Atomic Energy Central School No. 4 Rawatbhata

Class XII (Physics, Chemistry, Biology)

Time:3 hours Multiple Choice Questions Examination Aug(2019-20) MM: 120

Name of student:_____Class:_____ Roll No.____Invig Sign___

General Instructions:1. Darken the appropriate circle in the OMR answer sheet.
2. Each question carries 1 mark. There is no negative marking.

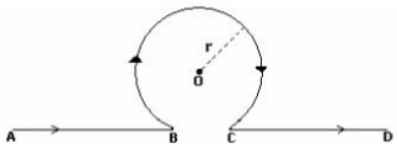
Physics

1. A magnetic needle lying parallel to a magnetic field requires W units of work to turn it, through 60^0. The torque needed to maintain the needle in this position will be **1**

   a) $\sqrt{(3W)}$ b) $\frac{(\sqrt{3}W)}{2}$

   c) 2 W d) W

2. An infinitely long straight conductor is bent into the shape as shown in fig. The magnetic induction at the centre of circular loop is **1**



   a) ∞ b) $\frac{\mu_o i}{2\pi r}(\pi - 1)$

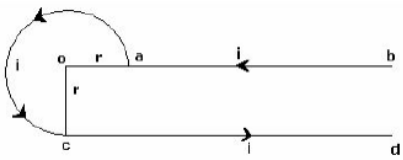
   c) $\frac{\mu_o i}{2\pi r}(\pi + 1)$ d) zero

3. If number of turns, area and current through a coil is given by n, A and i respectively then its magnetic moment will be **1**

   a) n^2iA b) ni A

   c) niA^2 d) $ni\sqrt{A}$

4. What is magnetic induction at point O, if the current carrying wire is in the shape given in the figure? **1**



   a) $\frac{\mu_o i}{4\pi r}$ b) $\frac{\mu_o i}{4\pi r}.\frac{2\pi}{2}$

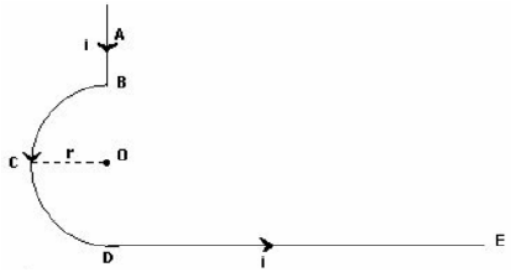
   c) $\frac{\mu_o i}{4\pi r}[\frac{3\pi}{2} + 1]$ d) $\frac{\mu_o i}{4\pi r}[\frac{\pi}{2} + 1]$

5. An electron is revolving around a proton in a circular orbit of diameter 0.1 nm. It produces a magnetic field of 14 Wb/m^2 at the proton. What is angular speed of the electron? **1**

   a) $4.4 \times 10^{16} rads^{-1}$ b) $8.8 \times 10^{16} rads^{-1}$

c) $6.4 \times 10^{16} \text{rads}^{-1}$ d) $1.4 \times 10^{16} \text{rads}^{-1}$

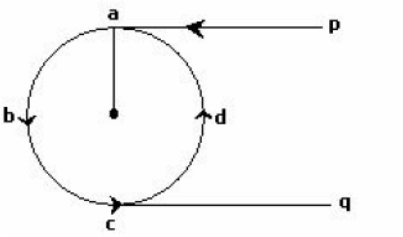
6. In the fig given below magnetic induction at the point O is **1**



a) $\frac{\mu_o I}{4r} \cdot \frac{\mu_o I}{4\pi r}$ b) $\frac{\mu_o I}{4r} + \frac{\mu_o I}{2\pi r}$

c) $\frac{\mu_o I}{4r} + \frac{\mu_o I}{4\pi r}$ d) $\frac{\mu_o I}{4\pi r}$

7. ABCD is a circular coil of non-insulated thin uniform conductor. Conductors pa and qc are very long straight parallel wires, tangential to the coil at points a and c. Find magnetic induction at centre of coil when a current of 5 A is passing thereby. Radius of coil is 10 cm **1**



a) $0.5 \times 10^{-5}\text{T}$ b) $2 \times 10^{-5}\text{T}$

c) $2.4 \times 10^{-5}\ T$ d) None of these

8. Two long parallel wires P and Q are held perpendicular to the plane of the paper with distance of 5 m between them. If P and Q carry current of 2.5 A and 5A respectively in the same direction, then the magnetic field at a point half way between the wire is: **1**

a) $\frac{\sqrt{3}\mu_0}{\pi}$ b) $\frac{\mu_0}{\pi}$

c) $\frac{3\mu_0}{2\pi}$ d) $\frac{\mu_0}{2\pi}$

9. In a coil of 0.1 m radius and 100 turns, 0.1 amp current is passed. What will be the magnetic field at the centre of the coil **1**

a) $6.28 \times 10^{-4}\ T$ b) $4.31 \times 10^{-2}\text{T}$

c) $2 \times 10^{-1}\text{T}$ d) $9.81 \times 10^{-4}\text{T}$

10. A proton (charge + e coul) enters a magnetic field of strength B (Tesla) with speed v, parallel to the direction of magnetic lines of force. The force on the proton is **1**

a) evB/2 b) α

c) zero d) evB

11. The magnetic field in a circular loop of diameter 0.1 m carrying a current of 1 A is **1**

a) $3.8 \times 10^{-5} T$ b) $4.4 \times 10^{-5} T$

c) $1.25 \times 10^{-8} T$ d) $2.8 \times 10^{-5} T$

12. A bar magnet is equivalent to **1**

a) toroid carrying current b) circular coil carrying current

c) solenoid carrying current d) straight conductor carrying current

13. A particle having charge 100 times that of an electron is revolving in a circular path of radius 0.8 m with one rotation per second. Magnetic field produced at the centre of the circular path is **1**

a) $10^{-17}\ \mu_o$ b) $10^{-7} \mu_o$

c) $10^{-3} \mu_o$ d) $10^{-11} \mu_o$

14. A wire of given length is first bent in one loop and then in three loops. If same current is passed in both cases, the ratio of magnetic inductions at the centre will be **1**

a) 1 : 4 b) 9 : 1

c) 1 : 9 d) 1 : 3

15. A wire of length L is bent to form a ring of single loop and current is flown through it. The magnetic field at its centre is B. If the same wire is bent to form 2 loops and same current is flowing, the new B' at its centre will be **1**

a) B b) $\frac{B}{2}$

c) 4B d) 2B

16. If electron velocity is $2\hat{i} + 3\hat{j}$ and it is subjected to magnetic field of $4\hat{k}$, then its **1**

a) none of these b) speed will change

c) both path will change and speed will change d) path will change

17. Two straight horizontal parallel wires are carrying the same current in the same direction, d is the distance between the wires. You are provided with a small freely suspended magnetic needle. At which of the following positions will the orientation of the needle be independent of the magnitude of the current in the wires **1**

a) at a distance $\frac{a}{2}$ from any of the wires in the horizontal plane

b) anywhere on the circumference of a vertical circle of a radius d and centre

c) at a distance $\frac{d}{2}$ from any of the wires

d) at points halfway between the wires in the horizontal plane.

18. A wire of length L carrying current i is placed perpendicular to the magnetic induction B. The total force on the wire is **1**

a) LB/i

b) iL/B

c) iLB

d) iB/L

19. The resistance of the coil of ammeter is R. The shunt resistance required to increase its range four fold should have a resistance: **1**

a) $\frac{R}{3}$

b) $\frac{R}{5}$

c) $\frac{R}{4}$

d) 4 R

20. The ratio of magnetic induction on the axis of a straight long current carrying solenoid at a point on end to that at the centre of solenoid is **1**

a) 1 : 1

b) $\sqrt{2}$: 1

c) 2 : 1

d) 1 : 2

21. A bar magnet of magnetic moment M and length L is cut into two equal parts each of length $\frac{L}{2}$. The magnetic moment of each part will be: **1**

a) $\frac{M}{2}$

b) $\frac{M}{4}$

c) M

d) $\sqrt{2}M$

22. A magnetic needle is kept in a non-uniform magnetic field such that dipole moment is never parallel or antiparallel to magnetic field. It experiences: **1**

a) a force and a torque

b) a torque, but not a force

c) neither a force nor a torque

d) a force, but not a torque

23. A long solenoid with 60 turns of wire per centimeter carries a current of 0.15 A. The wire that makes up the solenoid is wrapped around a solid core of silicon steel K_m = 5200 (The wire of the solenoid is jacketed with an insulator so that none of the current flows into the core.) For a point inside the core, find the magnitude of the total magnetic field **1**

a) 6.88T

b) 5.88T

c) 5.00T

d) 4.88T

24. A bar magnet of magnetic moment 1.5 J/T lies aligned with the direction of a **1**

uniform magnetic field of 0.22 T. What is the amount of work required by an external torque to turn the magnet so as to align its magnetic moment normal to the field direction?

