyclotron frequency and show that it is independent of the speed of the charged particles.

OR

(a) State and explain ampere circutal law?

(b) Using this law derive the magnetic filed due to long solenoid at its axis.

(c) Obtain formula of magnetizing fieild due to long solenoid at its axis.

General Instructions:
(i) All questions are compulsory.
(ii) This question paper contains 29 questions.
(iii)Question 1- 4 in Section A are very short-answer type questions carrying 1 mark each.
(iv) Question 5-12 in Section B are short-answer type questions carrying 2 marks each.
(v) Question 13-23 in Section C are long-answer-I type questions carrying 4 marks each.
(vi) Question 24-29 in Section D are long-answer-II type questions carrying 6 marks each.

SECTION – A
Questions 1 to 4 carry 1 mark each.

1. If the binary operation * on the set of integers Z, is defined by $a * b = a + 3b^2$, then find the value of $2 * 4$.

2. If $f : R \to R$ be defined by $f(x) = (3 - x^3)^{1/3}$, then find $fof(x)$.

3. If A is a 3×3 matrix, $|A| \neq 0$ and $|3A| = k |A|$, then write the value of k.

4. Find a vector in the direction of vector $2\hat{i} - 3\hat{j} + 6\hat{k}$ which has magnitude 21 units.

OR

Find the unit vector in the direction of vector $\overrightarrow{PQ}$, where P and Q are the points (1, 2, 3) and (4, 5, 6), respectively.

SECTION – B
Questions 5 to 12 carry 2 marks each.

5. Prove that $\tan^{-1} \sqrt{x} = \dfrac{1}{2} \cos^{-1}\left(\dfrac{1-x}{1+x}\right), x \in (0,1)$

6. If $\begin{bmatrix} x-y & z \\ 2x-y & w \end{bmatrix} = \begin{bmatrix} -1 & 4 \\ 0 & 5 \end{bmatrix}$, find the value of $x + y$.

7. If $y = \cot^{-1} \sqrt{\dfrac{1-\sin x}{1+\sin x}}$, find $\dfrac{dy}{dx}$.

8. Evaluate: $\displaystyle\int \dfrac{xe^x}{(1+x)^2} dx$

OR

Evaluate: $\displaystyle\int \dfrac{1}{\sqrt{2x-x^2}} dx$

9. Find the approximate change in the volume V of a cube of side x meters caused by increasing the side by 2%.

10. If $\vec{a}$ and $\vec{b}$ are perpendicular vectors, $|\vec{a}+\vec{b}| = 13$ and $|\vec{a}| = 5$ find the value of $|\vec{b}|$.

OR

If $\vec{a} = 5\hat{i} - \hat{j} - 3\hat{k}$ and $\vec{b} = \hat{i} + 3\hat{j} - 5\hat{k}$, then show that the vectors $\vec{a} - \vec{b}$ and $\vec{a} + \vec{b}$ are perpendicular.

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

OR

If $P(A) = \dfrac{6}{11}$, $P(B) = \dfrac{5}{11}$ and $P(A \cup B) = \dfrac{7}{11}$, find $P(A|B)$

12. Form the differential equation representing the family of curves $y = a \sin(x + b)$, where a, b are arbitrary constants.

SECTION – C
Questions 13 to 23 carry 4 marks each.

13. Evaluate: $\displaystyle\int \dfrac{\cos x}{(1 - \sin x)(2 - \sin x)}\, dx$

14. Determine the value of k so that the function
$$f(x) = \begin{cases} kx^2, & if \ \ x \le 2; \\ 3, & if \ \ x > 2 \end{cases}$$ is continuous.

OR

Discuss the differentiability of the function $f(x) = \begin{cases} 1+x, & if \ \ x \le 2; \\ 5-x, & if \ \ x > 2 \end{cases}$ at x = 2.

15. Show that the matrix $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$ satisfies the equation $A^2 - 4A + I = O$, where I is 2×2 identity matrix and O is 2×2 zero matrix. Using this equation, find A^{-1}.

16. An experiment succeeds thrice as often as it fails. Find the probability that in the next five trials, there will be at least 3 successes.

