

Physics

1. Identify the false statement from the following

- (a) If cohesive force = adhesive force, then angle of contact, $\theta = 90^\circ$
- (b) If cohesive force < adhesive force, then angle of contact, $\theta < 90^\circ$
- (c) If cohesive force > adhesive force, then angle of contact, $\theta > 90^\circ$
- (d) If the radius of capillary is reduced to half, then the rise of liquid column becomes four times

2. In the case of a diatomic gas, if heat is given at constant pressure then the part of energy which is used for expansion of gas is

- (a) $\frac{2}{7}$
- (b) $\frac{2}{5}$
- (c) $\frac{3}{7}$
- (d) $\frac{3}{5}$

3. Among the following which is dimensionally correct?

- (a) Pressure = Force per unit volume
- (b) Pressure = Energy per unit volume
- (c) Pressure = Energy per unit area
- (d) Pressure = Force per unit volume per unit time

4. If pressure of CO_2 (real gas) in a container is given by $p = \frac{RT}{2V - b} - \frac{a}{4b^2}$

Then, mass of the gas in the container is

- (a) 44 g
- (b) 33 g
- (c) 22 g
- (d) 5g

5. The relative velocity of two consecutive layers is 8 cms^{-1} and the perpendicular

distance between the layers is 0.1 cm. The velocity gradient is

- (a) 0.8 s^{-1}
- (b) 0.08 s^{-1}
- (c) 8.0 s^{-1}
- (d) 80 s^{-1}

6. When a projectile is fired with initial velocity u at an angle of projection θ , then its range is R . If the initial velocity is doubled at same angle of projection, then the new range will be

- (a) R
- (b) $\frac{R}{2}$
- (c) $2R$
- (d) $4R$

7. If a resistance of $R \Omega$ is connected in series with an inductor L and the phase angle between voltage and current is $\frac{\pi}{4}$, then the value of inductive reactance is

- (a) zero
- (b) R
- (c) $\frac{R}{2}$
- (d) $\frac{R}{4}$

8. If two waves of equal amplitude and frequency interfere each other then the ratio of intensity when the two waves arrive in phase to that when they arrive 90° out of phase is

- (a) $\sqrt{2} : 1$
- (b) $1 : 1$
- (c) $4 : 1$
- (d) $2 : 1$

9. In a transistor, forward bias is always smaller than the reverse bias because it

- (a) helps to produce large voltage gain
- (b) helps to maintain a constant base current
- (c) helps in avoiding excessive heating of transistor
- (d) None of the above

10. If the total power rating of a group of electric lamps is 1000 W and they are connected across an AC voltage

$$E = 200 \sin(310t + 60^\circ)$$

Then, the rms value of the circuit current is

- (a) $10\sqrt{2}$ A (b) $20\sqrt{2}$ A
(c) 10A (d) 20A
11. For a particle starting from rest, the acceleration varies with time according to relation,

$$A = -a\omega^2 \sin \omega t$$

The displacement of this particle at a time t will be

- (a) $a\omega \cos \omega t$
(b) $a \sin \omega t$
(c) $a\omega \sin \omega t$

(d) $-\frac{1}{2}(a\omega^2 \sin \omega t)t^2$

12. If a body is moving with uniform speed v in a circle of radius r , then tangential acceleration will be

- (a) zero (b) $\frac{v}{r}$
(c) $\frac{v^2}{r}$ (d) $\frac{v}{r^2}$

13. By using the equation $\tan \theta = \frac{rg}{v^2}$, the value

of θ (angle of banking) for a cyclist taking a curve can be calculated. But the equation is (symbols have their usual meanings)

- (a) dimensionally correct only
(b) numerically correct only
(c) both dimensionally and numerically correct
(d) neither dimensionally nor numerically correct

14. The point at which the gravitational potential and the gravitational field due to earth is zero is at

- (a) earth's surface
(b) a height R_e from earth's surface
($R_e =$ radius of earth)
(c) a point below the earth's surface
(d) infinity

15. If the breaking force for a wire is F , then the value of breaking force on increasing the thickness of wire 2 times will be

- (a) F (b) $2F$
(c) $4F$ (d) $8F$

16. The Young's modulus of a material is 3 times its modulus of rigidity, the volume elasticity is

- (a) zero (b) infinity
(c) $2 \times 10^{10} \text{ N-m}^{-2}$ (d) $3 \times 10^{10} \text{ N-m}^{-2}$

17. An arc of radius r carries charge. The linear density of charge is λ and the arc subtends an angle of 60° at the centre. What is the value of electric potential at the centre?

- (a) $\frac{\lambda}{16\epsilon_0}$ (b) $\frac{\lambda}{8\epsilon_0}$
(c) $\frac{\lambda}{12\epsilon_0}$ (d) $\frac{\lambda}{4\epsilon_0}$

18. Newton's law of cooling is a special case of

- (a) Planck's law (b) Kirchhoff's law
(c) Wien's law (d) Stefan's law

19. At a certain temperature, if the r.m.s. velocity of O_2 is 400 m/s then at the same temperature the r.m.s. velocity of H_2 molecules will be

- (a) 400 m/s (b) 1600 m/s
(c) 3200 m/s (d) 6400 m/s

20. The moment of inertia of a thin circular lamina of mass 1 kg and diameter 0.2 m rotating about one of its diameter is

- (a) $2.5 \times 10^{-3} \text{ kg-m}^2$
(b) $4 \times 10^{-2} \text{ kg-m}^2$
(c) $5 \times 10^{-3} \text{ kg-m}^2$
(d) $5.5 \times 10^{-3} \text{ kg-m}^2$

21. If the kinetic energy of a body is decreased by 36%, then its momentum is decreased by

- (a) 6% (b) 8%
(c) 20% (d) 36%

22. A man is riding on a cycle with velocity 7.2 km/h up a hill having a slope 1 in 20. The total mass of the man and cycle is 100 kg. The power of the man is

- (a) 98 W (b) 125 W
(c) 175 W (d) 200 W

23. When a ring of mass 10 kg and diameter 0.4 m is rotated about its axis it makes 2100 rev/min. The angular momentum of the ring will be

- (a) $0.4 \text{ kg m}^2 \text{ s}^{-1}$ (b) $4.4 \text{ kg m}^2 \text{ s}^{-1}$
 (c) $44 \text{ kg m}^2 \text{ s}^{-1}$ (d) $88 \text{ kg m}^2 \text{ s}^{-1}$

24. Two electric bulbs one rated 40 W-200 V and other 100 W -200 V are connected in a house wiring circuit. Which one of the following statement about them is correct?

- (a) The resistance of the filaments in both the bulbs are same
 (b) The resistance of filament in 40 W bulb is more than the resistance of 100 W bulb
 (c) The resistance of the filament in 100 W bulb is more than the resistance of 40 W bulb
 (d) None of the above

25. In the hydrogen atom, the electron is making 6.6×10^{15} rps. If the radius of the orbit is 0.53×10^{-10} m, then magnetic field produced at the centre of the orbit is

- (a) 0.14 T (b) 1.4 T
 (c) 12.5 T (d) 140 T

26. According to Boolean Algebra $\overline{\overline{A} \cdot \overline{B}} \cdot A$ equals to

- (a) A (b) $A + B$
 (c) $\overline{A + B}$ (d) $\overline{A \cdot B}$

27. The mobility of free electrons is greater than that of free holes because

- (a) they are light
 (b) they require low energy to continue their motion
 (c) they carry negative charge
 (d) they mutually collide less

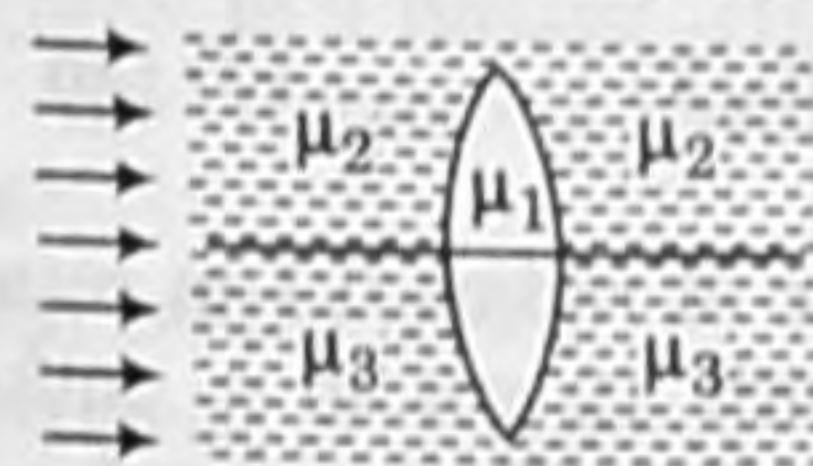
28. A light ray is incident by grazing one of the face of a prism and after refraction ray does not emerge out, what should be the angle of prism while critical angle is C ?

- (a) $A > 2C$ (b) $A < 2C$
 (c) $A = 2C$ (d) None of these

29. A man can see only between 75 cm to 200 cm. The power of lens to correct the near point will be

- (a) -3 D (b) $-8/3 \text{ D}$
 (c) $+3 \text{ D}$ (d) $+8/3 \text{ D}$

30. A double convex lens made up of a material of refractive index μ_1 is immersed inside two liquids of refractive indices μ_2 and μ_3 as shown in figure. If $\mu_2 > \mu_1 > \mu_3$ and a wide parallel beam of light incident on the lens from the left, then the lens will give rise to



- (a) a convergent beam and a divergent beam
 (b) two different divergent beams
 (c) two different convergent beams
 (d) a single convergent beam

31. A radioactive nucleus is being produced at a constant rate α per second. Its decay constant is λ . If N_0 is the number of nuclei at time $t = 0$, then maximum number of nuclei possible are

- (a) N_0 (b) $N_0 + \frac{\alpha}{\lambda}$
 (c) $\frac{\alpha}{\lambda}$ (d) $\frac{\lambda}{\alpha} + N_0$

32. The bob of a simple pendulum of mass m and length l is dropped from the horizontal position strikes a block of the same mass elastically placed on a horizontal frictionless table. The kinetic energy of the block will be

- (a) zero (b) mgl
 (c) $\frac{mgl}{2}$ (d) $2mgl$

33. Metallic ropes are suspended on the carriers which take inflammable material because

- (a) they keep the body of the carrier in contact with the earth
 (b) they keep the centre of gravity of the carrier nearer to the earth
 (c) they controlled the speed of the carrier
 (d) nothing should be placed under the carrier

34. The terminal potential difference of a cell is greater than its emf when it is

- (a) in open circuit
 (b) being charged
 (c) being discharged
 (d) being either charged or discharged.