a) 0.43J
b) 0.33J
c) 0.23J
d) 0.38J

25. A bar magnet of magnetic moment 1.5 J/T lies aligned with the direction of a uniform magnetic field of 0.22 T. What is the amount of work required by an external torque to turn the magnet so as to align its magnetic moment opposite to the field direction? **1**

a) 0.66J
b) 0.86J
c) 0.56J
d) 0.76J nC

26. The radius of the coil of a Tangent Galvanometer which has 10 turns is 0.1 m. The current required to produce a deflection of 60°, $\left(B_H = 4 \times 10^{-5} T\right)$ is: **1**

a) A
b) 2.6 A
c) 2.1 A
d) 1.1 A

27. A current is flowing north along a power line. The direction of the magnetic field above it neglecting the earth's field is towards. **1**

a) south
b) west
c) north
d) east

28. A Rowland ring of mean radius 15 cm has 3500 turns of wire wound on a ferromagnetic core of relative permeability 800. What is the magnetic field B in the core for a magnetising current of 1.2A? **1**

a) 3.48 T
b) 5.48 T
c) 4.08 T
d) 4.48 T

29. A toroidal solenoid with 500 turns is wound on a ring with a mean radius of 2.90 cm. Find the current in the winding that is required to set up a magnetic field of 0.350 T in the ring if the ring is made of silicon steel of relative permeability,$\mu_r = 5200$ **1**

a) 19.5mA
b) 21.5mA
c) 23.5mA
d) 22.5mA

30. A short bar magnet has a magnetic moment of 0.48 J/T .Magnetic field produced by the magnet at a distance of 10 cm from the centre of the magnet on the axis has a direction and magnitude of . **1**

a) 0.76 G along S-N direction.
b) 0.86 G along S-N direction.

c) 1.06 G along S-N direction. d) 0.96 G along S-N direction.

31. A long solenoid with 60 turns of wire per centimeter carries a current of 0.15 A. The wire that makes up the solenoid is wrapped around a solid core of silicon steel K_m = 5200 (The wire of the solenoid is jacketed with an insulator so that none of the current flows into the core.) the magnetization inside the core is **1**

a) 4.48MA/m b) 4.88MA/m

c) 4.68MA/m d) 4.28MA/m

32. A short bar magnet placed in a horizontal plane has its axis aligned along the magnetic north-south direction. Null points are found on the axis of the magnet at 14 cm from the centre of the magnet. The earth's magnetic field at the place is 0.36 G and the angle of dip is zero. What is the total magnetic field on the normal bisector of the magnet at the same distance as the null–point (i.e., 14 cm) from the centre of the magnet? (At null points, field due to a magnet is equal and opposite to the horizontal component of earth's magnetic field.) **1**

a) 0.62 G in the direction of earth's field. b) 0.54 G in the direction of earth's field.

c) 0.58 G in the direction of earth's field. d) 0.64 G in the direction of earth's field.

33. A sample of paramagnetic salt contains 2.0×10^{24} atomic dipoles each of dipole moment $1.5 \times 10^{-23} \mathrm{JT}^{-1}$. The sample is placed under a homogeneous magnetic field of 0.64 T, and cooled to a temperature of 4.2 K. The degree of magnetic saturation achieved is equal to 15%. What is the total dipole moment of the sample for a magnetic field of 0.98 T and a temperature of 2.8 K? (Assume Curie's law) **1**

a) 8.2 J/T b) 10.34 J/T

c) 5.9 J/T d) 6.6 J/T

34. Magnetic dipole moment is a vector quantity directed from: **1**

a) east to west b) south to north

c) west to east d) north to south

35. A magnet of magnetic moment M is kept in a uniform magnetic field of strength B, making an angle θ with its direction. The torque acting on it is: **1**

a) $MB(1 - \cos\theta)$ b) MB

c) $MB \sin\theta$ d) $MB \cos\theta$

36. A circular coil of 16 turns and radius 10 cm carrying a current of 0.75 A rests with its plane normal to an external field of magnitude 5.0×10^{-2} T. The coil is free to turn about an axis in its plane perpendicular to the field direction. When the coil is turned slightly and released, it oscillates about its stable equilibrium with a frequency of 2.0 s^{-1}. What is the moment of inertia of the coil about its axis of rotation **1**

a) $1.2 \times 10^{-4} \text{kgm}^2$ b) $2.0 \times 10^{-4} \text{kgm}^2$

c) $2.2 \times 10^{-4} \text{kgm}^2$ d) $1.4 \times 10^{-4} \text{kgm}^2$

37. A magnetic dipole is under the influence of two magnetic fields. The angle between the field directions is 60^0, and one of the fields has a magnitude of $1.2 \times 10^{-2} \text{T}$. If the dipole comes to stable equilibrium at an angle of 15^0 with this field, what is the magnitude of the other field? **1**

a) $5.6 \times 10^{-3} \text{T}$ b) $4.8 \times 10^{-3} \text{T}$

c) $5.2 \times 10^{-3} \text{T}$ d) $4.4 \times 10^{-3} \text{T}$

38. At a given place on the earth's surface, horizontal component of earth's magnetic field is $3 \times 10^{-5} T$ and resultant magnetic field is $6 \times 10^{-5} T$. The angle of dip at the place is: **1**

a) 40° b) 30°

c) 60° d) 50°

39. The force between two magnetic poles is F. If the distance between the poles and pole strengths of each pole are doubled, then the force experienced is: **1**

a) F b) $\frac{F}{4}$

c) 2 F d) $\frac{F}{2}$

40. A toroidal solenoid with 500 turns is wound on a ring with a mean radius of 2.90 cm. Find the current in the winding that is required to set up a magnetic field of 0.350 T in the ring if the ring is made of annealed iron of relative permeability, $\mu_r = 1400$ **1**

a) 72.5mA b) 69.5mA

c) 79.5mA d) 82.5mA

41. Which of the following turns lead acetate paper black? **1**

a) H_2S b) H_2SO_4

c) SO_2 d) SO_3

42. When chlorine is passed through concentrated hot solution of KOH, the compound formed is **1**

a) $KClO_2$ b) KClO

c) $KClO_4$ d) $KClO_3$

43. How many moles of oxygen are obtained by heating 8 mol of potassium chlorate? **1**

a) 28 b) 8

c) 16 d) 12

44. Which of the following is thermally the most stable? **1**

a) H_2O b) H_2Se

c) H_2S d) H_2Te

45. Laughing gas is **1**

a) N_2O_3 b) N_2O_5

c) N_2O d) NO

46. First compound of inert gas was prepared by Bartlett in 1962. The compound is **1**

a) $XeOF_4$ b) XeO_3

c) XeF_6 d) $Xe[PtF_6]$

47. Which of the following reaction depicts the oxidizing behaviour of H SO ? **1**

a) $Ca(OH)_2 + H_2SO_4 \rightarrow CaSO_4 + 2H_2O$

b) $2PCl_5 + H_2SO_4 \rightarrow 2POCl_3 + 2HCl + SO_2Cl_2$

c) $NaCl + H_2SO_4 \rightarrow NaHSO_4 + HCl$

d) $2HI + H_2SO_4 \rightarrow I_2 + SO_2 + 2H_2O$

48. When sugar is treated with conc. Sulphuric acid, the sugar is charred. In this process, sugar is **1**

a) Oxidised b) Reduced

c) Dehydrated d) Sulphonated

49. The structure of ClF is **1**

a) Octahedral b) T-shaped

c) Pyramidal d) Tetrahedral

50. In XeO and XeF the oxidation state of Xe is **1**

a) +4 b) +6

c) +3 d) +1

51. Pure chlorine is obtained **1**

a) By heating $PtCl_4$ b) By treating bleaching powder with HCl

c) By heating MnO_2 and HCl d) By heating a mixture of NaCl and MnO_2 with conc. Sulphuric acid