17. Solve the differential equation $(\tan^{-1}y - x)\, dy = (1 + y^2)\, dx$.

OR

Find the particular solution of the differential equation $\dfrac{dx}{dy} + y \cot x = 2x + x^2 \cot x, x \ne 0$ given

that $y = 0$ when $x = \dfrac{\pi}{2}$

18. The probabilities of two students A and B coming to the school in time are $\dfrac{3}{7}$ and $\dfrac{5}{7}$ respectively. Assuming that the events, 'A coming in time' and 'B coming in time' are independent, find the probability of only one of them coming to the school in time.

19. If $x = 3\sin t - \sin 3t$, $y = 3\cos t - \cos 3t$, find $\dfrac{d^2 y}{dx^2}$ at $t = \dfrac{\pi}{3}$.

20. A wire of length 28 m is to be cut into two pieces. One of the pieces is to be made into a square and the other into a circle. What should be the length of the two pieces so that the combined area of the square and the circle is minimum?

21. Find the angle between the line $\dfrac{x+1}{2} = \dfrac{y}{3} = \dfrac{z-3}{6}$ and the plane $10x + 2y - 11z = 3$.

22. Prove that, $\left[\vec{a}+\vec{b} \ \ \vec{b}+\vec{c} \ \ \vec{c}+\vec{a}\right] = 2\left[\vec{a} \ \ \vec{b} \ \ \vec{c}\right]$ for any three vectors $\vec{a}$, $\vec{b}$, $\vec{c}$

23. Find the equation of the normals to the curve $y = x^3 + 2x + 6$ which are parallel to the line $x + 14y + 4 = 0$.

OR

Find the intervals in which the function f given by $f(x) = \sin x + \cos x$, $0 \le x \le 2\pi$ is strictly increasing or strictly decreasing.

SECTION – D
Questions 24 to 29 carry 6 marks each.

24. Let $A = \{1, 2, 3, ..., 9\}$ and R be the relation in $A \times A$ defined by $(a, b) R (c, d)$ if $a + d = b + c$ for $(a, b), (c, d)$ in $A \times A$. Prove that R is an equivalence relation. Also obtain the equivalence class $[(2, 5)]$.

OR

Let $A = R - \{3\}$ and $B = R - \{1\}$. Consider the function $f : A \to B$ defined by $f(x) = \left(\dfrac{x-2}{x-3} \right)$.

Show that f is one-one and onto and hence find f^{-1}.

25. Using properties of determinants, prove that $\begin{vmatrix} a & a+b & a+b+c \\ 2a & 3a+2b & 4a+3b+2c \\ 3a & 6a+3b & 10a+6b+3c \end{vmatrix} = a^3$

OR

Show that $\Delta = \begin{vmatrix} (y+z)^2 & xy & zx \\ xy & (x+z)^2 & yz \\ xz & yz & (x+y)^2 \end{vmatrix} = 2xyz(x+y+z)^3$

26. Evaluate: $\displaystyle\int_0^\pi \dfrac{x \sin x}{1 + \cos^2 x} dx$

OR

Find $\displaystyle\int_0^2 (x^2 + 1)dx$ as the limit of a sum.

27. Find the area of the region enclosed between the two circles: $x^2 + y^2 = 4$ and $(x - 2)^2 + y^2 = 4$.

28. Find the equation of the plane which contains the line of intersection of the planes $\vec{r}.(\hat{i} + 2\hat{j} + 3\hat{k}) - 4 = 0$, $\vec{r}.(2\hat{i} + \hat{j} - \hat{k}) + 5 = 0$ and which is perpendicular to the plane $\vec{r}.(5\hat{i} + 3\hat{j} - 6\hat{k}) + 8 = 0$.

29. A small firm manufactures gold rings and chains. The total number of rings and chains manufactured per day is atmost 24. It takes 1 hour to make a ring and 30 minutes to make a chain. The maximum number of hours available per day is 16. If the profit on a ring is Rs. 300 and that on a chain is Rs 190, find the number of rings and chains that should be manufactured per day, so as to earn the maximum profit. Make it as an L.P.P. and solve it graphically.