35. If a magnet is suspended at an angle 30° to the magnetic meridian, it makes an angle of 45° with the horizontal. The real dip is

- (a) $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$ (b) $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$
 (c) $\tan^{-1}(\sqrt{3})$ (d) $\tan^{-1}\left(\frac{2}{\sqrt{3}}\right)$

36. A Cu disc of radius 0.1 m rotates about its centre with 10 rps in a uniform magnetic field of 0.1 T. The emf induced across the radius of the disc is

- (a) 10π mV (b) 20π mV
 (c) $\frac{\pi}{10}$ V (d) $\frac{2\pi}{10}$ V

37. The coefficient self inductance of a solenoid is 0.18 mH. If a core of soft iron of relative permeability 900 is inserted, then the coefficient of self-inductance will become

- (a) 0.0002 mH (b) 0.006 mH
 (c) 5.4 mH (d) 162 mH

38. If a resonant AC circuit contains a capacitor of capacitance 10^{-6} F and an inductor of 10^{-4} H, then the frequency of electrical oscillations will be

- (a) 10 Hz (b) 10^5 Hz
 (c) $\frac{10}{2\pi}$ Hz (d) $\frac{10^5}{2\pi}$ Hz

39. Threshold frequency for a metal is 10^{15} Hz. If light of wavelength 4000 Å falls on its surface, then which of the following statement is correct?

- (a) Photo electrons come out with zero speed.
 (b) Photo electrons come out with 10^3 m/s speed.
 (c) Photo electrons come out with 10^5 m/s speed.
 (d) No photo electric emission takes place.

40. In a semiconductor the concentrations of electrons and holes are $8 \times 10^{18} \text{ m}^{-3}$ and $5 \times 10^{18} \text{ m}^{-3}$ respectively. If the mobilities of electrons and holes are $2.3 \text{ m}^2 \text{ V}^{-1} \text{ s}^{-1}$ and $0.01 \text{ m}^2 \text{ V}^{-1} \text{ s}^{-1}$ respectively, then semiconductor is

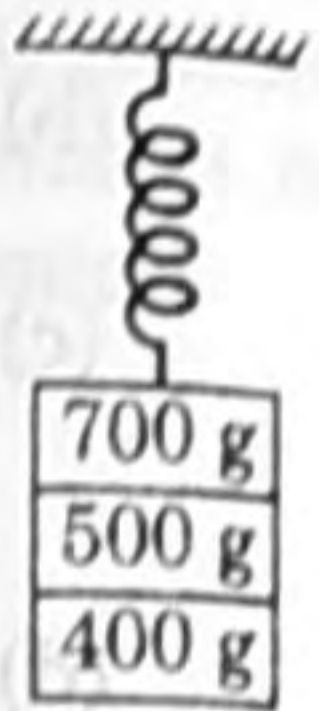
- (a) *n*-type and its resistivity is $0.034 \Omega\text{-m}$
 (b) *n*-type and its resistivity is $0.34 \Omega\text{-m}$
 (c) *p*-type and its resistivity is $0.034 \Omega\text{-m}$
 (d) *p*-type and its resistivity is $0.34 \Omega\text{-m}$

41. The periodic time of a particle executing SHM is 4 s. The time taken by it to go from its mean position to half the maximum displacement (amplitude) is

- (a) 1 s (b) 2 s
 (c) $\frac{1}{3}$ s (d) $\frac{2}{3}$ s

42. When three masses 700g, 500g and 400g are suspended at the end of a spring as shown, they are in equilibrium. If the mass of 700g is removed, then system oscillates with a period of 3 s, if further 500 g mass is also removed then the system will oscillate with a period of

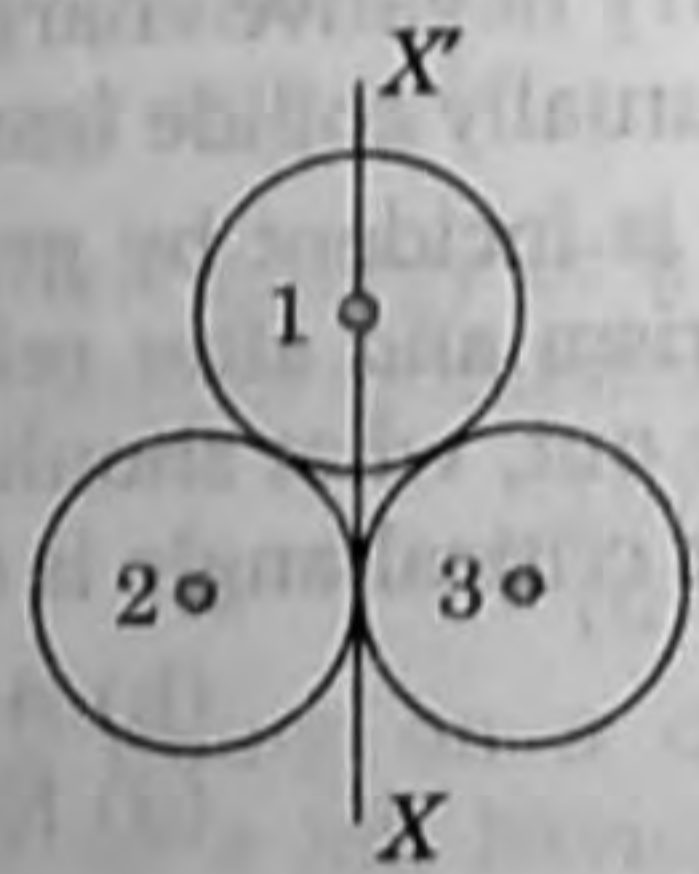
- (a) 1 s (b) 2 s
 (c) 3 s (d) 4 s



43. In steady state of thermal conduction, temperature of the ends A and B of a 20 cm long rod are 100°C and 0°C respectively. What will be the temperature of the rod at a point at a distance of 6 cm from the end A of the rod?

- (a) 5°C (b) 70°C
 (c) -30°C (d) -50°C

44. If three rings each of mass m and radius r are arranged as shown in figure, then the moment of inertia of the system about the axis XX' will be



- (a) $3mr^2$ (b) $\frac{3}{2}mr^2$
 (c) $7mr^2$ (d) $\frac{7}{2}mr^2$

45. If a body of mass 10 kg is dropped to the ground from a height of 5 m, then the work done by the gravitational force is (Take $g = 9.8 \text{ m/s}^2$)

- (a) + 490 J
 (b) -490 J
 (c) -980 J
 (d) + 980 J

46. A mass of 10 kg is sliding along a rough horizontal surface. If the coefficient of friction is $\frac{1}{\sqrt{3}}$, then the least force which acts at an angle of 30° to horizontal is (Take $g = 10 \text{ m/s}^2$)

- (a) 25 N
 (b) 50 N
 (c) $\frac{50}{\sqrt{3}}$ N
 (d) 100 N

47. The velocity of a particle is given by $(10 + 2t^2)$ ms. The average acceleration of the particle between 2 s and 5 s will be

- (a) 2 m/s^2
 (b) 4 m/s^2
 (c) 10 m/s^2
 (d) 14 m/s^2

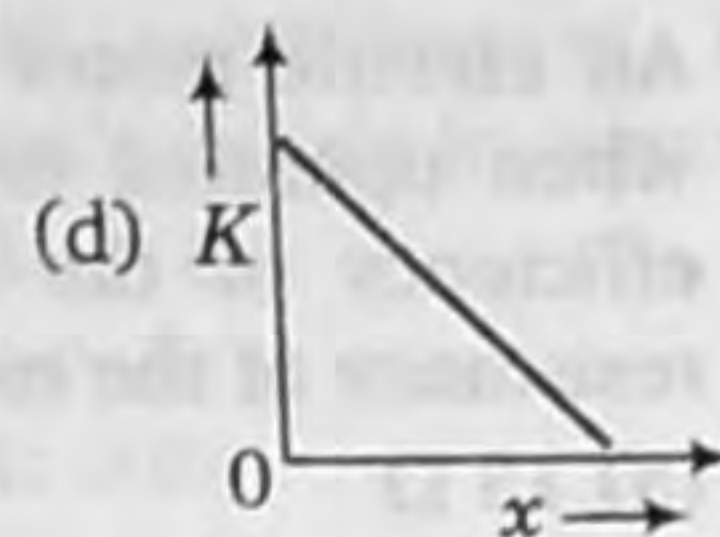
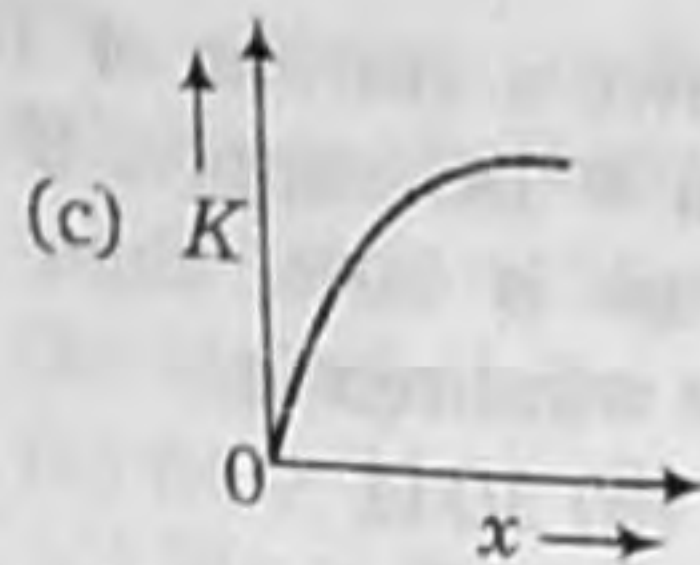
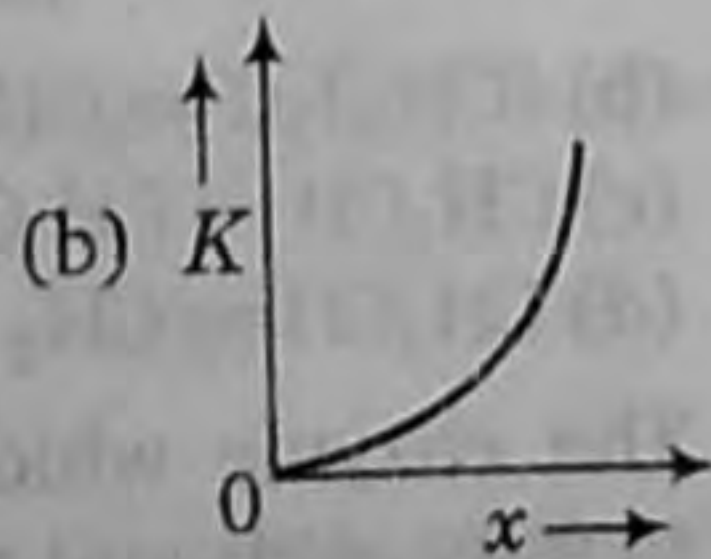
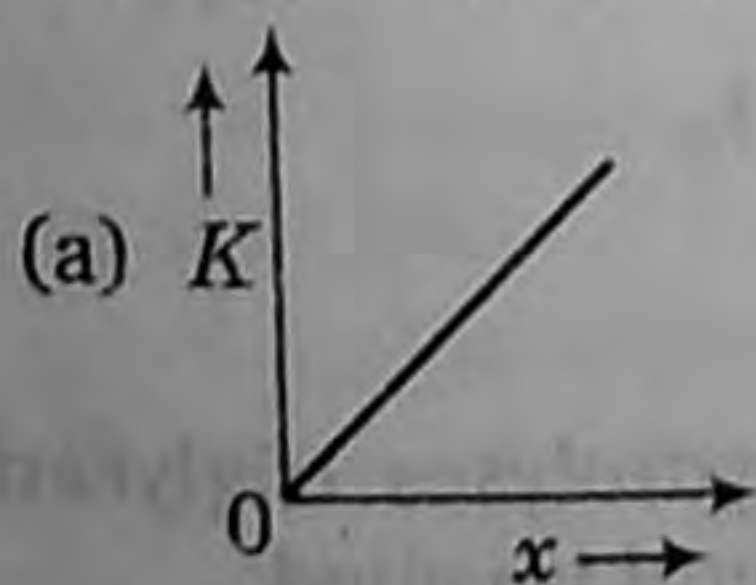
48. At the highest point of the path of a projectile, its

- (a) kinetic energy is minimum
 (b) kinetic energy is maximum
 (c) potential energy is minimum
 (d) total energy is maximum

49. If a body of mass m is projected at an angle of 45° with the horizontal, then total change in momentum when it strikes the ground will be (Take air resistance negligible)

- (a) mv
 (b) $\sqrt{2}mv$
 (c) $\frac{mv}{\sqrt{2}}$
 (d) $2mv$

50. A body moves from rest with a constant acceleration. Which one of the following graphs represents the variation of its kinetic energy K with the distance travelled x ?