52. When KBr is treated with conc. H SO , reddish brown gas is evolved. The gas is **1**

a) Br_2 + HBr b) NO_2

c) H_2O_2 d) Br_2

53. A radioactive element which can decay to give two noble gases is **1**

a) Ac^{239} b) U^{238}

c) Ra^{226} d) Th^{232}

54. Fluorine reacts with conc. NaOH to produce **1**

a) NaF and O_2 b) NaF and O_2F

c) NaF and OF_2 d) NaF and O_3

55. Xenon difluoride has _____ shape. **1**

a) Linear b) Trigonal

c) Angular d) Pyramidal

56. Ni in traces can be tested using **1**

a) Dimethylglyoxime b) Potassium ferrocyanide

c) Ammonium sulphocyanide d) Sodium nitroprusside

57. The yellow colour of the chromate changes to orange on acidification due to the formation of **1**

a) $Cr_2O_7^{2-}$ b) Cr_2O_3

c) CrO_2 d) CrO_4^{2-}

58. Which is called chromic acid? **1**

a) CrO b) H_2CrO_4

c) Cr_3O_4 d) Cr_2O_3

59. The lanthanoid contraction is due to : **1**

a) filling of 5d before 4f b) filling of 4f before 4d

c) filling of 4d before 4f d) filling of 4f before 5d

60. Which among the following is a synthetic element? **1**

a) Pa b) U

c) Fm d) Th

61. In the reaction, $SnCl_2 + HgCl_2 \rightarrow A + SnCl_4$, A is **1**

a) $HgCl_2$ b) Hg

c) HgCl d) $HgCl_3$

62. In dilute alkaline solution, MnO changes to **1**

a) MnO_4^{2-} b) MnO_2

c) Mn_2O_3 d) MnO

63. Oxidation state of Mn in MnO_4^- is +7 indicating all electrons paired in Mn but MnO_4^- is coloured. This is due to: **1**

a) none of these b) both presence of unpaired electron in d-orbital in oxygen and charge transfer

c) presence of unpaired electron in d-orbital in oxygen d) charge transfer

64. Which of the following is paramagnetic as well as coloured ion? **1**

a) Ti^{4++} b) Cu^+

c) Sc^{3+} d) Cu^{2+}

65. KMnO is the oxo salt of **1**

a) Mn_2O_3 b) MnO_3

c) Mn_2O_7 d) MnO_2

66. Which of the following is not considered a transition metal? **1**

a) Zn b) Ac

c) Y d) La

67. Which one of the following element is the main metallic constituent of haemoglobin? **1**

a) Mn b) Fe

c) Cu d) Al

68. Among the following, which bivalent ion of the first transition series shows maximum magnetic moment ? **1**

a) Co^{2+} b) Ni^{2+}

c) Mn^{2+} d) Fe^{2+}

69. Sodium pentacyanonitrosylferrate(II) is also called **1**

a) Sodium ferrocyanide b) Sodium sulphocyanide

c) Sodium nitroprusside d) Sodium cobaltnitrite

70. Which of the following complex ions/molecules of nickel is paramagnetic? **1**

a) $[Ni(CO)_4]$ b) $[Ni(CN)_4]^{2-}$

c) $[Ni(NH_3)_4]^{2+}$ d) $Ni(dimethylglyoxime)_2$

71. A complex of platinum, ammonia and chlorine produces four ions per molecule in the solution. The structure consistent with the observation is **1**

a) $[Pt(NH_3)_2Cl_4]$ b) $[Pt(NH_3)_5Cl]Cl_3$

c) $[Pt(NH_3)_4Cl_2]Cl_2$ d) $[Pt(NH_3)_6]Cl_4$

72. K [Al(C O)] is called **1**

a) Potassium trioxalatoaluminate(III) b) Potassium alumina(III)oxalate

c) Potassium aluminooxalate

d) Potassium trioxalatoaluminum(III)

73. The formula of Zeise's salt is **1**

a) $K^+[PtCl_3(C_2H_4)]^-$ b) $[PtCl_3.C_2H_6]^-K^+$

c) $[PtCl_2.(C_2H_2)]^-K^+$ d) $[PtCl_3.C_6H_6]^-K^+$

74. Which is used in cancer therapy? **1**

a) Zeise's salt b) Cis – Platin

c) EDTA d) Cyanocobalamine

75. Which of the following compound would exhibit coordination isomerism? **1**

a) $[Cr(H_2O)]Cl_3$ b) $[Cr(NH_3)_6][Co(CN)_6]$

c) [Cr(en)2]NO_2 d) $[Ni(NH_3)_6][BF_4]_2$

76. The isomers [(C H) P Pd(SCN)] and [(C H) P Pd(NCS)] show **1**

a) Linkage isomerism b) Coordination isomerism

c) Geometrical isomerism d) Ionization isomerism

77. K CoF is high spin complex. What is the hybrid state of Co atom in this complex? **1**

a) d^2sp^3 b) dsp^2

c) sp^3d d) sp^3d^2

78. The metal-carbon bond in metal carbonyls possess **1**

a) σ character b) π character

c) single bond d) both σ and π character.

79. The hardness of water is estimated by **1**

a) Titration with EDTA b) Gravimetric method

c) Distillation method d) Conductivity method

80. Which of the following species is expected to be colourless? **1**

a) $[Ti(H_2O)_6]^{3+}$ b) $[Fe(CN)_6]^{4-}$

c) $[Cr(NH_3)_6]^{3+}$ d) $[Ti(NO_3)_4]$

Biology

81. Study the following : **1**

A. The cells of malignant tumors divide erratically.

B. They are malignant tumors of epithelial cells.

C. They are malignant tumors of organs that originate from mesoderm.

D. These tumors are found in organs such as spleen and lymph nodes.

Which of the above are true for angiosarcoma?

a) A and B b) B and C

c) B and D d) A and C

82. Carcinoma refers to **1**

a) Malignant tumors of the colon b) Malignant tumors of the connective tissue

c) Malignant tumors of the skin or mucous membrane d) Benign tumors of the connective tissue

83. Marijuana, hashish, charas and ganga are group of drugs collectively called **1**

a) Coke
b) Opioids
c) Crack
d) Cannabinoids

84. Assertion: LSD and marijuana are clinically used as analgesics. **1**
Reason: Both these drugs suppress brain function.

a) Assertion is true statement but reason is false
b) Both Assertion and Reason are false
c) Both Assertion and Reason are true and the Reason is the correct explanation of the Assertion
d) Both Assertion and Reason are true and the Reason is not the correct explanation of the Assertion

85. The drug which binds to specific opioid receptors present in our central nervous system and gastrointestinal tract is **1**

a) Cannabinoids
b) Opioids
c) Heroine
d) Smack

86. Electron beam therapy is a kind of radiation therapy to treat **1**

a) Enlarged prostate gland
b) Kidney stones
c) Gall bladder stones by breaking them
d) Certain types of cancer

87. Cancer cells are damaged by radiations while others are not because cancer cells are **1**

a) Hydrolysis
b) Undergoing rapid divisions
c) Different in nature
d) Starved

88. The virus that causes AIDS is **1**

a) B cells
b) Cytoxic T cells
c) The membrane of lymph nodes
d) Helper T cells

89. Assertion: Dope test is used to estimate the level of blood alcohol by analyzing the breath of persons drinking alcohol. 1
Reason: A drunken person usually feels tense and less talkative.

a) Both Assertion and Reason are true and the Reason is not the correct explanation of the Assertion
b) Both Assertion and Reason are false
c) Assertion is true statement but reason is false
d) Both Assertion and Reason are true and the Reason is the correct explanation of the Assertion

90. Which of the following is major cause of lung cancer? **1**

a) Intake of alcohol
b) Tobacco smoking
c) Industrial dust
d) Drug abuse

91. A certain patient is suspected to be suffering from Acquired Immuno Deficiency Syndrome. Which diagnostic technique will you recommend for its detection? **1**

a) MRI
b) Ultra Sound
c) WIDAL
d) ELISA

92. Which of the following birth control measure can be considered as the safest? 1

a) Termination of unwanted pregnancy
b) The rhythm method

c) The use of physical barriers d) Sterilization techniques

93. Pathogenic bacterium that cause typhoid fever in human being is **1**

a) Streptococcus typhi b) Salmonella feverish

c) Salmonella typhi d) Streptococcus pneumonia

94. In order to obtain disease-free plants through tissue culture techniques, the best method is **1**

a) Protoplasm culture b) Anther culture

c) Embryo rescue d) Meristem culture

95. Match the following crop plants with their variety in the given table: **1**

	Crop plant		**Variety**
(i)	Wheat	a	Pusa Komal
(ii)	Chilli	b	Pusa Swarnim
(iii)	Brassica	c	Himgiri
(iv)	Cowpea	d	Pusa Sadabahar
(v)	Okra	e	Pusa Shubhra
(vi)	Cauliflower	f	Pusa Sawani

a) (i)-(e), (ii)-(f), (iii) - (a), (iv) - (b), (v) - (c), (vi) - (d)

b) (i)-(d), (ii)-(b), (iii) - (a), (iv) - (c), (v) - (f), (vi) - (e)

c) (i)-(c), (ii)-(d), (iii) - (b), (iv) - (a), (v) - (f), (vi) - (e)

d) (i)-(f), (ii)-(c), (iii) - (a), (iv) - (b), (v) - (e), (vi) - (d)

96. Micro-propagation is the method of producing thousands of genetically identical plants through **1**

a) Bagging b) Hybridization

c) Emasculation d) Tissue culture

97. Tissue culture technique was first performed successfully by **1**

a) White b) Haberlandt

c) Gautheret d) Nobecoourt

98. The breeding of unrelated animals which may be between individual of same breed or between different breeds of different species is called **1**

a) Cross breeding b) Hybridisation

c) In breeding d) Out-breeding

99. Honey is the food of high nutritive value and find use in **1**

a) Homeopathic system of medicine b) Indigenous system of medicine

c) All of these d) Allopathic system of medicine

100. Gene banks are part of **1**

a) Both ex situ and in situ conservation
b) Tribal diet
c) In situ conservation
d) Ex situ conservation

