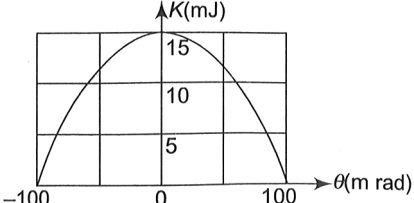


SAMPLE PAPER - 129


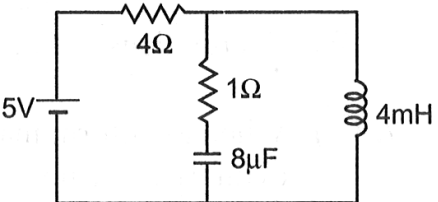
Time : 1 : 15 Hr.

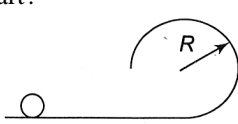
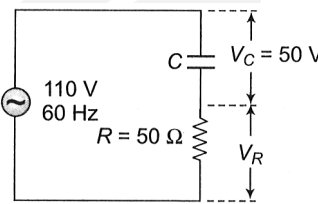
Question : 60

PHYSICS

01. If the radius of the first orbit of the hydrogen atom is 0.53 \AA , then the de-Broglie wavelength of the electron in the ground state of hydrogen atom will be
 (1) 0.53 \AA (2) 3.33 \AA
 (3) 1.67 \AA (4) 1.06 \AA
02. A body is fired with a velocity of magnitude $\sqrt{gR} < V < \sqrt{2gR}$ at an angle of 30° with the radius vector of earth. If at the highest point the speed of the body is $V/4$, the maximum height attained by the body is equal to
 (1) $V^2/8g$
 (2) R
 (3) $\sqrt{2} R$
 (4) none of these
03. Figure shows the kinetic energy K of a simple pendulum versus its angle θ from the vertical. The pendulum bob has mass 0.2 kg . The length of the pendulum is equal to ($g = 10 \text{ m/s}^2$).
- 
- (1) 2.0 m (2) 1.8 m
 (3) 1.5 m (4) 1.2 m
04. $\frac{2.5}{\pi} \mu\text{F}$ capacitor and 3000-ohm resistance are joined in series to an AC source of 200 volt and 50 s^{-1} frequency. The power factor of the circuit and the power dissipated in it will respectively
 (1) $0.6, 0.06 \text{ W}$ (2) $0.06, 0.6 \text{ W}$
 (3) $0.6, 4.8 \text{ W}$ (4) $4.8, 0.6 \text{ W}$
05. Two electric dipoles of moment P and $64 P$ are placed in opposite direction on a line at a distance of 25 cm . The electric field will be zero at point between the dipoles whose distance from the dipole of moment P is
 (1) 5 cm (2) $\frac{25}{9} \text{ cm}$
 (3) 10 cm (4) $\frac{4}{13} \text{ cm}$
06. Two identical cells send the same current in 2Ω resistance, whether connected in series or in parallel. The internal resistance of the cell should be
 (1) 1Ω (2) 2Ω
 (3) $\frac{1}{2} \Omega$ (4) 2.5Ω
07. Dimensions of a in van der Waals' constant in equation

$$\left(P + \frac{a}{V^2}\right)(V - b) = nRT$$

 (1) $[\text{ML}^5\text{T}^{-2}]$ (2) $[\text{ML}^{-1}\text{T}^{-2}]$
 (3) $[\text{M}^{-1}\text{L}^3\text{T}^0]$ (4) $[\text{M}^1\text{L}^3\text{T}^0]$
08. Three magnets each of magnetic moment M are arranged to form an equilateral triangle, then the magnetic moment of the system is
- 
- (1) $3M$ (2) $2M$ (3) zero (4) $\frac{\sqrt{3}}{4} M$
09. In the figure, the steady state current through the inductor will be
- 