51. An earth satellite is moved from one stable circular orbit to a further stable orbit, then among the following which one will increase?

- (a) Linear orbital speed
 (b) Centripetal acceleration
 (c) Gravitational potential energy
 (d) Gravitational force

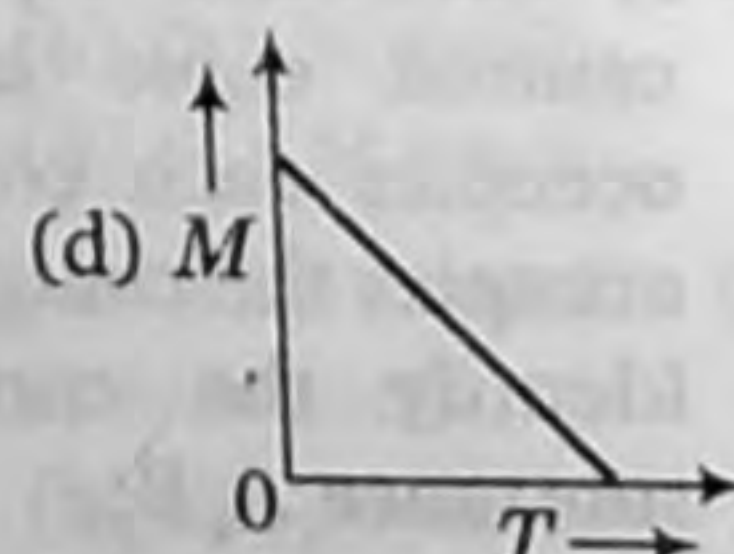
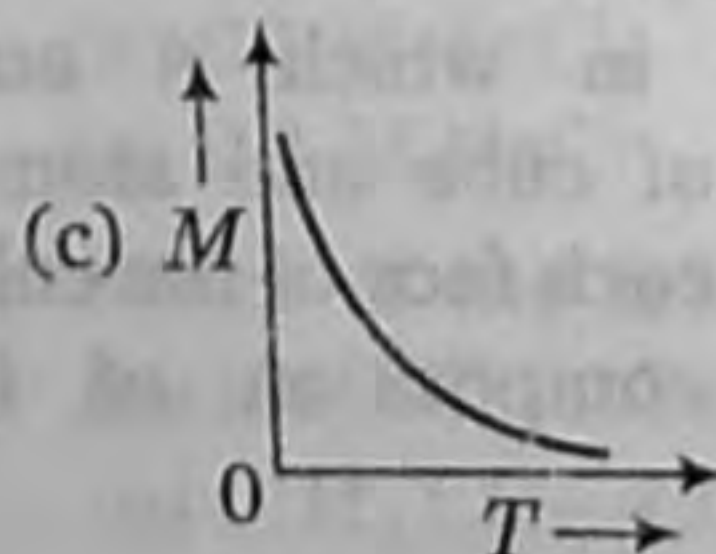
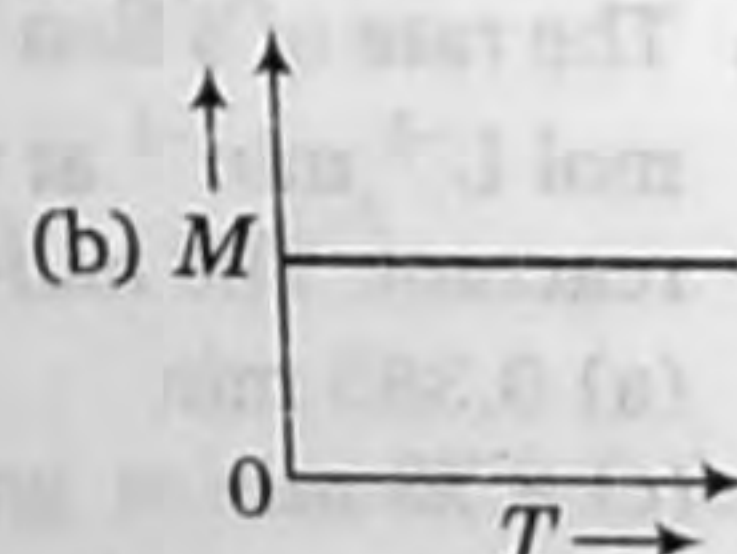
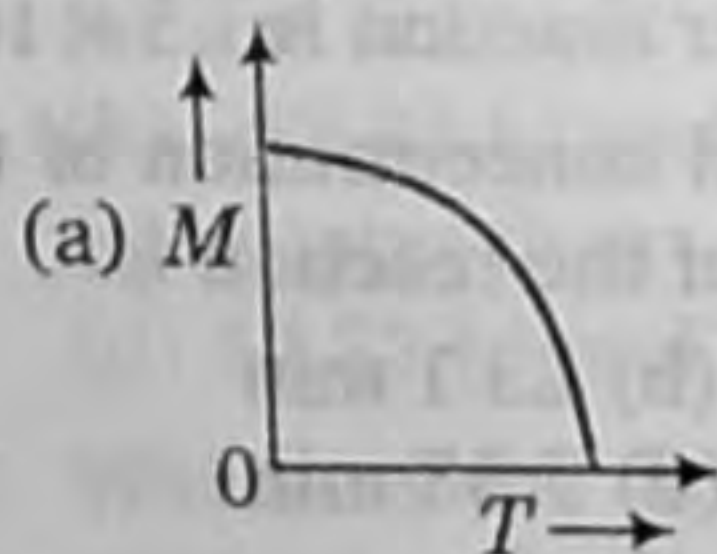
52. The value of g at the surface of the earth is 9.8 m/s^2 . At a place 480 km above the surface of earth, the value of g will be (Take radius of earth = 6400 km)

- (a) 4.2 m/s^2
 (b) 7.2 m/s^2
 (c) 8.4 m/s^2
 (d) 9.8 m/s^2

53. Two long freely hanging wires firstly joined in parallel and then in series. When the two combinations are connected with a battery, then which type of force acts between the two wires in two cases?

- (a) Repulsive force in both cases
 (b) Attractive force in both cases
 (c) Repulsive force when in parallel and attractive force when in series
 (d) Attractive force when in parallel and repulsive force when in series

54. Which one of the following curves represents the curve between magnetic moment and temperature of the magnet?



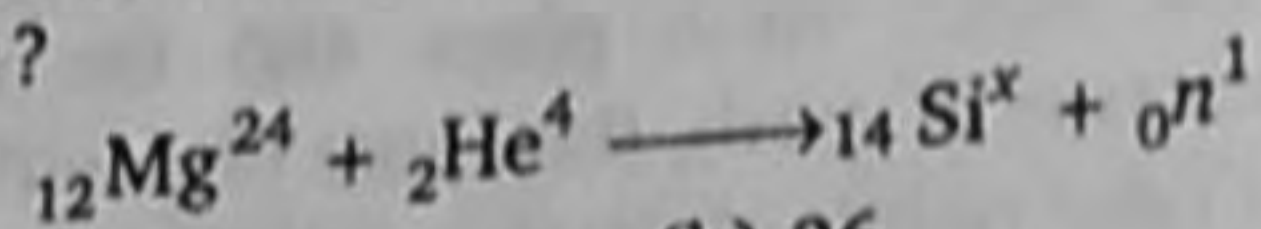
55. An electric motor draws a current of 10 A when operated on 60 V DC supply. If the efficiency of the motor is 50%, then the resistance of the motor windings is

- (a) 15 Ω (b) 30 Ω
(c) 3 Ω (d) 6 Ω

56. In a series L-C-R circuit, having $C = 2\mu\text{F}$, $L = 1\text{ mH}$ and $R = 10\ \Omega$, when the current in the circuit is maximum at that time the ratio of energies stored in the capacitor and the inductor will be

- (a) 1 : 2 (b) 2 : 1
(c) 1 : 5 (d) 5 : 1

57. In the following reaction, what is the value of x ?



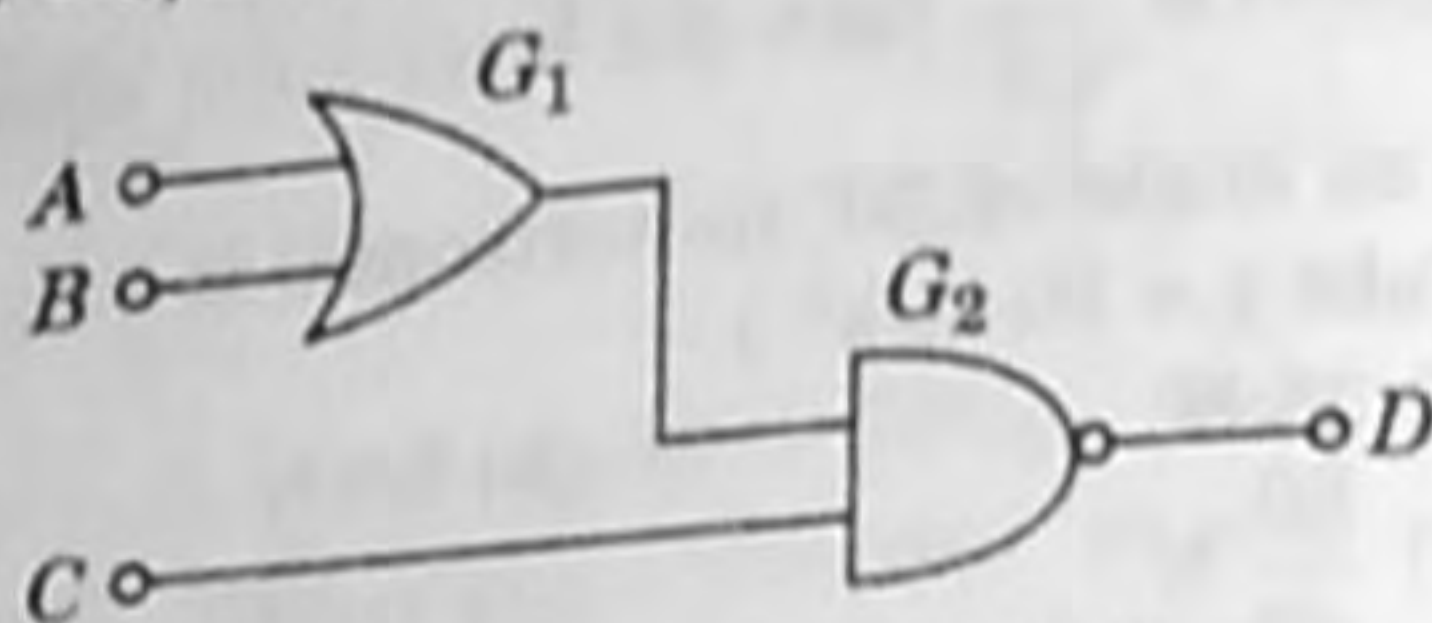
- (a) 22 (b) 26
(c) 27 (d) 28

58. If before the saturation state of a diode, for the plate voltages 400 V and 200 V the

currents are i_1 and i_2 respectively, then the ratio of i_1/i_2 is

- (a) 2/1 (b) 1/2
(c) $\sqrt{2}/4$ (d) $2\sqrt{2}/1$

59. If the logic gates are combined as shown in figure and the logic states of inputs A, B, C are as follows $A = B = C = 0$ and $A = B = 1$, $C = 0$, then the logic states of output D are