101. Bagging is done to **1**

a) Avoid cross pollination
b) Avoid self-pollination
c) Prevent contamination from unwanted pollen
d) Achieve desired pollination

102. Which of the following can yield a completely haploid plant **1**

a) Stem apical meristem
b) Carpel
c) Anther
d) Root tip

103. Evaluation of newly evolved varieties is carried out by **1**

a) ICAR
b) National bureau of plant genetic resources
c) IARI
d) All agricultural universities

104. Single cell protein (SCP) is **1**

a) Protein obtained from unicellular organisms.
b) Biomass got from microorganisms
c) Protein obtained from a clone of cells
d) Protein obtained from biomass of microorganisms

105. Breeding crops with higher levels of vitamins and minerals or higher protein and healthier fats is called **1**

a) Tissue culture
b) Bio-fortification
c) Single cell protein
d) Gametogenesis

106. Pisciculture and aquaculture differ in **1**

a) Pisciculture is form of aquaculture
b) Both are not related
c) Both are same
d) Aquaculture is a form of Pisciculture

107. An important drug is obtained from the bark of **1**

a) Withania
b) Papaver
c) Momordica
d) Cinchona

108. Which of the following is a gram-negative bacterium? **1**

a) Streptomyces coelicolor
b) Bacillus subtilis
c) Escherichia coli
d) Amycolatopsis orientali

109. The virus commonly used as biocontrol agents are called **1**

a) Myxovirus
b) Retrovirus
c) Baculovirus
d) Reo-virus

110. A symbiotic relationship/interaction in which 'one species benefits and the other species is not affected' is called 1

a) Helotism b) Ectomycorrhizae
c) Endomycorrhizae d) Commensalisms

111. Which one of the following is not used in organic farming? 1

a) Snail b) Oscillatoria
c) Earthworm d) Glomus

112. Which kingdoms among the living organism contain only micro-organisms? 1

a) Fungi and Protista b) Arthropoda and fungi
c) Monera and Fungi d) Monera and Protista

113. Which one of the following is used as biological insecticide? 1

a) Caterpillar b) Mazra Poka
c) Silkmoth d) Tiger beetle

114. Fleming, Chain and Florey were awarded the Nobel Prize in 1945 for discovery of 1

a) Antacid b) Antibodies
c) Insulin d) Antibiotic

115. Green manure plants used by farmer mainly belong to 1

a) Poaceae b) Compositae
c) Solanaceae d) Leguminosae

116. Which is the root of breeding programmes: 1

a) Totipotency b) Genetic similarity
c) Pure lines d) Genetic variability

117. The most important of the symbiotic nitrogen fixing bacteria which forms nodules on the roots of legume plants is 1

a) Penicillium b) Streptococcus
c) Rhizobium d) Aspergillus

118. Organism like Escherichia coli and Chlamydia trachomatis fall into which domain? 1

a) Eukarya b) Animalia
c) Archaea d) Bacteria

119. The term antibiotic was coined by 1

a) Howard Florey b) John Tyndall
c) Gerhard Domagk d) Selman Waksman

120. Typhoid fever could be confirmed by 1

a) ECG b) ELISA
c) Widal test d) Western blot

Solution

Class 12 - Physics

MCQ (2019-20)

Section A

1. (a)
   $\sqrt{(3W)}$

   Explanation:
   the work done to turn a needle through an angle θ is $W = mB\cos\theta$
   The torque needed to maintain $\tau = mB\sin\theta$.
   $\frac{\tau}{W} = \tan\theta$.
   $\tau = W\tan\theta = W\tan 60 = \sqrt{3}W$

2. (b)
   $\frac{\mu_o i}{2\pi r}(\pi - 1)$

   Explanation:
   Magnetic field directions due to straight conductor and due to circular loop are in the opposite direction
   net magnetic field is
   = $\frac{\mu_o i}{2\pi r}(\pi - 1)$

3. (b)
   ni A

   Explanation:
   The magnetic moment associated with a coil carrying current is given by the product of its area and the current through it. M=n I A

4. (c)
   $\frac{\mu_o i}{4\pi r}[\frac{3\pi}{2} + 1]$

   Explanation:
   Magnetic field due to ba straight conductor is zero. Magnetic field due to circular current carrying conductor ac is $\frac{3}{4}\frac{\mu_0 I}{2r}$ (outward) and magnetic field due to straight conductor cd is $\frac{\mu_0}{4\pi} \times \frac{I}{r}$ (outward)

Total magnetic field is $\frac{\mu_o i}{4\pi r}[\frac{3\pi}{2}+1]$

5. (a)
$4.4\times10^{16}\text{rads}^{-1}$

Explanation:
The revolving electron is similar to a loop carrying current. Field at the center of the loop of radius r is $B=\frac{\mu_0 I}{2r}$.
The current due to the revolving electron $I=\frac{B(2r)}{\mu_0}=\frac{14\times0.1\times10^{-9}}{4\pi\times10^{-7}}=\frac{7\times10^{-3}}{2\pi}$
The current can also be written as, $I=\frac{e}{T}$
where, T is the time taken to complete one revolution. Since $T=\frac{2\pi}{\omega}$
where ω is the angular speed of the electron, $I=\frac{e}{T}=\frac{e\omega}{2\pi}$
$\frac{e\omega}{2\pi}=\frac{7\times10^{-3}}{2\pi}$
$\omega=\frac{7\times10^{-3}}{e}=\frac{7\times10^{-3}}{1.6\times10^{-19}}$
$=4.38\times10^{16}\approx4.4\times10^{16}rad/s$

6. (c)
$\frac{\mu_o I}{4r}+\frac{\mu_o I}{4\pi r}$

Explanation:
Magnetic field due to AB conductor is 0, magnetic field due to semicircular arc BCD and straight conductor DE are in the same direction so add up
net magnetic field = $\frac{\mu_o I}{4r}+\frac{\mu_o I}{4\pi r}$

7. (c)
$2.4\times10^{-5}\ T$

Explanation:
Magnetic field due to pa,abcd and cq are acting along the same direction so total field is the sum due to field of all the conductors
= $\frac{\mu_0}{4\pi}\times\frac{I}{r}+\frac{\mu_0}{2}\times\frac{I}{r}+\frac{\mu_0}{4\pi}\times\frac{I}{r}$
= $2.4\times10^{-5}\ T$

8. (d)
$\frac{\mu_0}{2\pi}$

Explanation:

Net magnetic field = $\frac{\mu_0}{4\pi} \times \frac{2}{\mathrm{r}} \times (\mathrm{I}_2 - \mathrm{I}_1)$

r = 2.5 m; $\mathrm{I}_1 \ = 2.5 \ \mathrm{A}; \ \mathrm{I}_2 \ = 5 \ \mathrm{A}$

net magnetic field $= \frac{\mu_0}{2\pi}$

9. (a)

$6.28 \times 10^{-4} \ T$

Explanation:

$B = \frac{\mu_0 nI}{2r}$

$= \frac{4\pi \times 10^{-7} \times 100 \times 0.1}{2 \times 0.1}$

$= 6.28 \times 10^{-4}$

10. (c)

zero

Explanation:

Lorentz force is given by $F = Bqv \sin \theta$

When the proton enters the magnetic field parallel to the direction of the lines of force, $\theta = 0$.

Therefore F = 0

11. (c)

$1.25 \times 10^{-8} T$

Explanation:

$B = \frac{\mu_0 I}{2r} = \frac{4\pi \times 10^{-7} \times 1}{0.1}$

$= 12.56 \times 10^{-6}$

$= 1.25 \times 10^{-5} T$

12. (c) solenoid carrying current

Explanation:

A solenoid carrying current produces a magnetic field very similar to that of bar magnet. The magnetic field lines emerge from the ends of a solenoid and the number of field lines near its perpendicular bisector is almost equal to zero. A circular coil produces field along its axis. A straight conductor produces a magnetic field that can be represented by concentric circles. A toroid is a solenoid that has collapsed on itself. The field in a toroid is confined to the ring like region bounded by the toroid.

13. (a)

$10^{-17}\,\mu_o$

Explanation:

A charge moving in a circular path is equivalent to a current $I = \frac{q}{T}$

Since the particle has charge 100 times e and it makes 1 revolution per second,

q = 100e and T = 1s.