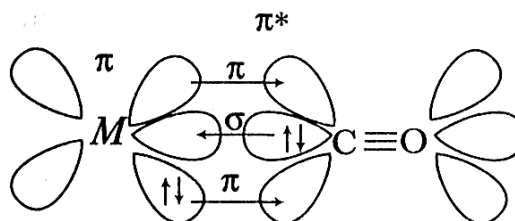
- (1) zero (2) 1.25 A
 (3) 1 A
 (4) none of the above
10. A car of mass 1000 kg accelerates uniformly from rest to a velocity of 54 km/h in 5 s. The average power of the engine during this period (in watts) is (neglect friction)
 (1) 2000 W (2) 22500 W
 (3) 5000 W (4) 2250 W
11. Assuming f to be the frequency of first-line in Balmer series, the frequency of the immediate next (i.e. second) line is
 (1) $0.50f$ (2) $1.35f$
 (3) $2.05f$ (4) $2.70f$
12. Figure shows a rough track, a portion of which is in the form of a cylinder of radius R . With what minimum velocity a sphere of radius r be set rolling on the horizontal part so that it completely goes around the circle on the cylindrical part?
- 
- (1) $\sqrt{\frac{27}{7}g(R-r)}$
 (2) $\sqrt{\frac{20}{7}g(R-r)}$
 (3) $\sqrt{\frac{20}{7}gR}$ (4) $\sqrt{\frac{17}{7}g(R-r)}$
13. In the given circuit, $V_C = 50$ V and $R = 50\Omega$. The values of C and V_R are
- 
- (1) $100\mu\text{F}$, 60V (2) $100\mu\text{F}$, 98V
 (3) $1.6\mu\text{F}$, 30V (4) $2\mu\text{F}$, 60V
14. In a streamline flow
 (1) The velocity of a fluid particle remains constant
 (2) The velocity of all fluid particles crossing a given position is constant
 (3) Speed of a fluid particle remains constant
 (4) The velocity of all fluid particles at a given instant is same
15. Assertion (A) : In a straight solenoid, energy density is greater at the centre than near its ends.

Reason (R) : Energy density is given by $U = \frac{1}{2} \frac{B^2}{\mu_0}$

- (1) Both A and R are true and R is the correct explanation of A
 (2) Both A and R are true and R is not the correct explanation of A
 (3) A is true but R is false
 (4) Both A and R are false

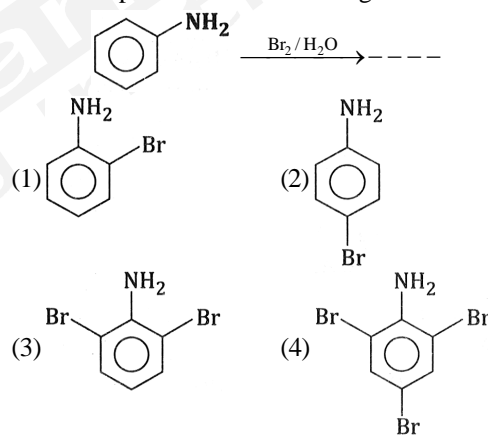
CHEMISTRY

16. Consider the following figure.

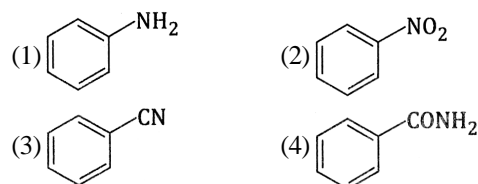


Which type of bond formed between metals and ligand ?

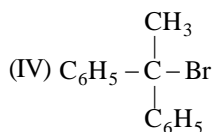
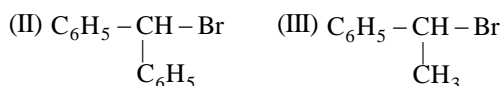
- (1) synergic bond (2) σ -bond
 (3) π -bond (4) None of these
17. Which of the following compound will give a yellow precipitate with iodine and alkali?
 (1) Benzophenone (2) Methyl acetate
 (3) Acetamide (4) Propane 2 ol
18. The main product of the following reaction is:



19. A given nitrogen containing aromatic compound 'A' reacts with Sn/HCl followed by HNO_2 to give an unstable compound 'B'. 'B' on treatment with phenol, forms a beautiful coloured compound 'C' with the molecular formula $\text{C}_{12}\text{H}_{10}\text{N}_2\text{O}$. The structure of 'A' is:



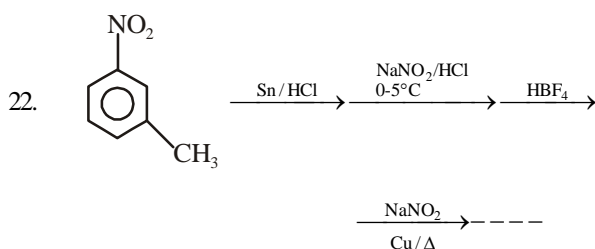
20. Study the following compounds and arrange them in decreasing S_N1 mechanism.



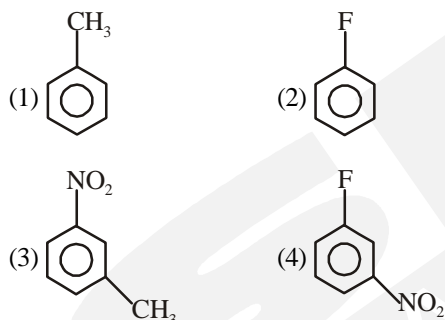
- (1) $IV > II > III > I$ (2) $I > III > II > IV$
 (3) $IV > III > II > I$ (4) $I > II > III > IV$

21. The heating of phenyl methyl ether with HI produces:

- (1) iodobenzene (2) phenol
 (3) benzene (4) ethyl chlorides



The final product is:

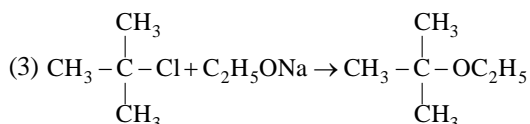


23. The last element of the p-block in 6th period is represented by the outermost electronic configuration:

- (1) $7s^2, 7p^6$ (2) $5f^{14}, 6d^{10}, 7s^2, 7p^0$
 (3) $4f^{14}, 5d^{10}, 6s^2, 6p^6$ (4) $4f^{14}, 5d^{10}, 6s^2, 6p^4$

24. Which of the following is a correct reaction?

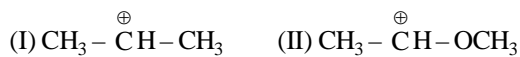
- (1) $CH_3-CH_2-Cl + AgCN \rightarrow CH_3-CH_2-CN$ (Major)
 (2) $CH_3-CH_2-Cl + KNO_2 \rightarrow CH_3-CH_2-N \begin{smallmatrix} \diagup O \\ \diagdown O \end{smallmatrix}$ (major)



(major)

- (4) $CH_3-CH_2-Cl + CH_3-COOAg \rightarrow CH_3COOC_2H_5 + AgCl$

25. What is the correct order of decreasing stability of the following cations?

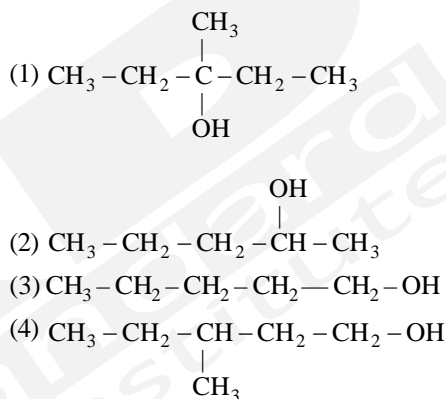


- (1) $(II) > (I) > (III)$ (2) $(II) > (III) > (I)$
 (3) $(III) > (I) > (II)$ (4) $(I) > (II) > (III)$

26. Arrange the following compounds in increasing order of boiling point:

- Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol
 (1) Propan-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol
 (2) Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol
 (3) Pentan-1-ol, butan-2-ol, butan-1-ol, propan-1-ol
 (4) Pentan-1-ol, butan-1-ol, butan-2-ol, propan-1-ol