- (a) 1, 0 (b) 1, 1
(c) 0, 1 (d) 0, 0

60. Two waves $y_1 = a \sin 2000\pi t$ and $y_2 = a \sin 2008\pi t$ produces beats, the number of beats heard per second will be

- (a) 0 (b) 1
(c) 4 (d) 5

Chemistry

1. 4.5 g of aluminium (at. mass 27 u) is deposited at cathode from Al^{3+} solution by certain quantity of electric charge. The volume of hydrogen produced at STP from H^+ ions in solution by the same quantity of electric charge will be

- (a) 22.4 L (b) 44.8 L
(c) 5.6 L (d) 11.2 L

2. The rate of a first order reaction is 1.5×10^{-2} mol $\text{L}^{-1} \text{min}^{-1}$ at 0.5 M concentration of the reactant. The half-life of the reaction is

- (a) 0.383 min (b) 23.1 min
(c) 8.73 min (d) 7.53 min

3. A substance A_xB_y crystallises in a face centred cubic lattice in which A atom occupies each corner of cube and atom B occupies the centres of each face of the cube. Identify the correct composition of the substance A_xB_y .

- (a) AB_3
(b) A_4B_3

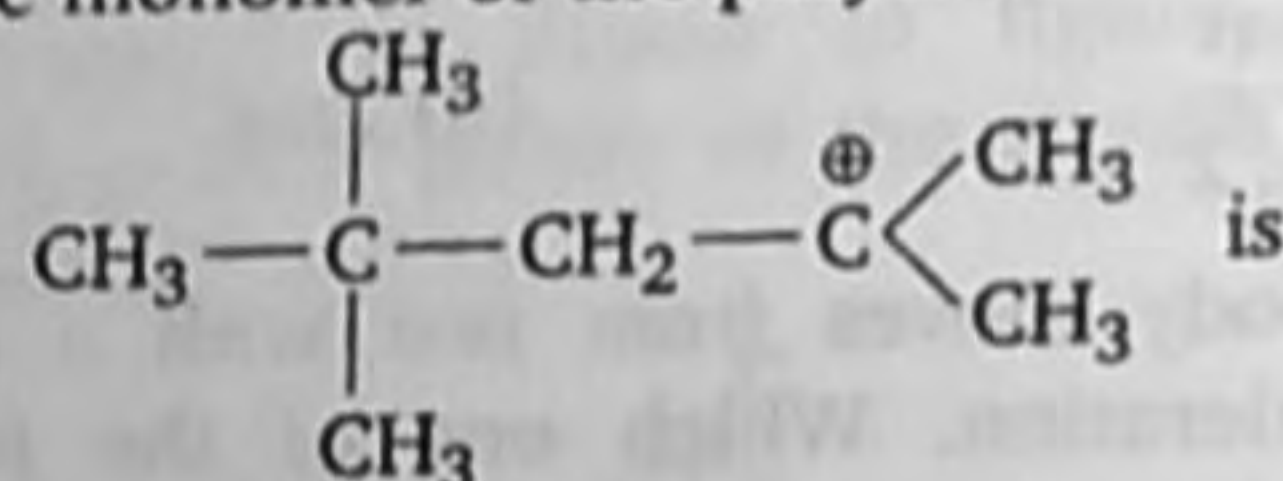
(c) A_3B

(d) Composition cannot be specified

4. The helical structure of protein is stabilised by

- (a) dipeptide bonds (b) hydrogen bonds
(c) ether bonds (d) peptide bonds

5. The monomer of the polymer



- (a) $\text{H}_2\text{C} = \text{C} \begin{array}{l} \text{CH}_3 \\ \text{CH}_3 \end{array}$
(b) $(\text{CH}_3)_2\text{C} = \text{C}(\text{CH}_3)_2$
(c) $\text{CH}_3\text{CH} = \text{CH} \cdot \text{CH}_3$
(d) $\text{CH}_3\text{CH} = \text{CH}_2$

6. The enzyme which hydrolyses triglycerides to fatty acids and glycerol is called

- (a) maltase (b) lipase
(c) zymase (d) pepsin

7. The decreasing order of bond angle is
- $\text{NO}_2 > \text{NO}_2^+ > \text{NO}_2^-$
 - $\text{NO}_2^- > \text{NO}_2 > \text{NO}_2^+$
 - $\text{NO}_2^+ > \text{NO}_2 > \text{NO}_2^-$
 - $\text{NO}_2^+ > \text{NO}_2^- > \text{NO}_2$

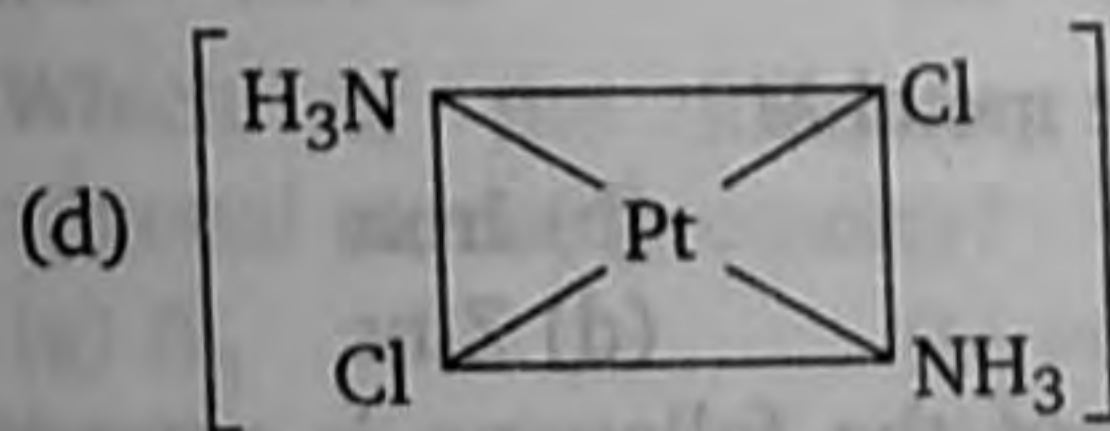
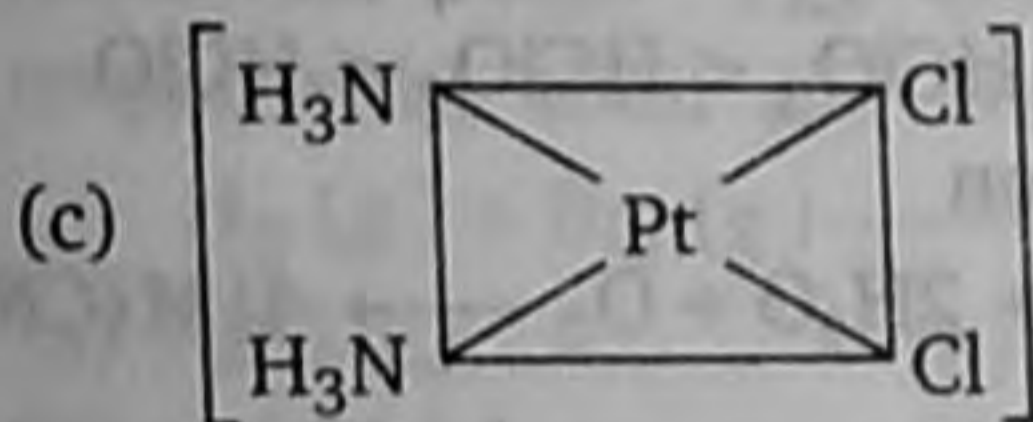
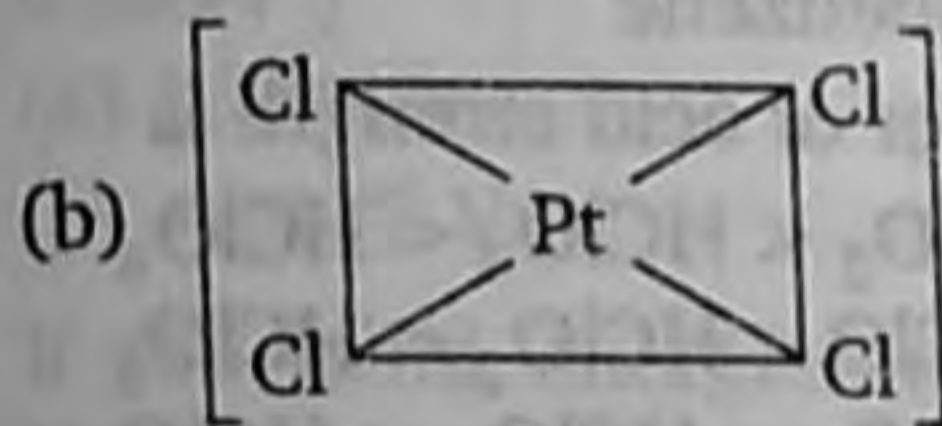
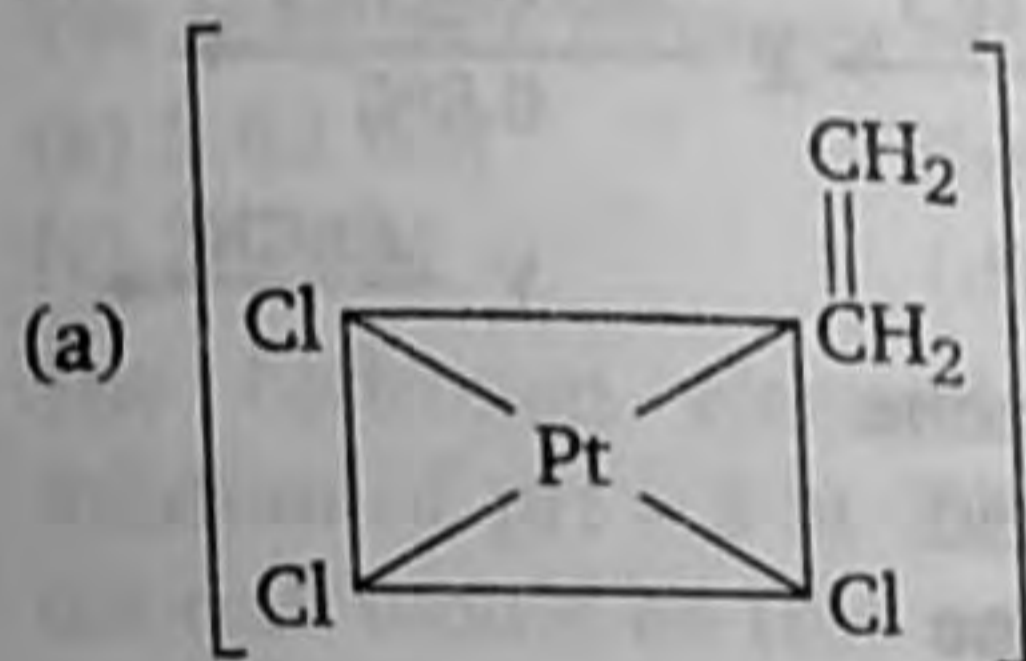
8. The strongest reducing agent among the following is