$I = \frac{q}{T} = \frac{100e}{1}$

$= 100 \times 1.6 \times 10^{-19}$

$= 1.6 \times 10^{-17} A$

The magnetic field at the centre $B = \frac{\mu_0 I}{2r} = \frac{\mu_0 \left(1.6 \times 10^{-17}\right)}{2 \times 0.8} = \mu_0 \times 10^{-17}$

14. (c)

1 : 9

Explanation:

$L = 2\pi \mathrm{r} \ = 3 \times 2\pi \mathrm{r}$

$\frac{\mathrm{B}}{\mathrm{B}} = \frac{\mathrm{r}}{3\mathrm{r}} = \frac{1}{9}$

1 : 9

15. (c)

4B

Explanation:

The radii of the coils in two cases are R_1 and R_2.

Then, $L = 2\pi R_1 = 2 \times 2\pi R_2; R_2 = \frac{R_1}{2}$

$B = \frac{\mu_0 I}{2R_1}$ and $B' = \frac{\mu_0 nI}{2R_2} = \frac{\mu_0 2I}{2\left(\frac{R_1}{2}\right)} = 4\frac{\mu_0 I}{2R_1} = 4B$

16. (d)

path will change

Explanation:

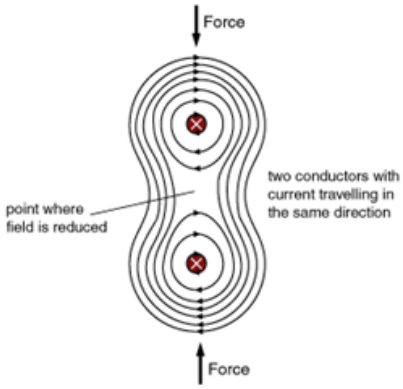
As magnetic force always act perpedicular to the direction of motion so path or direction will change withot any change in speed.

17. (d)

at points halfway between the wires in the horizontal plane.

Explanation:

Consider two wires carrying current in the same direction as shown. The current acts inwards to the plane of the screen. The magnetic field lines are in the plane of the screen and are concentric circles. At the point midway between the wires, the field lines are directed opposite to each other. The magnetic fields due to



the two wires are directed opposite to each other. They also have the same magnitude since the wires carry currents of equal magnitude. At a distance $\frac{d}{2}$, in the horizontal plane, the net magnetic field is zero. A magnetic needle placed at this point experiences no force. The orientation of the needle becomes independent of the current in the wires.

18. (c) iLB

Explanation:

Magnitude of the Force experienced by a current carrying conductor placed in a magnetic field is $ILB\sin\theta$. If the angle between the directions of the current and the magnetic field is 90^0, F= iLB

19. (a)

$\frac{R}{3}$

Explanation:

voltage across ammetre and shunt are same. so

$V = I \times R = 3I \times S$

solving S= R/3

20. (c)

2 : 1

Explanation:

A solenoid is equivalent to a bar magnet.
For points at distances greater than the length of the solenoid, the field along the axis of the solenoid is $B_{axial} = \frac{\mu_0}{4\pi}\frac{2m}{x^3}$ and along the perpendicular bisector or equatorial line is $B_{equatorial} = \frac{\mu_0}{4\pi}\frac{m}{x^3}$
$\frac{B_{axial}}{B_{equatorial}} = \frac{2}{1}$

21. (a)
$\frac{M}{2}$

Explanation:
Since magnetic moment is given by product of pole strength and length of dipole, when it is cut into two pieces of half the length, each peice will have magnetic moment equal to half of the original piece.

22. (a)
a force and a torque

Explanation:
In non uniform magnetic field, force on both the poles is opposite but not equal hence it experiences force.
And as angle between directions of magnetic moment and magnetic field is neither 0 or nor 180^o, hence it also experiences torque.

23. (b)
5.88T

Explanation:
$B = \mu_o K_m n i$
$= 4\pi \times 10^{-7} \times 5200 \times 60 \times 10^2 \times 0.15$
= 5.88T

24. (b)
0.33J

Explanation:
Work done,
$W = mB[cos\theta_1 - cos\theta_2]$

$= 1.5 \times 0.22 \times \left[cos\theta - cos\frac{\pi}{2}\right]$
$= 1.5 \times 0.22 = 0.33J$

25. (a)
0.66J

Explanation:
$W = mB[cos\theta_1 - cos\theta_2] = mB[cos0 - cos\pi]$
$= 2mB = 2 \times 1.5 \times 0.22 = 0.66J$

26. (d)
1.1 A

Explanation:
When no current is passed through the coil, the magnetic needle is influenced only by B_H. When current I is passed, there is a magnetic field B along the axis of the coil, perpendicular to B_H. The magnetic needle comes to rest at an angle with B_H, such that,
$B = B_H \tan\theta$
Also B at centre of coil is equal to $\mu_o NI/2R$
Hence $I = \frac{2RB_H tan\theta}{\mu_o N} = \frac{2\times0.1\times4\times10^{-5}\times\sqrt{3}}{4\pi\times10^{-7}\times10} = 1.1A$

27. (d) east
Explanation:
According to Right Hand Rule (If one points thumb of his right hand in the direction of current, then the direction in which the fingure curls gives the direction of magnetic field at that point. Hence the direction of magnetic field above the wire is east.

28. (d)
4.48 T

Explanation:
$B = \frac{\mu_o\mu_r Ni}{2\pi r} = \frac{4\pi\times10^{-7}\times800\times3500\times1.2}{2\pi\times15\times10^{-2}}$ = 4.48 T

29. (a)
19.5mA

Explanation:

$i = \frac{B \times 2\pi r}{\mu_o \mu_r N} = \frac{0.35 \times 0.29 \times 10^{-2}}{4\pi \times 10^{-7} \times 5200 \times 500}$

$= 19.5 \times 10^{-3} A$

30. (d)

0.96 G along S-N direction.

Explanation:

$\overrightarrow{B}_{axial} = \frac{\mu_o}{4\pi} \frac{2\overrightarrow{m}}{r^3}$

$= 10^{-7} \times \frac{2 \times 0.48}{10^{-3}} T = 0.96G$

Direction of magnetic field at axial point is along direction of magnetic moment i.e. from South to North.

31. (c)

4.68MA/m

Explanation:

$M = \frac{B}{\mu_o} = \frac{\mu_o K_M N i}{\mu_o}$

$= 5200 \times 60 \times 10^2 \times 0.15$

$= 4.68 \times 10^6 A/m$

32. (b)

0.54 G in the direction of earth's field.

Explanation:

Earth's magnetic field at the given place,*H* = 0.36 G

The magnetic field at a distance *d*, on the axis of the magnet is given as:

$B_1 = \frac{\mu_0 M}{4\pi \times d^3} = H$ ...(i)

Where,

μ_0 = Permeability of free space

M = Magnetic moment

The magnetic field at the same distance *d*, on the equatorial line of the magnet is given as:

$B_2 = \frac{\mu_0 M}{4\pi \times d^3} = \frac{H}{2}$ [Using equation (i)]

Total magnetic field, B = B_1 + B_2

$= H + \frac{H}{2}$

= 0.36 + 0.18 = 0.54G

Hence, the magnetic field is 0.54 G in the direction of earth's magnetic field.

33. (b)

10.34 J/T

Explanation:

Number of atomic dipoles, $n = 2.0 \times 10^{24}$

Dipole moment of each atomic dipole, $M = 1.5 \times 10^{-23} JT^{-1}$

When the magnetic field, B_1 = 0.64 T

The sample is cooled to a temperature, T_1 = 4.2°K

Total dipole moment of the atomic dipole, $M_{tot} = n \times M$

$= 2 \times 10^{24} \times 1.5 \times 10^{-23}$

= $30JT^{-1}$

Magnetic saturation is achieved at 15%.

Hence, effective dipole moment, $M_1 = \frac{15}{100} \times 30 = 4.5JT^{-1}$

When the magnetic field, B_2 = 0.98 T

Temperature, T_2 = 2.8°K

Its total dipole moment = M_2

According to Curie's law, we have the ratio of two magnetic dipoles as:

$\frac{M_2}{M_1} = \frac{B_2}{B_1} \times \frac{T_1}{T_2}$

$\therefore\ M_2 = \frac{B_2 T_1 M_1}{B_1 T_2}$

$= \frac{0.98 \times 4.2 \times 4.5}{2.8 \times 0.64} = 10.336JT^{-1}$

Therefore, $10.336JT^{-1} \approx 10.34JT^{-1}$is the total dipole moment of the sample for a magnetic field of 0.98 T and a temperature of 2.8 K.

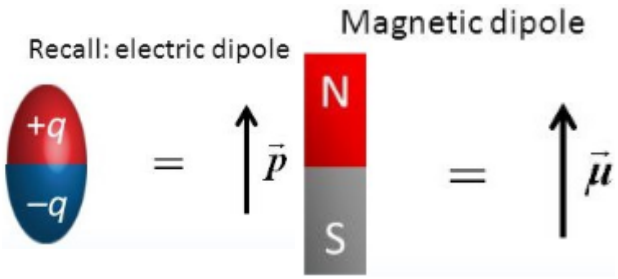
34. (b)

south to north

Explanation:

Magnetic dipole & dipole moment

A magnetic N and S pole make up a magnetic dipole



Magnetic dipole moment is analogous to an electric dipole moment.