Atomic Energy Central School No.4,Rawatbhata
Confidence Examination-III (2018-19)

Time: 3 Hours   Class: XII, Chemistry   Max. Marks: 70

Instructions- 1) Attempt all the questions. Use of log table is permissible.

2) Q.No. 1 to 5 are each of 1 Mark. Ans.them in about 10-15 words.

3) Q.No. 6 to 12 are each of 2 Marks. Ans .them in about 20-30words.

4) Q.No. 13 to 24 are each of 3 Mark. Ans .them in about 30-40 words.

5) Q.No. 25 to27 are long answer question of 5 Marks.

1. Write the formula of compound of Phosphorous which is obtained when conc. HNO_3 oxidizes with P_4 ?

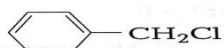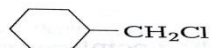2. Write the IUPAC name of following compound $CH_3 (CH_2)_2CH (Br) CH_3$

3. What is meant by selectivity & activity of catalyst?

              OR

What are associated colloids?

4. Which would undergo SN^1 faster –

5. What is n-type semiconductor? Give an example? OR What are F-centre?

6. i) Arrange the following compound in decreasing order of acidic strength : Phenol , Formic acid , Acetic Acid

ii) Write the mechanism of hydration of Ethene to form Alcohol (1+1)

7. Ag crystallizes with FCC unit cell with side length 409 pm calculate radius of Ag atom.

8. Draw the str. of $H_2S_2O_7$ & HNO_3

9. What products would be formed when a nucleotide from DNA containing thymine is hydrolyzed?

10. State the hybridization, magnetic behavior& geometry of $[Cr (CO)_6]$ on the basis of valance bond theory.

OR

What is spectrochemical series explain the difference between weak& strong field ligand?

11. i) What type of semiconductor is formed when Si doped with As?

    ii) ZnO is white but it turns yellow on heating, explain why?

12. How many e- flow through a metallic wire if a current of 5 A is passed for   2h?

 OR   Explain Kohlrausch's Law with example?

13. i) Write IUPAC name of $K_3[Fe (CN)_6]$

ii) Explain Linkage isomerism with example? (1+2)

14. Write short notes on following –

i) Coagulation & peptisation   ii) Bredig arc method   iii) Kraft Temperature

OR

14. i)What type of sol is Smoke? Write its dispersed phase & dispersion medium.

ii) Differentiate between Physiosorption & Chemisorption.

iii) What is collodion?   (3x1)

15. The rate constant for the first order decomposition of H_2O_2 is given by the equation:

log k= 14.34 -1.25x10^4 K/T

Calculate Ea for the reaction & at what temp. Will its half life be 256 min?

16. Among the following compound which is more reactive towards SN^2 reaction, towards β elimination reaction, & which is optically active-

   2-Chloro pentane,   2-bromo 2- methyl butane,   1-bromopentane

   Also give explanation of your answer.

17. Explain the following –

i) Mond Process of Ni refining (also write reaction) ii) Column chromatography for purification of rare elements. Iii) Extraction of Au by cyanide process.

18. How would you obtain i) Benzoquinone from phenol

ii)p- bromo aniline from Aniline   iii) Aniline from Benzoic Acid

19. Write the Str. & name of monomer of following monomer –

Nylon-6, Nylon66, Buna –S, terelene, Teflon, Natural Rubber.

20. Explain the following with one example of each –

i) Cationic detergent   ii) Anti fertility drug   iii) Artificial Sweeteners

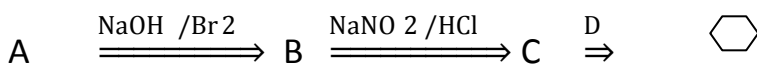21 Give reason for the following – i) PCl_5 is more covalent than PCl_3

 ii) Fe on reaction with HCl forms $FeCl_2$ not $FeCl_3$.

iii) H_3PO_2 is stronger reducing agent than H_3PO_3

22. i) Arrange these in decrease order of pK_b –

   $C_2H_5NH_2$, CH_3NH_2, $C_6H_5NH_2$, $(C_2H_5)_2NH$,

ii) Identify A,B,C, & D in the following sequence of reaction-

A $\xrightarrow{\text{NaOH }/Br2}$ B $\xrightarrow{\text{NaNO 2 }/HCl}$ C $\xrightarrow{D}$ ⬡

23. Explain the following i)Why Vit.C cannot stored in our body?

 ii) Nucleotide & Nucleoside

iii) Which polysaccharide present in bread?