- F^-
- Cl^-
- Br^-
- I^-

9. Which of the following compounds is resistant to nucleophilic attack by hydroxyl ion?

- Methylacetate
- Acetonitrile
- Acetamide
- Diethylether

10. Which of the following is considered to be an anticancer species?



11. CN^- is a strong field ligand. This is due to the fact that

- it carries negative charge
- it is a pseudohalide
- it can accept electrons from metal species
- it forms high spin complexes with metal species

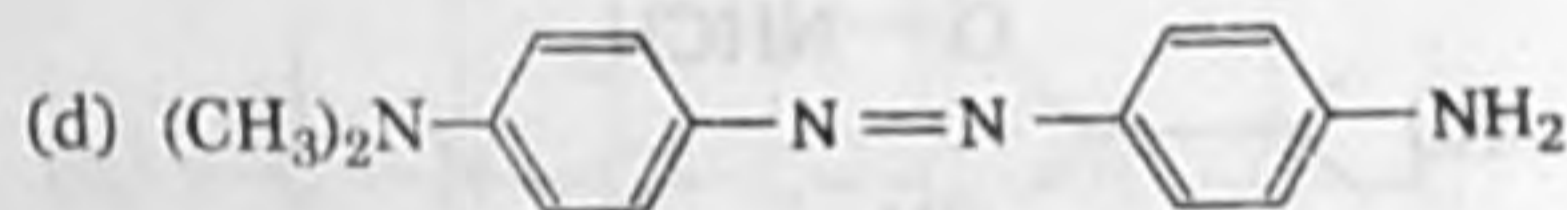
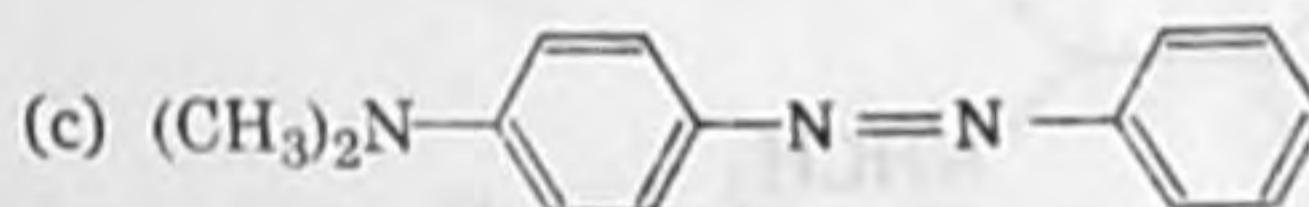
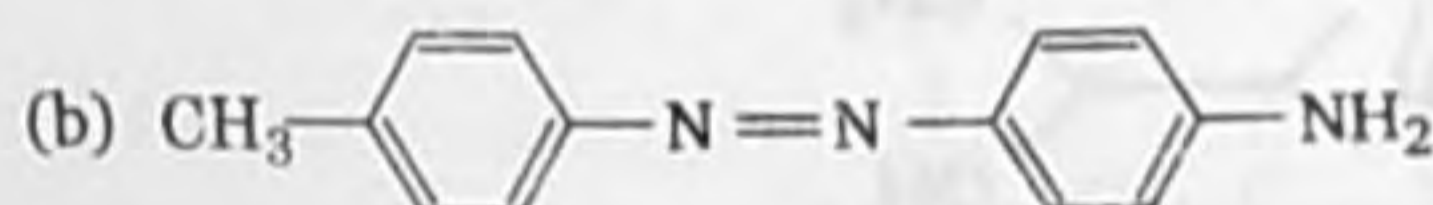
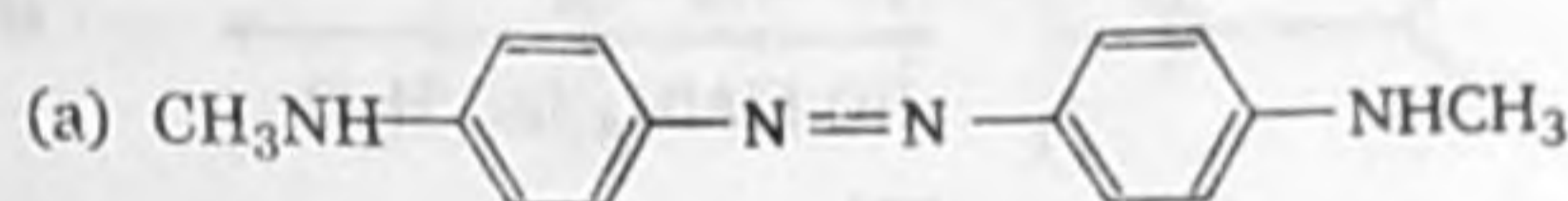
12. The correct order of solubility of the sulphates of alkaline earth metals in water is

- $\text{Be} > \text{Ca} > \text{Mg} > \text{Ba} > \text{Sr}$
- $\text{Mg} > \text{Be} > \text{Ba} > \text{Ca} > \text{Sr}$
- $\text{Be} > \text{Mg} > \text{Ca} > \text{Sr} > \text{Ba}$
- $\text{Mg} > \text{Ca} > \text{Ba} > \text{Be} > \text{Sr}$

13. In blast furnace, iron oxide is reduced to iron by

- carbon
- limestone
- CO
- zinc

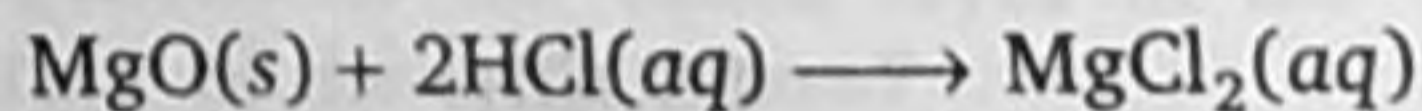
14. Aniline when diazotised in cold and then treated with dimethyl aniline gives a coloured product. Its structure would be



15. 100 cc of 0.6 N H_2SO_4 and 200 cc of 0.3 N HCl were mixed together. The normality of the solution will be

- 0.2 N
- 0.4 N
- 0.8 N
- 0.6 N

16. The absolute enthalpy of neutralisation of the reaction,



+ $\text{H}_2\text{O}(l)$ will be

- less than $-57.33 \text{ kJ mol}^{-1}$
- $-57.33 \text{ kJ mol}^{-1}$
- greater than $-57.33 \text{ kJ mol}^{-1}$
- $57.33 \text{ kJ mol}^{-1}$

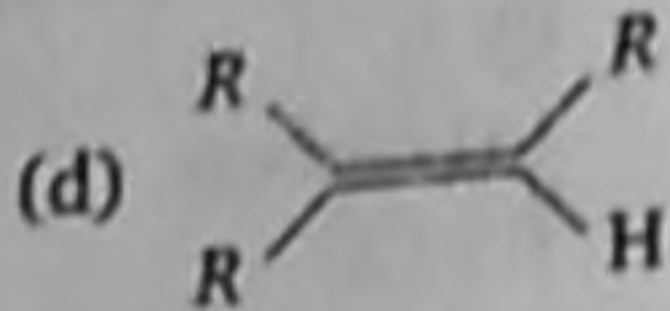
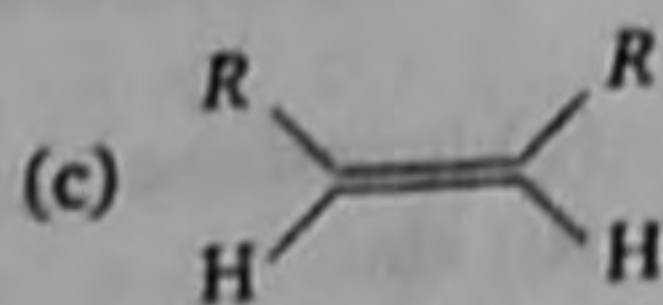
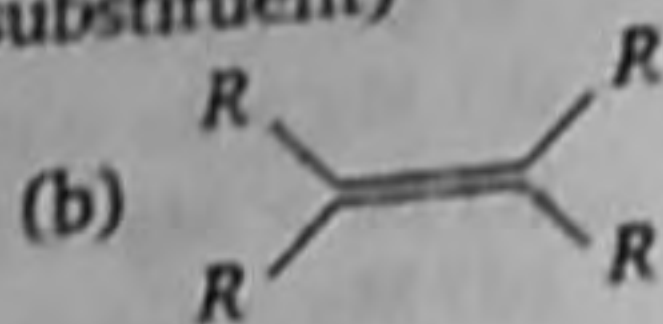
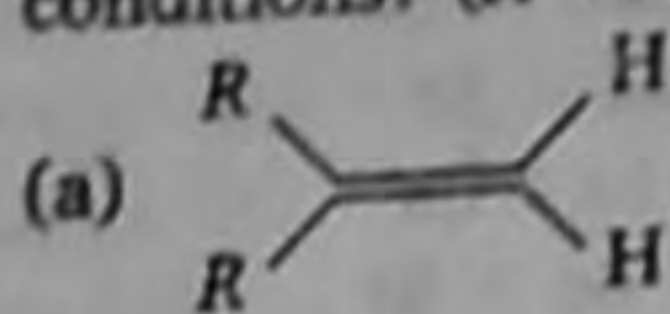
17. Which of the following solutions will have the highest boiling point?