Direction Vector from S to N pole (by convention).

35. (c)

$MB \sin\theta$

Explanation:

Torque is cross product of magnetic moment and magnetic field. Therefore, magnitude of torque is given by

$MB \sin\theta$

36. (a)

$1.2 \times 10^{-4}\text{kgm}^2$

Explanation:

Here N = 16, r = 10 cm = 0.1 m, i = 0.75 A, B = 5×10^{-2}T, $\nu = 2\ s^{-1}$

$m = NiA = Ni\pi r^2 = \frac{16 \times 0.75 \times 22}{7 \times 0.1^2} = .377 J/T$

Moment of inertia, $I = \frac{mB}{4\pi^2\nu^2} = \frac{.377 \times 5 \times 10^{-2}}{4 \times (3.14)^2 \times 2^2}$

$= 1.2 \times 10^{-4} kgm^2$

37. (d)

$4.4 \times 10^{-3}\text{T}$

Explanation:

Magnitude of one of the magnetic fields, $B_1 = 1.2 \times 10^{-2} T$

Magnitude of the other magnetic field = B_2

Angle between the two fields,$\theta = 60^\circ$

At stable equilibrium, the angle between the dipole and field B_1, $\theta_1 = 15^\circ$

Angle between the dipole and field B_2, $\theta_2 = \theta - \theta_1$ = 60° – 15° = 45°

At rotational equilibrium, the torques between both the fields must balance each other.

∴ Torque due to field B_1 = Torque due to field B_2 $MB_1 \sin\theta_1 = MB_2 \sin\theta_2$

Where,

M= Magnetic moment of the dipole

$\therefore B_2 = \frac{B_1 \sin\theta_1}{\sin\theta_2}$

$= \frac{1.2\times10^{-2}\times\sin 15^\circ}{\sin 45^\circ} = 4.39 \times 10^{-3} T$

Hence, the magnitude of the other magnetic field is $= 4.39 \times 10^{-3} T$.

38. (c)

60°

Explanation:

$cos\delta = \frac{B_H}{B} = \frac{3\times10^{-5}}{6\times10^{-5}} = 0.5$

hence angle of dip = 60°

39. (a)

F

Explanation:

$F\alpha\frac{q_m q'_m}{r^2}$

Hence $\frac{F'}{F} = (\frac{2q_m 2q'_m}{4r^2})/\frac{q_m q'_m}{r^2} = 1$

or F' = F

40. (a)

72.5mA

Explanation:

$B = \frac{\mu_o \mu_r N i}{2\pi r}$

$i = \frac{B.2\pi r}{\mu_o \mu_r N}$

$= \frac{0.35\times0.29\times10^{-2}}{4\pi\times10^{-7}\times1400\times500}$

$= 72.5 \times 10^{-3} A$

Solution

Class 12 - Chemistry

Multiple Choice Questions Test(August 2019)

Section A

41. (a)

    H_2S

    Explanation:

    $Pb^{2+} + S^{2-} \rightarrow PbS\,(black)$

    $(CH_3COO)_2Pb\ +\ H_2S \rightarrow\ PbS\ + 2CH_3COOH$

42. (d)

    $KClO_3$

    Explanation:

    Cl_2 on treatment with conc. Base form ClO_3^- ion.

    Cl_2 + 6KOH $\rightarrow$ 5KCl + $KClO_3$ + 3H_2O

43. (d)

    12

    Explanation:

    $2KClO_3 \rightarrow 2KCl\ +\ 3O_2$

    2mol of $KClO_3$ gives 3 mol of O_3.

    So 8 mol of potassium chlorate will yield = $\frac{8\ \times\ 3}{2}$ = 12 mol of O_2.

44. (a)

    H_2O

    Explanation:

    Stability of hydrides decreases down the group so most stable is H_2O. The thermal stability decreases as the atomic mass increases. Water dissociates at 2000^0C while tellurium hydride, H_2Te decomposes at room temperature. This is due to an increase in the bond length of M-H (M- O, S, Se, Te).

Thus the thermal stability decreases as the atomic size increases. As with the increase in atomic size, the bond length also increases which decreases the thermal stability.

45. (c)
N_2O

Explanation:
N_2O is also known as Laughing gas. when inhaled in moderate quantity, it produces a hysterical laughter.

46. (d)
$Xe[PtF_6]$

Explanation:
Bartlett in 1962 prepared $Xe[PtF_6]$. He passed orange red vapours platinum hexa fluoride over xenon to form yellow solid of xenon platinum hexa fluoride.
PtF_6 + Xe → $Xe[PtF_6]$ xenon hexafluoroplatinate(V)

47. (d)
$2HI + H_2SO_4 \rightarrow I_2 + SO_2 + 2H_2O$

Explanation:
$2HI + H_2SO_4 \rightarrow I_2 + SO_2 + 2H_2O$
Concentrated sulphuric acid is a good oxidising agent. it oxidises HI to I_2.

48. (c)
Dehydrated

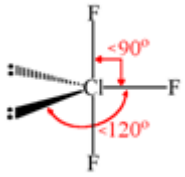
Explanation:
Concentrated H_2SO_4 is a dehydrating agent and is hygroscopic in nature. So it absorbs water to form black charry mass of carbon.
$C_{12}H_{22}O_{11} \rightarrow 12C + 11H_2O$

49. (b)
T-shaped

Explanation:

CN=0.5(V+M-C+A) For. ClF_3 CN= 5 so hybridisation is sp3d. The structure is trigonal bipyramidal.

ClF_3 has 10 electrons around the central atom. this means there are 5 electron pairs arranged in a trigonal bipyramidal shape with a 90^0 F-Cl-F bond angle. There are 2 equatorial lone pairs making the final structure T- shaped.



50. (b)

+6

Explanation:

The oxidation state of Xe is +6. XeO_3 , the oxidation of Xe is calculated as x+3(-2)= 0 gives x= +6.

Similarly, for XeF_6 , x + 6(-1) = 0 which is x = +6.

51. (c)

By heating MnO_2 and HCl

Explanation:

MnO_2 and HCl react to form Cl_2.

$$MnO_2(s) + 4HCl(l) \rightarrow MnCl_2(s) + 2H_2O(l) + Cl_2(g) \uparrow$$

52. (d)

Br_2

Explanation:

Br^- get oxidized to Br_2 on treatment with H_2SO_4.

$2KBr + 2H_2SO_4 \rightarrow K_2SO_4 + SO_2 \uparrow + Br_2 \uparrow + 2H_2O$.

Concentrated sulphuric acid oxidises HBr to Bromine.

53. (d)

Th^{232}

Explanation:

Th^{232} can decay to give two noble gases. They are radon and xenon. Any sample of thorium or its compounds contain traces of these daughters, which are isotopes of thallium, lead, bismuth, polonium, radon, radium, and actinium.^{232}Th also very occasionally undergoes spontaneous fission rather than alpha decay, to form xenon gas as a fission product.

54. (a)

NaF and O_2

Explanation:

Fluorine reacts with conc. NaOH to produce NaF and O_2. But with dilute alkali it forms OF_2 and NaF.

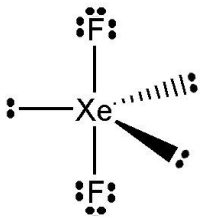
$2F_2 + 4NaOH \rightarrow 4NaF + 2H_2O + O_2\uparrow$

55. (a)

Linear

Explanation:

CN=0.5(V+M-C+A) For XeF_2 CN = 5 .So shape will be linear and structure will be trigonal bipyramidal. Xenon and the two fluorine atoms lie in a straight line while the three equatorial positions are occupied by three lone pairs of electrons. Hence it has a linear shape.



56. (a)

Dimethylglyoxime

Explanation:

Ni^{2+} forms complex with DMG which is red in colour.

57. (a)

$Cr_2O_7^{2-}$

Explanation:

Chromate ion (CrO_4^{2-}) changes to dichromate ion ($Cr_2O_7^{2-}$) on acidification.

$2\ CrO_4^{2-} + 2\ H^+ \rightarrow Cr_2O_7^{2-} + H_2O$

58. (b)

H_2CrO_4

Explanation:

H_2CrO_4 is chromic acid. It is actually formed by mixing concentrated sulphuric acid to a dichromate like sodium dichromate. It is a strong acid as it completely dissociates into H^+ ions.

59. (d)

filling of 4f before 5d

Explanation:

This effect is particularly pronounced in the case of lanthanides, as the 4*f* subshell which is filled before 5d is not very effective at shielding the outer shell (n=5 and n=6) electrons. Thus the shielding effect is less able to counter the decrease in radius caused by increasing nuclear charge. This leads to "lanthanoid contraction".