27. Among the following compounds which can be dehydrated very easily, is:



28. If the enthalpy and entropy change for the reaction

- $A_2(g) + B_2(g) \rightleftharpoons 2AB(g)$
 are 75 kJ mol^{-1} and $250 \text{ JK}^{-1} \text{ mol}^{-1}$ respectively. The temperature at which the reaction will be at equilibrium is
 (1) 250 K (2) 300 K
 (3) 400 K (4) 450 K

29. In a galvanic cell

- (1) Chemical reaction produces electrical energy
 (2) Electrical energy produces chemical reaction
 (3) Reduction occurs at anode
 (4) Oxidation occurs at cathode

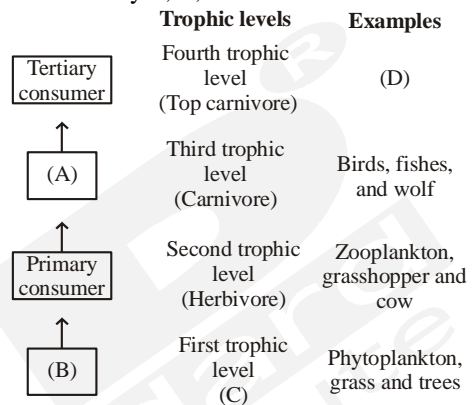
30. Solution that shows positive deviation from Raoult's law.

- (1) Carbon disulphide and acetone
 (2) Chloroform and acetone.
 (3) Both
 (4) None

31. Suberin is deposited on –
 (1) Tangential walls of epidermal cells
 (2) Radial walls of cortical cells
 (3) Tangential walls of endodermal cells
 (4) radial walls of epidermal cells
32. Maximum absorption by chlorophyll 'a' occurs in-
 (1) blue & green region
 (2) red & green region
 (3) blue & red region
 (4) yellow & red region
33. The genotypic ratio obtained in incomplete dominance is
 (1) 3 : 1
 (2) 1 : 1 : 2
 (3) 2 : 1 : 1
 (4) 1 : 2 : 1
34. Which of the following is true about base pairing in DNA –
 (1) Guanine forms two H-bond with Cytosine
 (2) Guanine forms three H-bond with Cytosine
 (3) Guanine forms two H-bond with Adenine
 (4) Guanine forms three H-bond with Adenine
35. Choose incorrect statement RNA-
 (1) was first genetic material
 (2) acts as catalyst too
 (3) is more stable than DNA
 (4) has protein synthesizing mechanism built around it
36. Meselson and Stahl performed experiment for proving DNA replication scheme in-
 (1) 1952 (2) 1953 (3) 1958 (4) 1961
37. Kingdom Protista has brought together Chlamydomonas and a with b and amoeba; which were earlier placed in separate kingdoms.
 (1) a-Chara; a-entamoeba
 (2) a-Chlorella; a-Porphyrans
 (3) a-Chlorella; a-Paramecium
 (4) a-Volvox; a-Plasmodium
38. Select the incorrect match.
 (1) Zygotene - Condensation of chromatin occurs
 (2) Pachytene - Action of enzyme recombinase is seen
 (3) Diplotene - Formation of synaptonemal complex
 (4) Diakinesis - Terminalisation of chiasmata
39. Read the following statements and select the correct ones.
 (a) Prophase I is the longest phase of meiosis I.
 (b) Meiosis I is equational division.
 (c) The spindle fibres completely disappear in telophase I
 (d) Replication of DNA takes place in interkinesis.