- 0.1 M FeCl_3
- 0.1 M BaCl_2
- 0.1 M NaCl
- 0.1 M urea

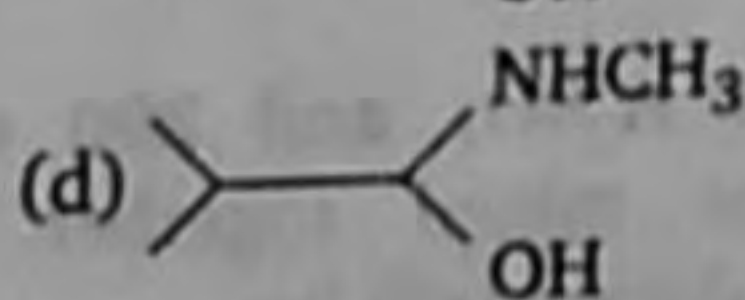
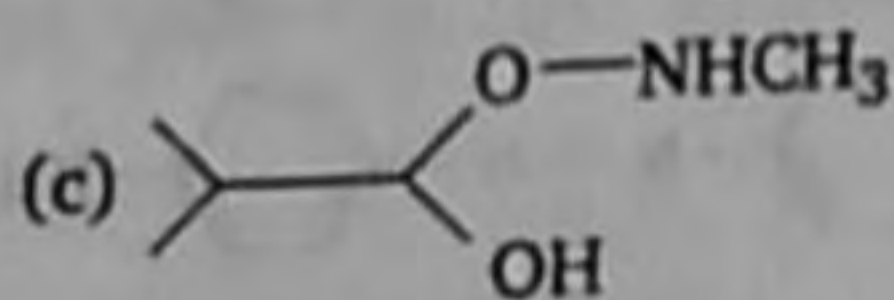
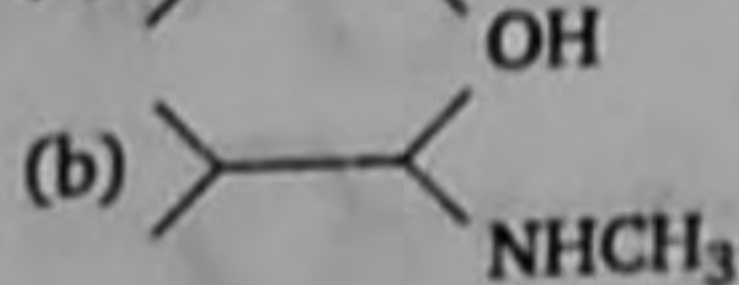
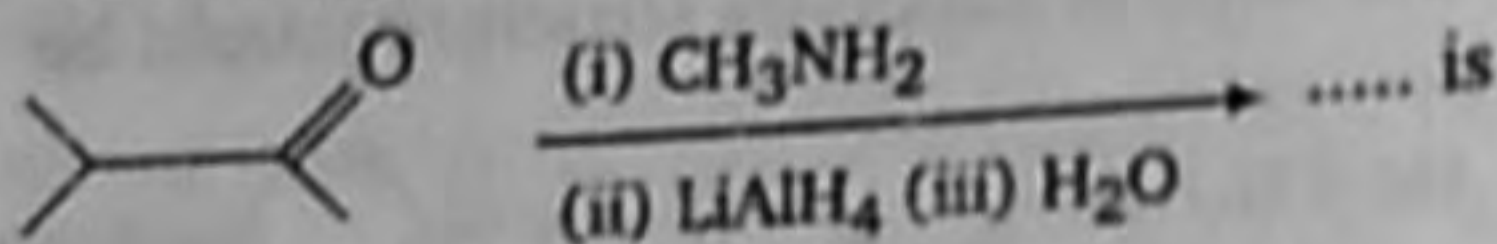
18. Which of the following is least reactive in a nucleophilic substitution reaction?

- $(\text{CH}_3)_3\text{C}-\text{Cl}$
- $\text{CH}_2=\text{CHCl}$
- $\text{CH}_3\text{CH}_2\text{Cl}$
- $\text{CH}_2=\text{CHCH}_2\text{Cl}$

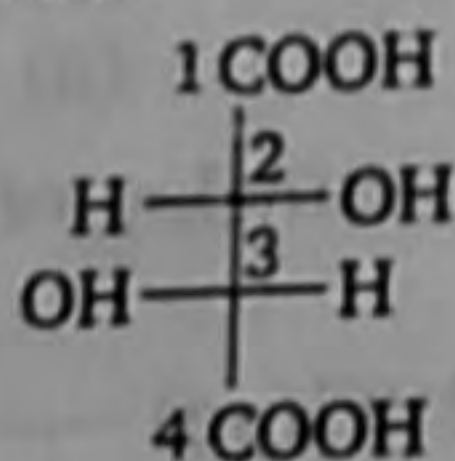
19. Which one of the following alkenes will react faster with H_2 under catalytic hydrogenation conditions? (R = Alkyl substituent)



20. The major organic product formed from the following reaction



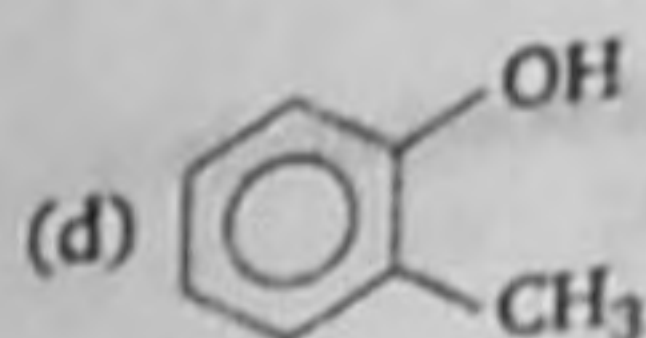
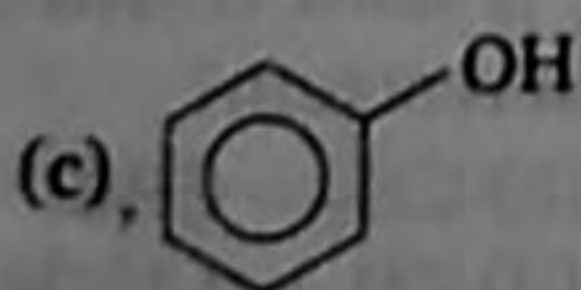
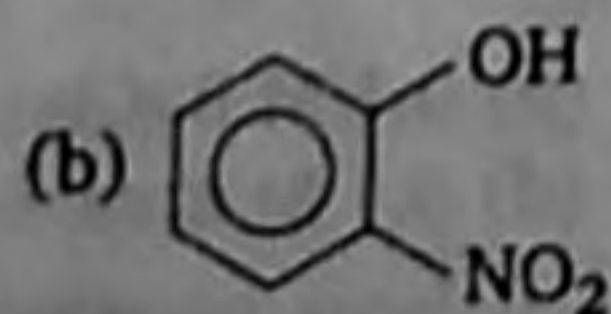
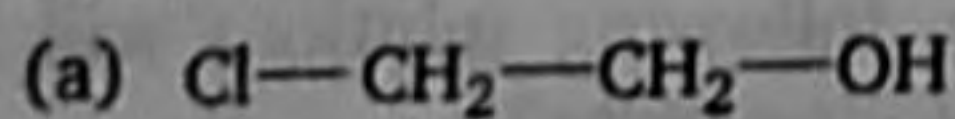
21. In the compound



configuration at C_2 and C_3 atoms are

- (a) S, S (b) R, S
(c) S, R (d) R, R

22. Which one of the following compounds is most acidic?



23. Number of atoms of oxygen present in 10.6 g of Na_2CO_3 will be

(a) 6.02×10^{23} (b) 12.04×10^{22}
(c) 1.806×10^{23} (d) 31.80×10^{28}

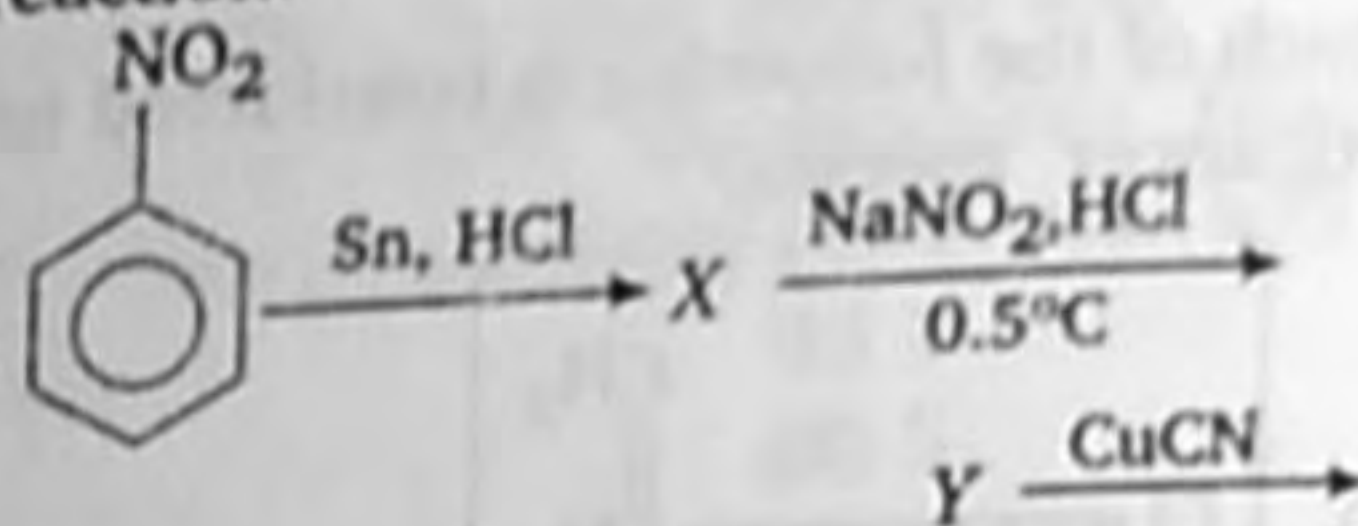
24. The surface tension of which of the following liquid is maximum?

- (a) H_2O (b) C_6H_6
(c) CH_3OH (d) $\text{C}_2\text{H}_5\text{OH}$

25. Which of the following polymer can be used for lubrication and as an insulator?

- (a) PVC (b) PTFE
(d) SBR (d) PMMA

26. State the product available in the following reaction.

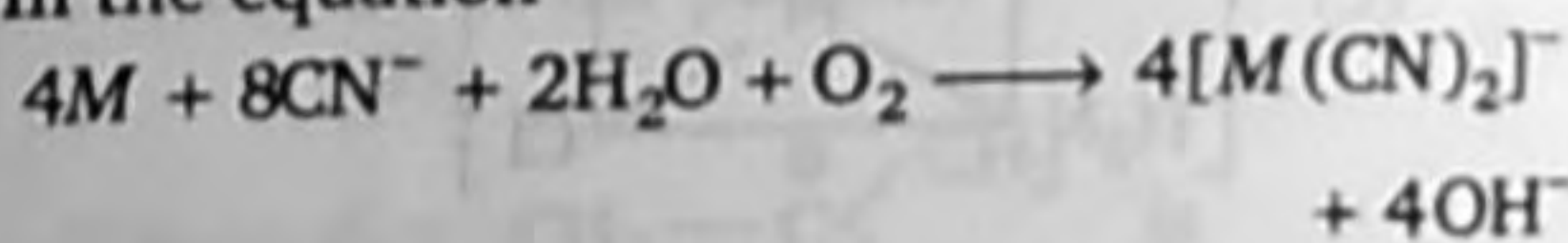


- (a) cyanobenzene
(b) benzoic acid
(c) cyanoethane
(d) *p*-aminoazobenzene

27. The correct order of acid strength is

(a) $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$
(b) $\text{HClO}_4 < \text{HClO} < \text{HClO}_2 < \text{HClO}_3$
(c) $\text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4 < \text{HClO}$
(d) $\text{HClO}_4 < \text{HClO}_3 < \text{HClO}_2 < \text{HClO}$

28. In the equation



Identify the metal M .