24.i)Account for the following – a) Transition metals form alloy.   b) Zn, Cd & Hg are soft metals

c) E^0 value for Mn^{3+}/ Mn^{2+} couple is highly positive (+1.57 V) as compared to Cr^{3+}/ Cr^{2+}

OR

 i) Account for the following – a)How is the variability in oxidation state of Transition metals different from that of p- block elements?

   b) Out of Cu^+& Cu^{++} which ion is unstable in aqueous soln. & why

   c) Orange color of $Cr_2O_7^{-2}$ ion changes to yellow when treated with alkali why?

ii) Explain lanthanoid contraction. What are its consequences?

25. i) Explain +ve& -ve deviation of non ideal Sol^n & also draw its graph.

ii) Calculate maximum molarity of CuS in aq.Sol^n,if $K_{s.p}$ value of CuS is $6x10^{-16}$

OR

i) Why some times we get abnormal molecular mass using colligative properties? Explain it.

ii) Calculate amount of $CaCl_2$ (i=2.47) to be dissolved in 2.5 L water so that osmotic pr. is 0.75 atm. at $27\ ^0$ C. (2+3)

26. i) Distinguish between the following by chemical test - a) Acetophenone & benzoquinone b) Phenol & benzoic acid

ii) Account for the following –   a) Aldehydes are more reactive than ketone.

   a) Aniline does not undergo Friedel craft Reaction .

   b) Carboxylic acid has higher b.p. than alcohol.

                   OR

i) How will you convert the following- a) benzoic acid to benzaldehyde

b) Acetophenone to benzoic acid

c) Ethanoic acid to 2- hydroxyethanoic acid

ii) An organic compound contains 69.7% Carbon 11.63% H & rest Oxygen. The molecular mass of the compound is 86 It does not reduce tollens reagent & not formsaddition compound with NaHCO3 & give +ve iodoform test. On vigorous oxidation it gives ethanoic acid & propanoic acid. Identify compound & write its structure.

 27 i) Explain lanthanoids contraction & its causes and consequences

ii) Describe similarity & dissimilarity of lanthanoids & Actinoids   (3+2)

OR

i) Write the chemical equations for preparation of $K_2Cr_2O_7$?

ii) Why Mn^{+2} compounds more stable than Fe^{+2} towards oxidation? (3+2)

ATOMIC ENERGY CENTRAL SCHOOL No 4 RAWATBHATA

Confidence Examination - III (2018-19)

Subject – Biology

Time: 3Hrs   Class – XII   M.M. 70

General Instruction:-

1) There are a total of 27 questions and five sections in the questions paper. All questions are compulsory.
2) This question paper consists of four sections A, B, C and D. Section 'A' consists of 5 question of one mark each. Section 'B' is of 7 questions of 2 marks each, section 'C' is of 12 questions of 3 marks each and Section 'D' consists of 3 questions of five marks each.
3) There is no overall choice. However an internal choice has been provided in one questions of 2 marks one question of 3 marks and all questions of 5 marks. Attempt only one choice in all such questions.
4) Wherever necessary, the diagrams drawn should be neat and properly labeled

SECTION "A"

1. Mention the chemical changes that proinsulin undergoes, to be able to act as mature insulin.
2. How cytokine barriers do provided immunity in humans?
3. Name two diseases whose spread can be controlled by the eradication of *Aedes* mosquitoes.
4. Write the name of the following :
5. (i) A 15 mya primate that was ape-like.
   (ii) A 2 mya primate that lived in East African grasslands.