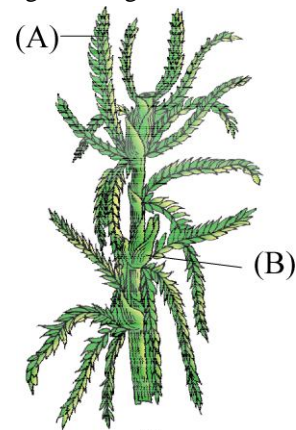
- (1) (a), (b) and (c) (2) (a), (c) and (d)
 (3) (a) and (c) (4) (b), (c) and (d)

40. In a pea flower, five petals are arranged in a specialized manner with one posterior, two lateral and two anterior. These are named as _____, _____ and _____ respectively.
 (1) Keel, Wings and Standard
 (2) Vexillum, Keel and Standard
 (3) Keel, Standard and Carina
 (4) Standard, Wings and Keel
41. Refer the given diagrammatic representation of trophic levels in an ecosystem some spaces are marked A, B, C and D. Identify A, B, C and D.



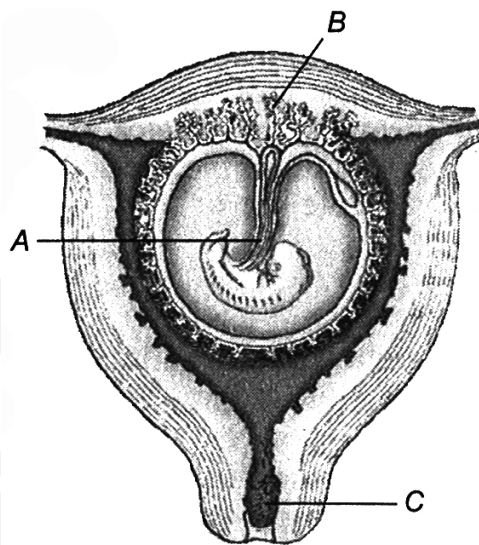
- (1) A-Primary producer; B-Secondary consumer; C-Man/Lion; D-Plants
 (2) A-Secondary consumer; B-Primary producer; C-Man/lion; D-Plants
 (3) A-Primary producer; B-Secondary consumer; C-Plants; D-Man/lion
 (4) A-Secondary consumer; B-Primary producer; C-Plants; D-Man/lion

42. Identify the given diagram and label



- (1) Sphagnum, a liverwort A = archegonia branch B = antheridial branch
 (2) Sphagnum, a moss A = archegonia branch B = antheridial branch
 (3) Funaria, a moss A = antheridial branch B = archegonia branch
 (4) Sphagnum, a liverwort A = antheridial branch B = archegonia branch

43. How many of the following statements about Double – helix structure of DNA is correct
 (i) Two chains are coiled in right – handed fashion
 (ii) Pitch of helix is 3.6 nm
 (iii) There are roughly 10 bp in each turn
 (iv) Plane of one base pair stacks over the other
 (1) 1 (2) 2 (3) 3 (4) 4
44. (1) Ribosomes in cytoplasm are 80S, but in thylakoid of Chloroplast 70S.
 (2) Cytoskeleton is involved in many functions such as mechanical support, motility, maintenance of chromosome structure and shape of the cell.
 (3) Both centrioles in a centrosome are perpendicular to each others, overall organisation like the cartwheel.
 (4) Perinuclear space is a 10–50 µm space between two parallel membranes.
 (5) Sometimes a few chromosomes have non-staining secondary constrictions at variable locations, and called satellite.
 Which are correct.
 (1) 2, 3 & 5 (2) 1, 3, 4 & 5 (3) 3 & 5 only (4) None
45. If there are 250 snails in a pond, and within a year their number increases to 2500 by reproduction.
 What should be their birth rate per snail per year?
 (1) 10 (2) 9 (3) 25 (4) 15
49. I. On an average a healthy human breathes 12-16 times/minute.
 II. The volume of air involved in the breathing movements can be estimated by spirometer.
 III. Diaphragm is very useful in both inspiration and expiration.
 Which of the above statements are incorrect?
 Choose the correct option.
 (1) I and II
 (2) II and III
 (3) I and III
 (4) None of these
50. In the given diagram find out A, B and C.



ZOOLOGY

46. Identify, whether the given conditions are anabolic or catabolic.
 I. Glucose → Lactic acid
 II. Amino acids → Proteins
 (1) I-catabolic; II-catabolic
 (2) I-anabolic; II-catabolic
 (3) I-catabolic; II-anabolic
 (4) I-anabolic; II-anabolic
47. Match the following columns.