- (a) Copper (b) Iron
(c) Silver (d) Zinc

29. Which one of the following is expected to exhibit optical isomerism?

(en = ethylenediamine)

- (a) *Cis*- $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
(b) *Trans*- $[\text{Co}(\text{en})_2\text{Cl}_2]$
(c) *Trans*- $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
(d) *Cis*- $[\text{Co}(\text{en})_2\text{Cl}_2]$

30. The best method for the separation of naphthalene and benzoic acid from their mixture is

- (a) chromatography (b) crystallisation
(c) distillation (d) sublimation

31. The standard emf of a galvanic cell involving cell reaction with $n = 2$ is found to be 0.295 V at 25°C. The equilibrium constant of the reaction would be

- (a) 2.0×10^{11} (b) 4.0×10^{12}
(c) 1.0×10^2 (d) 1.0×10^{10}

(Given, $F = 96500 \text{ C mol}^{-1}$,
 $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$)

32. Milk is

- (a) fat dispersed in water
(b) fat dispersed in milk
(c) fat dispersed in fat
(d) water dispersed in milk

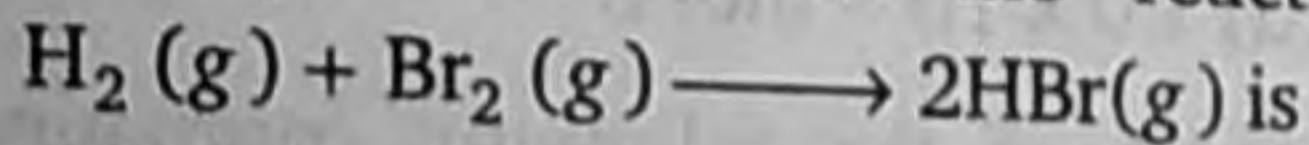
33. The magnetic moment of Cu^{2+} ion is

- (a) 5.63 BM (b) 4.19 BM
(c) 3.9 BM (d) 1.73 BM

34. The hydrogen electrode is dipped in a solution of $\text{pH} = 3$ at 25°C. The potential of the cell would be (the value of $2.303 RT/F$ is 0.059V)

- (a) 0.177 V (b) 0.087 V
(c) -0.177 V (d) 0.059 V

35. If the bond energies of H—H, Br—Br and H—Br are 433, 192 and 364 kJ mol^{-1} respectively, then ΔH° for the reaction



- (a) -261 kJ (b) +103 kJ
(c) +261 kJ (d) -103 kJ

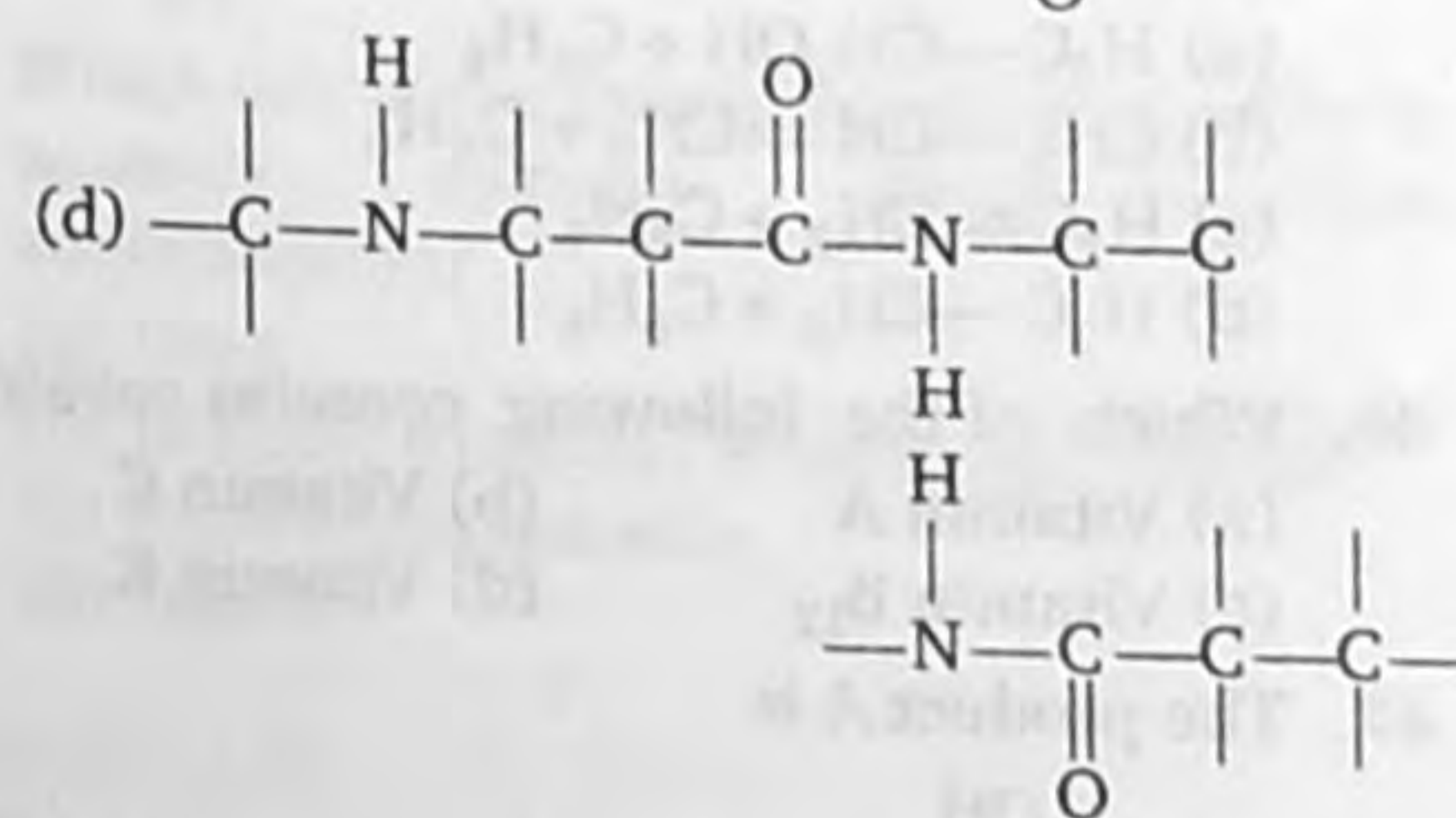
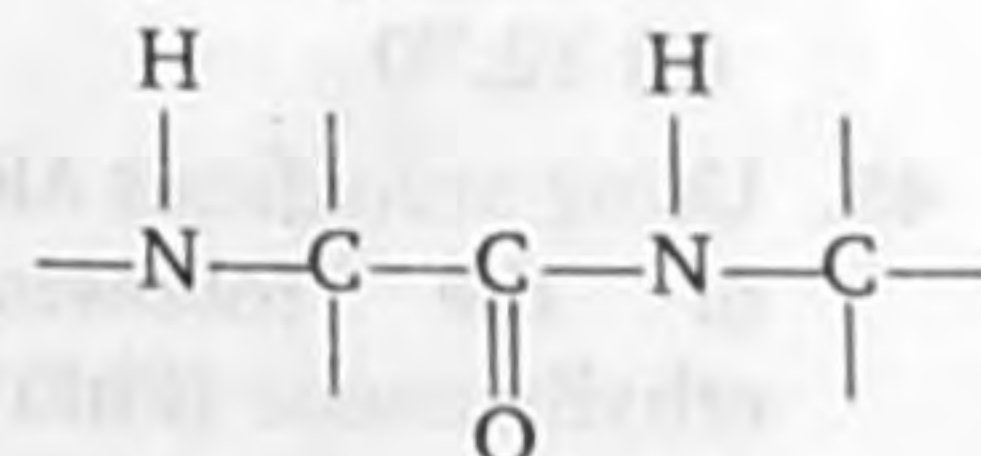
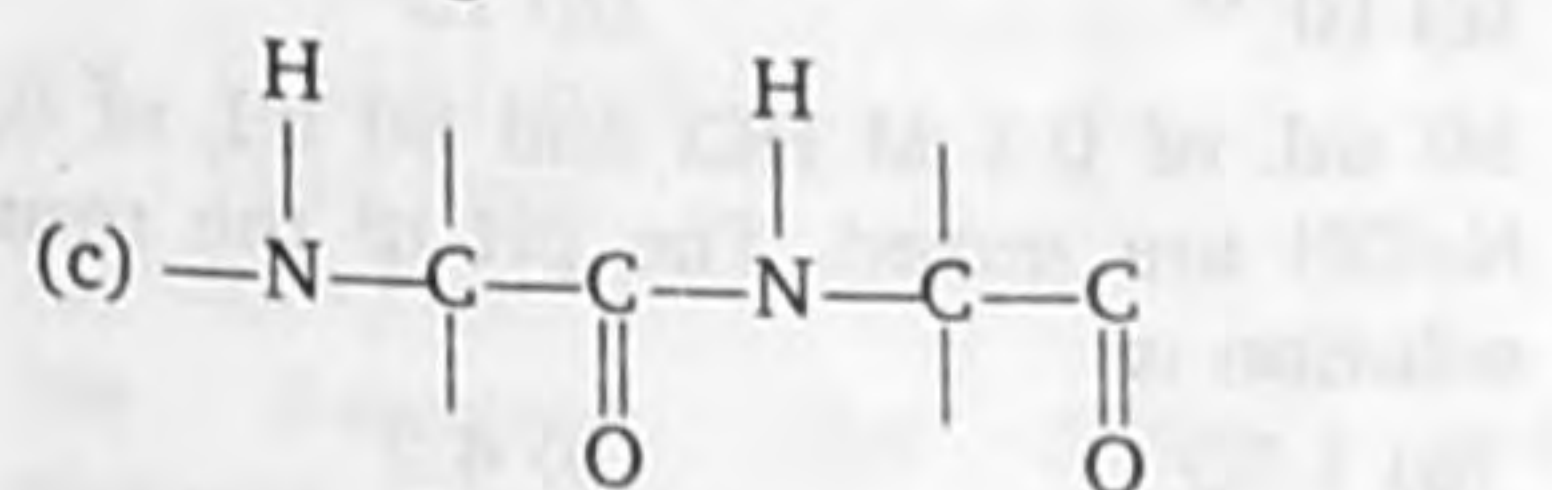
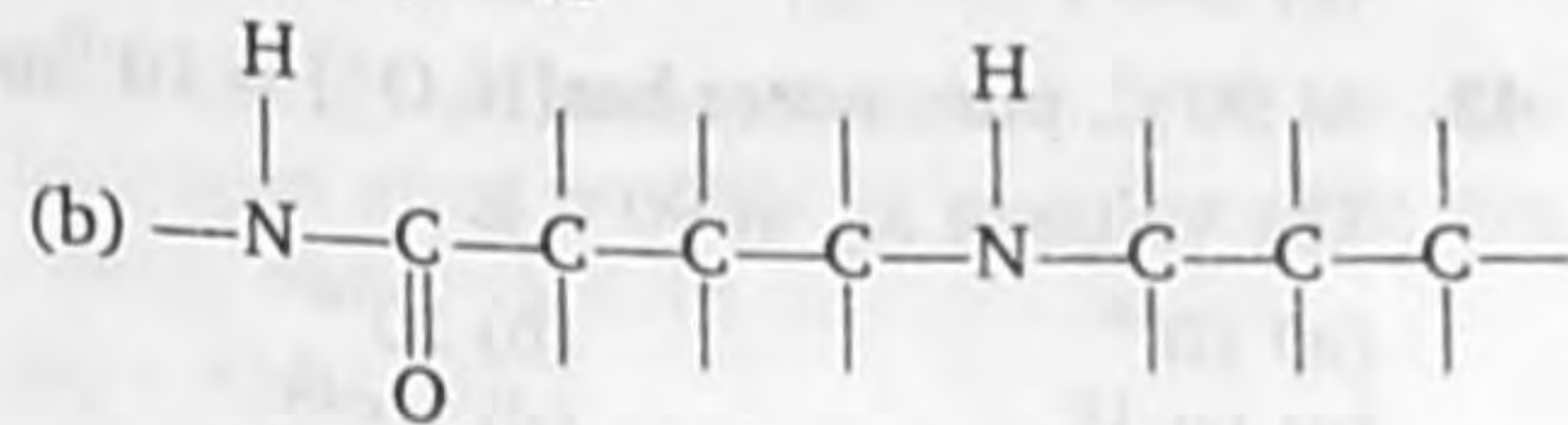
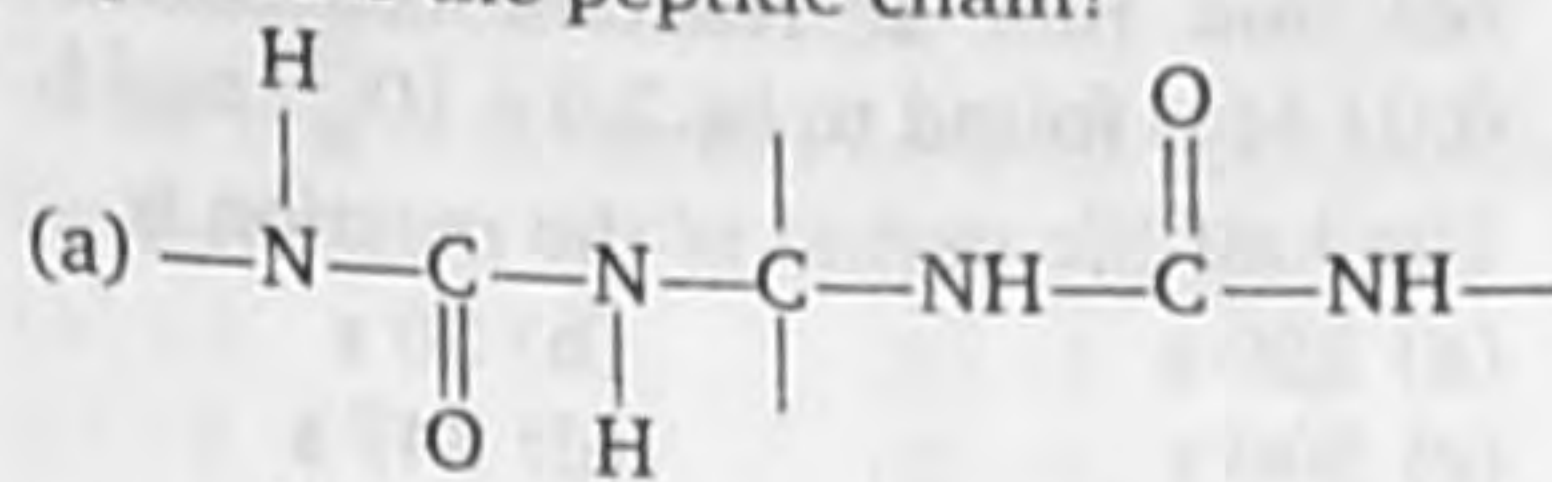
36. Which of the following molecules has trigonal planar geometry?