60. (c)

Fm

Explanation:

In chemistry, a synthetic element is a chemical element that does not occur naturally on earth, and can only be created artificially. So far, 24 synthetic

elements have been created (those with atomic numbers 95–118). All are unstable, decaying with half-lives ranging from 15.6 million years to a few hundred microseconds. Fm have atomic number of 100.

61. (b)
Hg

Explanation:
Tin(II) chloride react with mercury(II) chloride in acidic medium to produce mercury and tin(IV) chloride as given below:
$SnCl_2 + HgCl_2 \rightarrow Hg + SnCl_4$

62. (b)
MnO_2

Explanation:

In alkaline medium, reduction of MnO_4^- take place to form MnO_2. The chemical equation for this change is given below as:

$MnO_4^-(aq) + 2H_2O(l) + 3e^- \rightarrow MnO_2(s) + 4OH^-(aq)$

63. (d)
charge transfer

Explanation:

The oxidation state of Mn in MnO_4^- is +7. Which means that Mn does not have any unpaired d-electrons left. However, MnO_4^- is deep purple in colour because of charge transfer from the ligand (O^{2-}) to the metal center. This is called a ligand-to-metal charge transfer.

64. (d)
Cu^{2+}

Explanation:

Cu^{2+} have electronic configuration of [Ar] $3d^9$ with presence of one unpaired electron which is responsible for paramagnetism with magnetic moment of 1.8

- 2.2. It shows blue colour due to d-d transition of this unpaired electron in visible region.

65. (c)

Mn_2O_7

Explanation:

In Mn_2O_7, each Mn is tetrahedrally surrounded by oxygen including Mn-O-Mn bridge.

66. (a)

Zn

Explanation:

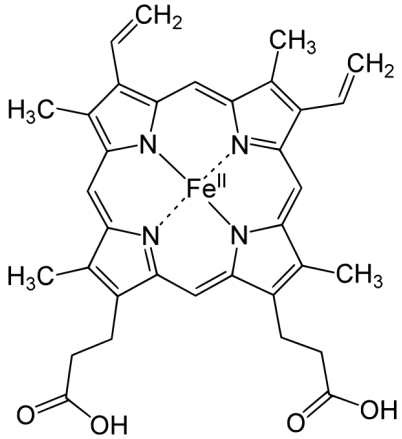
Zinc, cadmium and mercury of group 12 have full d^{10} configuration in their ground state as well as in their common oxidation states and hence, are not regarded as transition metals. However, being the end members of the three transition series, their chemistry is studied along with the chemistry of the transition metals.

67. (b)

Fe

Explanation:

O_2 is carried in the haemoglobin protein by the heme group. The heme group (a component of the haemoglobin protein) is a metal complex, with iron as the central metal atom, that can bind or release molecular oxygen. The structure of haemoglobin is as given below:



68. (c)

Mn^{2+}

Explanation:

Mn^{2+} has d^5 configuration so maximum number of unpaired electrons and hence maxium magnetic moment. This magnetic moment can be calculated by using the spin only formula: $\mu_{so} = \angle n(n+2)$, where n= number of unpaired electrons.

69. (c)
Sodium nitroprusside

Explanation:
$Na_2[Fe(CN)_5NO]$ i.e. Sodium pentacyanonitrosylferrate(II) is also called Sodium nitroprusside.

70. (c)
$[Ni(NH_3)_4]^{2+}$

Explanation:
Ni has atomic number 28, so Ni^{2+} has electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8$. NH_3 is a weak field ligand and hence two electrons are unpaired and hence this complex is paramagnetic.

71. (b)
$[Pt(NH_3)_5Cl]Cl_3$

Explanation:
On getting ionised this complex gives 3 Cl^- (ions outside the square brackets are ionisable) and a $[Pt(NH_3)_3Cl]^+$ i.e. 4 ions are produced per molecule of the compound.

72. (a)
Potassium trioxalatoaluminate(III)

Explanation:

Cation is named first and then the anion separated by a space. In a coordination complex, name of ligand is written first then the central metal atom/ion with its oxidation state in the parenthesis in roman numerals is mentioned. If the complex is an anion then -ate is added to the name of the central metal atom/ion. Here there are 3 K^+ ions so cations have a charge of +3. So overall charge on the complex anion is -3. Now each oxalate ion carries -2 charge and there are 3 oxalate ligands attached to aluminium. Let oxidation state of Al be x.

x + 3(-2) = -3

x - 6 = -3

x = -3 + 6 = +3

So, oxidation state of Al=+3

So, the name of the complex is Potassium trioxalatoaluminate(III)

73. (a)

$K^+[PtCl_3(C_2H_4)]^-$

Explanation:

Potassium trichloro(ethylene)platinate(II) i.e. $K[PtCl_3(C_2H_4)]$ is zeise's salt.

74. (b)

Cis – Platin

Explanation:

Cis-platin (cis – $[Pt(NH_3)_2(Cl)_2]$) is a coordination compounds used in treatment of cancer. It inhibits the growth of tumors.

75. (b)

$[Cr(NH_3)_6][Co(CN)_6]$

Explanation:

Coordination isomerism arises from the interchange of ligands between cationic and anionic entities of different metal ions present in a complex. Here interchange of CN^- and NH_3 ligands is possible between Cr and Co to give $[Co(NH_3)_6][Cr(CN)_6]$. So this complex can exhibit coordination isomerism.

76. (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.

77. (d)

sp^3d^2

Explanation:

Given complex can be written as $K_3[CoF_6]$. There are 3 Potassium ions K^+ means an overall +3 charge on cations and so the charge on the complex anion is -3. Each F^- ligand has -1 charge so there is a total of -6 charge on ligands. Let oxidation state of Co (Z=27) be x

x + (-6) = -3

x = -3 + 6 = +3

So oxidation state of Co=+3 and its electronic configuration is $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6$. Since its a high spin complex means there is no pairing of electrons in 3d subshell. Coordination number of Co is 6 as there are 6 ligands bound to it, so this octahedral complex has hybridization sp^3d^2.

78. (d)

both σ and π character.

Explanation:

The metal-carbon bond in metal carbonyls possesses both σ and π character. The M–C σ bond is formed by the donation of lone pair of electrons on the carbonyl carbon into a vacant orbital of the metal. The M–C π bond is formed by the donation of a pair of electrons from a filled d orbital of metal into the vacant antibonding π* orbital of carbon monoxide. The metal to ligand bonding creates a synergic effect which strengthens the bond between CO and the metal.

79. (a)

Titration with EDTA

Explanation:

Hardness of water is because of presence of Ca^{2+} and Mg^{2+} ions which can form stable complexes with EDTA. So by simple titration with EDTA, hardness of water can be estimated. The selective estimation of these ions can be done due to difference in the stability constants of their complexes with EDTA.

80. (d)

$[Ti(NO_3)_4]$

Explanation:

Ti has atomic number 22. And its electronic configuration is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$.

In given complex, there are four NO_3^- groups bonded to Ti. Each NO_3^- carries -1 charge, hence there is -4 charge on the ligands and overall the complex is neutral which means Ti is in +4 oxidation state. So Ti^{4+} has an electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6$ means there are no electrons in d orbital and hence d-d transition is not possible. So it is expected to be colourless.

Solution

Class 12 - Biology

MCQ (2019-20)

Section A

81. (d)
    A and C

    Explanation:
    An angiosarcoma (AS) is an uncommon malignant neoplasm characterized by rapidly proliferating, extensively infiltrating anaplastic cells derived from blood vessels and lining irregular blood-filled spaces. Angiosarcomas are aggressive and tend to recur locally, spread widely, and have a high rate of lymph node and systemic metastases. The rate of tumor-related death is high.

82. (c)
    Malignant tumors of the skin or mucous membrane

    Explanation:
    Carcinoma is a type of cancer or Malignant tumors of the skin or mucous membrane that starts in cells that make up the skin or the tissue lining organs, such as the liver or kidneys.
    The physical, chemical or biological agents that convert normal cell into cancerous cell are called carcinogens.

83. (d)
    Cannabinoids

    Explanation:
    A cannabinoid is one of a class of diverse chemical compounds that acts on cannabinoid receptors in cells that alter neurotransmitter release in the brain. Marijuana, hashish, charas and ganga contain chemicals called cannabinoids. They are generally, taken as inhalation or oral ingestion to effects cardiovascular system of the body.

84. (b)
    Both Assertion and Reason are false

Explanation:
Drug, marijuana and LSD are not used as analgesic or pain-killer. These drugs stimulate the brain function and create feeling of happiness under the influence of these drugs.

85. (b)
Opioids

Explanation:
Opioids are substances that act on opioid receptors to produce morphine-like effects.
The endogenous opioids are dynorphins, enkephalins, endorphins, endomorphins and nociceptin. The opioid receptors are ~40% identical to somatostatin receptors (SSTRs). Opioid receptors are distributed widely in the brain, and are also found in the spinal cord and digestive tract.
Opioids are most often used medically to relieve pain, and by people addicted to opioids.