SECTION "B"

6. You have obtained a high yielding variety of tomato.
   Name and explain the procedure that ensures retention of the desired characteristics repeatedly in large population of future generation of the tomato crop.
7. Mention any two major causes of air pollution. Write any two harmful effect of air pollution to plants and humans.
8. Your advice is to sought to improve the nitrogen content of the soil to be used for cultivation of a non-leguminous terrestrial crop.
   (i) Recommend two microbes that can enrich the soil with nitrogen.
   (ii) Why do leguminous crop not require such enrichment of the soil?

9. (a) Name the source plant of heroin drug. How is it obtained from plant?
   (b) Write the effect of heroin on human body.
10. With the help of an algebraic equation, how did Hardy-Weinberg explain that in a given population the frequency of occurrence of alleles of a gene is supposed to remain the same through generations?

                    OR

    Although a prokaryotic cell has no defined nucleus, yet DNA is not scattered throughout the cell. Explain
11. How did a citizen group called Friends of Arcata Marsh, Arcata, California, USA, help to improve water quality of the marsh land using integrated waste water treatment? Explain in four steps.
12. Being a biology student you suggest any two programs you would like to organize in the school so to bring awareness among the students on how to check air pollution in and around the school.

SECTION "C"

13. (a) Differentiate between analogous and homologous structures.
    (b) Select and write analogous structures from list given below.
    (i) Wings of butterfly and birds
    (ii) Vertebrate hearts

(iii) Tendrils of *Bougainvillea* and *Cucuribita*.

(iv) Tubers of sweet potato and potato.

14. Draw a diagram of a mature human sperm. Label any three parts and write their function.

15. Differentiate between parthenocarpy and parthenogenesis. Give one example of each.

16. (a) Organic farmers prefer biological control of diseases and pests over to the use of chemicals for the same purpose. Justify.

    (b) Give an example of a bacterium, a fungus and an insect that are used as biocontrol agents.

17. (a) Expand VNTR and describe its role in DNA fingerprinting technique.

    (b) List any two application technique.

18. (a) How has the development of bioreactor helped in biotechnology?

    (b) Name the most commonly used bioreactor and describe its working.

19. How has the use of Agrobacterium as vectors helped in controlling *Meloidegyne incognitia* infestation in tobacco plants? Explain in correct sequence?

20. Explain the roles of the following with the help of an example each in recombinant DNA technology.

    (a) Restriction enzymes

    (b) Plasmids

21. Explain the mechanism of 'sex determination' in birds. How does it differ from that of human beings?

22. (a) 'India has greater ecosystem diversity than Norway.' Do you agree with the statement? Give reasons in support of answer.

    (b) Write the difference between genetic biodiversity and species biodiversity that exists at all the levels of biological organization.

OR

Explain the effect on the characteristics of a river when urban sewage is discharged into it.

23. Medically it is advised to all young mothers that breast-feeding is the best for their newborn babies. Do you agree? Give reasons in support of your answer.

24. Explain outbreeding, outcrossing and crossbreeding practices in animal husbandry.

SECTION "C"

25. (a) Write the scientific name of the organism Thomas Hunt Morgan and his colleagues worked with for their experiments.

    (b) How did Sturtevant explain gene mapping while working with Morgan?

OR

(a) State the 'central dogma' as proposed by Francis Crick.

(b) Explain how the biochemical characterization (nature) of 'Transforming Principle' was determined, which was not defined from Grifith's experiments.

26. (a) Compare, giving reasons, the J-shaped and S-shaped models of population growth of species.

    (b) Explain 'fitness of a species', as mentioned by Darwin.

OR

(a) What is an ecological pyramid? Compare the pyramids of energy, biomass and number.

(b) Write any two limitations of ecological pyramids.

27. (a) Describe any two devices in a flowering plant which prevent both autogamy and geitonogamy.

    (b) Explain the events upto double fertilization after the pollen tube enters one of the synegids in an ovule of an angiosperm.

OR

(a) Explain menstrual cycle in human female.

(b) How can the scientific understand of the menstrual cycle of human females help as contraceptive measure?