Column I	Column II
A. Prosthetic group	1. NAD
B. Cofactor	2. Haem
C. Coenzyme	3. Zn ions

 (1) A-2, B-3, C-1
 (2) A-1, B-2, C-3
 (3) A-3, B-1, C-2
 (4) A-2, B-1, C-3
48. In humans, which of the following is not a step in respiration?
 (1) Alveolar diffusion of O₂ and CO₂
 (2) Transport of gases by blood
 (3) Diffusion of O₂ and CO₂ between blood and tissues
 (4) Utilisation of CO₂ by cells for catabolic reactions
51. Homo erectus lived about
 (1) 2 million years ago
 (2) 1.5 million years ago
 (3) 1 million years ago
 (4) .5 million year ago
52. Albinism is known to be due to an autosomal recessive mutation. The first child of a couple with normal skin pigmentation was an albino. What is the probability that their second child will also be an albino?
 (1) 50% (2) 75% (3) 100% (4) 25%
53. Which of the following statements is false?
 (1) The ovaries in frog are structurally and functionally connected with kidneys.
 (2) A mature female frog can lay 2500-3000, unferti- lized ova at a time.

- (3) In male frog there are 10-12 vasa efferentia arise from testes and enter kidneys on their side and open into Bidder's canal.
 (4) The eggs of frog are mesolecithal and telolecithal.

54. Match the following

Column A

- (1) Airborne disease
 (2) Waterborne disease
 (3) Insect as vector
 (1) (1)-(b), (2)-(a), (3)-(c)
 (2) (1)-(b), (2)-(c), (3)-(a)
 (3) (1)-(a), (2)-(b), (3)-(c)
 (4) (1)-(a), (2)-(c), (3)-(b)

Column B

- a) amoebiasis
 b) pneumonia
 c) filariasis

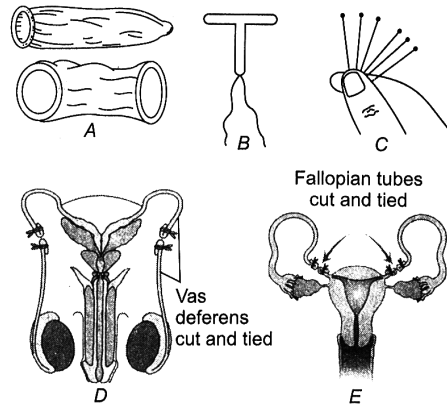
55. Which among the following techniques generate 3-D image of the internals of an object? (Like cancer/tumor)
 (1) Computed tomography
 (2) Radiography
 (3) MRI
 (4) None of these

56. Consider the phyla in the given box.
 Arthropods, Platyhelminthes, Mollusca, Echinodermata, Aschelminthes
 How many of them have true body cavity completely lined by mesoderm?
 (1) 5 (2) 3 (3) 2 (4) 4

57. ...A... band contains actin and is called ...B... band, whereas the ...C...-band called ...D...-band contains myosin.
 Choose the correct options for A, B and C.
 (1) A-Light, B-I, C-dark, D-A
 (2) A-Dark, B-I, C-light, D-A
 (3) A-Dark, B-A, C-light, D-I
 (4) A-Light, B-A, C-dark, D-I

58. In which of the following, heart pumps only deoxygenated blood?
 (1) Shark (2) Whale
 (3) Frog (4) Lizard

59. Match the following figures with their respective identity
 I. Tubectomy
 II. Vasectomy
 III. Implants
 IV. Condoms
 V. Copper-T



- (1) A-IV; B-V; C-III; D-II; E-I
 (2) A-IV; B-IV; C-II; D-I; E-V
 (3) A-I; B-II; C-III; D-IV; E-V
 (4) A-III; B-IV; C-V; D-I; E-II

60. Absence of one sex chromosome causes
 (1) Turner's syndrome.
 (2) Klinefelter's syndrome.
 (3) Down's syndrome.
 (4) Edwards syndrome