86. (d)
Certain types of cancer

Explanation:
Electron therapy or electron beam therapy (EBT) is a kind of external beam radiotherapy where electrons are directed to a tumor site.
Cancerous cells are killed by radiation therapy to treat certain types of cancer. As cancer cells divide rapidly and can be easily killed by radiation.

87. (b)
Undergoing rapid divisions

Explanation:
Cancer cells are killed by radiation to treat cancer. Cancer cells are undergoing rapid division and radiation killed these cells but normal cells are not affected by these radiation therapy.

88. (c)
The membrane of lymph nodes

Explanation:
Lymphadenopathy-associated virus (LAV) A former name for HIV is the virus that causes AIDS. It is membrane of lymph nodes. Lymph node get affected and destroy the defense mechanism of human body.

89. (b)
Both Assertion and Reason are false

Explanation:
Dope test is done to estimate the level of blood alcohol by analyzing the blood and urine sample. A drunken person is not able to take correct decision due to improper co-ordination of nervous system and feels free from all worries.

90. (b)
Tobacco smoking

Explanation:
The major cause of lung cancer is tobacco smoking in form of cigarettes, biddi etc. Chemical carcinogens are present in these tobacco products that harms the alveoli of lungs.

91. (d)
ELISA

Explanation:
A series of blood screenings are performed to test for HIV. The enzyme-linked immunosorbent assay (ELISA), also known as an enzyme immunoassay (EIA), is the first test that your healthcare provider will order to screen for HIV. ELISA, like the Western blot test, detects HIV antibodies in your blood. Antibodies are proteins your immune system produces in response to the presence of foreign substances, such as viruses.
If you test positive for HIV on the ELISA test, your provider will order the Western blot test to confirm HIV infection.

92. (d)
Sterilization techniques

Explanation:

A number of birth control measures are used to prevent unwanted pregnancy. Sterilization technique is considered as the safest way. Condom prevents unwanted pregnancy as well as sexually transmitted disease.

93. (c)
Salmonella typhi

Explanation:
Typhoid fever in human being is caused by Salmonella typhi. The pathogen enters to small intestine through food and contaminated water and migrates to other organs through blood.

94. (d)
Meristem culture

Explanation:
Disease free plants can be obtained by the tissue culture of meristematic tissues present at shoot tips. The newly formed cells are generally disease free and plants obtained from this are also disease free.

95. (c)
(i)-(c), (ii)-(d), (iii) - (b), (iv) - (a), (v) - (f), (vi) - (e)

Explanation:
(i) Himgiri variety of wheat is resistant to Leaf and stripe rust and Hill bunt.
(ii) Pusa Sadabahar variety of Chilli is resistant to Chilly mosaic virus, Tobacco mosaic virus and leaf curl.
(iii) Pusa swarnim variety of brassica is resistant to yellow mosaic virus.
(iv) Pusa Komal (variety of Cowpea) a product of crosses between photoinsensitive line P85-2 and photosensitive P426, was tested at 9 sites throughout India during 1977 to 1984 and released in 1986.
(v) Pusa sawani is a variety of okra is fairly tolerant to yellow vein mosaic disease.
(vi) Pusa Shubhra variety of Cauliflower is resistant to Black rot.

96. (d)
Tissue culture

Explanation:

Micro-propagation is the method of producing thousands of genetically identical plants through tissue culture. In this method explants is kept in nutrient medium in aseptic condition.

97. (a)
White

Explanation:
plant tissue culture is the technique of in vitro maintaining and growing cells, tissue or organs in nutrient medium. Tissue culture technique was first performed successfully by White in 1932.

98. (d)
Out-breeding

Explanation:
Out-breeding is the breeding of the unrelated animal which may be of same breed without common ancestors or cross breeding or inter-specific hybridization.

99. (b)
Indigenous system of medicine

Explanation:
Honey is the food of high nutritive value and finds use in Indigenous system of medicine. Beeswax is used in preparation of cosmetic and polishes.

100. (d)
Ex situ conservation

Explanation:
Gene banks are part of ex situ conservation of plants or plant parts. In ex situ conservation, plants parts are maintained in laboratory condition. In in situ conservation, plants are kept in natural condition with protection.

101. (c)
Prevent contamination from unwanted pollen

Explanation:

Bagging is the method of covering emasculated flowers to prevent contamination from unwanted pollen. Butter paper or similar other substance is used to cover the flower.

102. (c)
Anther

Explanation:
Anther can yield a completely haploid plant because anther is produced by meiosis cell division contain half the number of chromosome their normal cells have.

103. (a)
ICAR

Explanation:
Evaluation of newly evolved varieties is carried out by Indian council of agricultural research (ICAR) regarding productivity, harmful effect and effectiveness.

104. (b)
Biomass got from microorganisms

Explanation:
Single cell protein (SCP) is biomass got from microorganisms. Single cell proteins are alternate source of protein in much concentrated form.

105. (b)
Bio-fortification

Explanation:
Bio-fortification is the breeding of crops with higher levels of vitamins and minerals to improve public health. Nutritional quantity is increased for protein, vitamins and minerals.

106. (a)
Pisciculture is form of aquaculture

Explanation:

Pisciculture or fish farming is the principle form of aquaculture. Aquaculture involves farming in fresh water and salt water organism under controlled condition.

107. (d)
Cinchona

Explanation:
From the bark of Cinchona an important drug is obtained which is used to treat malaria. The drug named quinine has ability to plasmodium protozoa that cause malarial disease in human beings.

108. (c)
Escherichia coli

Explanation:
The bacterium that do not retain the Gram stain are called gram negative bacteria.
Escherichia coli (commonly abbreviated E. coli) is a Gram-negative gammaproteobacterium commonly found in the lower intestine of warm-blooded organisms

109. (c)
Baculovirus

Explanation:
Baculoviruses are large, complex deoxyribonucleic acid (DNA) viruses that infect arthropods. The viruses are highly pathogenic and a few members have been successfully exploited as biological control agents for agricultural and forestry pests.

110. (d)
Commensalisms

Explanation:
Commensalism is a relationship between two organisms where one receives a benefit or benefits from the other and the other is not affected by it. In other words, one is benefited and the other is neither benefited nor harmed.
Example:

- Orchids - Some orchids grow on trees and that does not harm the tree.
- Pilot fish - Pilot fish live around sharks, sea turtles and rays and eat the parasites that live on them as well as leftover food they do not eat. Young pilot fish gather around jellyfish and seaweeds.

111. (a)
Snail

Explanation:
In organic farming snail is not used. Glomus is kind of fungi used in organic farming for maintaining fertility of soil. Earthworm the process of composting to form vermiform compost and Oscillatoria is an algae that fix the nitrogen.

112. (d)
Monera and Protista

Explanation:
Monera and Protista contain only micro-organisms. Monera contains unicellular prokaryotic organisms like bacteria. Protista contains unicellular eukaryotic organisms.

113. (d)
Tiger beetle

Explanation:
Tiger beetle is a large group of beetles known for their aggressive predatory habits and running speed. They are used as biological insecticides in organic farming practices.

114. (d)
Antibiotic

Explanation:
Fleming, Chain and Florey were awarded the Nobel Prize in 1945 for discovery of antibiotics. Antibiotics prevent the growth of bacteria and fungi.

115. (d)
Leguminosae

Explanation:
Green manuring is growing crop that is ploughed under the soil to improve fertility. Most of the plant used for green manuring belongs to family Leguninosae.

116. (d)
Genetic variability

Explanation:
The success of any breeding program depends mainly on the genetic variability available in the population. Availability of a wide variability provides the breeder with a greater chance of selecting desired material. Besides knowledge of the variability, a detailed knowledge of the association of characteristics with yield is also necessary.

117. (c)
Rhizobium

Explanation:
Rhizobium are bacteria that fix nitrogen after becoming established inside root nodules of legumes. In order to express genes for nitrogen fixation, rhizobia require a plant host; they cannot independently fix nitrogen Rhizobium bacteria is found in the nodule of leguminous plants root. It increases the fertility of soil.

118. (d)
Bacteria

Explanation:
Escherichia coli and Chlamydia trachomatis fall into which Bacteria family. Bacteria can live in all kind of environment like air, water and soil including inside the body of plants and animals as parasite.

119. (d)
Selman Waksman

Explanation:

The term antibiotic was coined by Selman Abraham Waksman. He developed antibiotic Streptomycin that cure tuberculosis. He got noble prize in medicine in 1952.

120. (c)
Widal test

Explanation:
Widal test is a milestone invention in medicine. This test was devised by Frank Widal in 1896.
Widal test is most widely used diagnostic test for typhoid fever in developing countries. The Widal test has been in use for more than a century as an aid in the diagnosis of typhoid fever. It measures agglutinating antibody levels against O and H antigens.