- (a) IF_3 (b) PCl_3
(c) NH_3 (d) BF_3

37. Which of the following compounds is obtained when HCHO is reacted with ammonia?

- (a) Urotropine
(b) Formaldehyde ammonia
(c) Methyl amine
(d) Ethyl amine

38. Which one of the following structures represents the peptide chain?



39. Which of the following is responsible for depletion of the ozone layer in the upper strata of the atmosphere?

- (a) Polyhalogens (b) Ferrocenes
(c) Fullerenes (d) Freons

40. The radioactive isotope ${}^{60}_{27}\text{Co}$ which is used in the treatment of cancer can be made by (n, p) reaction. For this reaction the target nucleus is

- (a) ${}^{59}_{28}\text{Ni}$ (b) ${}^{59}_{27}\text{Co}$
(c) ${}^{60}_{28}\text{Ni}$ (d) ${}^{60}_{27}\text{Co}$

41. Reaction of HBr with propene in the presence of peroxide gives

- (a) isopropyl bromide
(b) 3-bromopropane
(c) allylbromide
(d) *n*-propylbromide

42. For a first order reaction, $A \rightarrow B$, the reaction rate at reactant concentration of 0.01 M is found to be $2.0 \times 10^{-15} \text{ mol L}^{-1} \text{ s}^{-1}$. The half-life period of the reaction is

- (a) 220 s (b) 30 s
(c) 300 s (d) 347 s

43. At 90°C , pure water has $[\text{H}_3\text{O}^+] = 10^{-6} \text{ mol/L}$. The value of K_w at 90°C is

- (a) 10^{-6} (b) 10^{-8}
(c) 10^{-12} (d) 10^{-14}

44. 50 mL of 0.1 M HCl and 50 mL of 0.2 M NaOH are mixed. The pH of the resulting solution is

- (a) 1.30 (b) 4.2
(c) 12.70 (d) 11.70

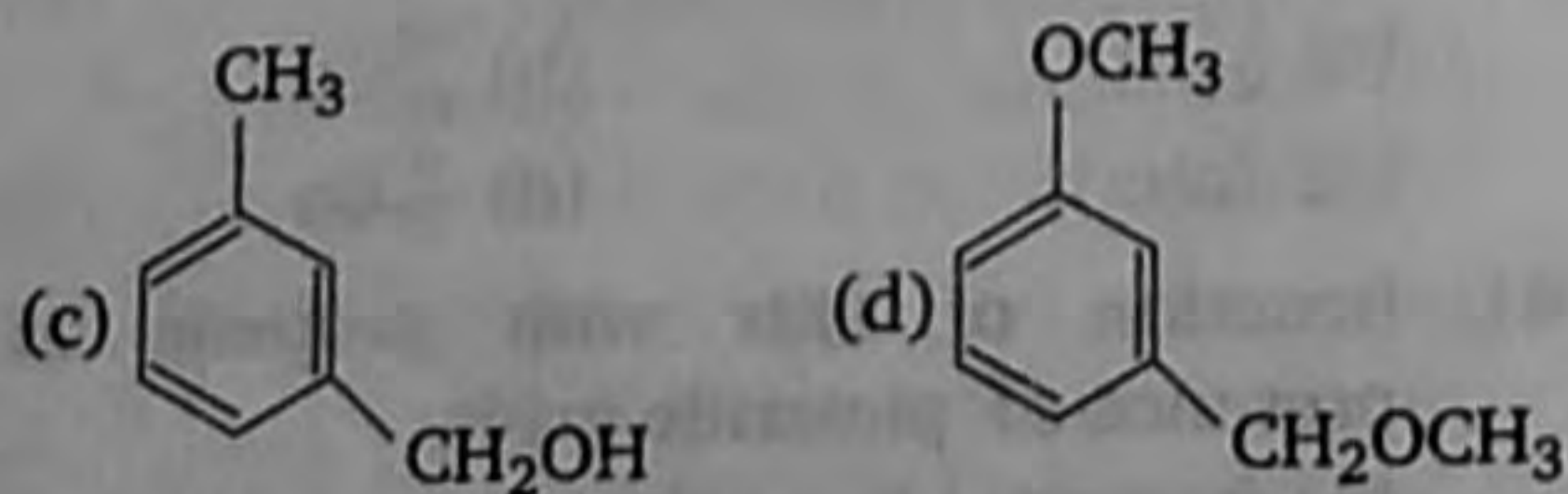
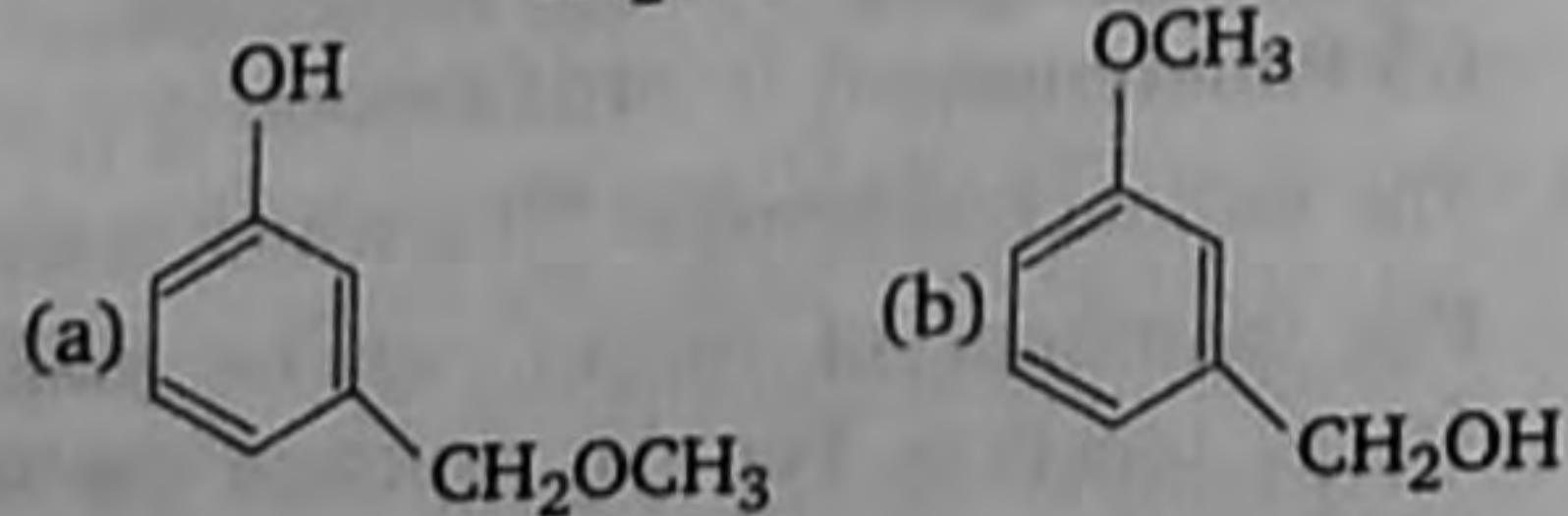
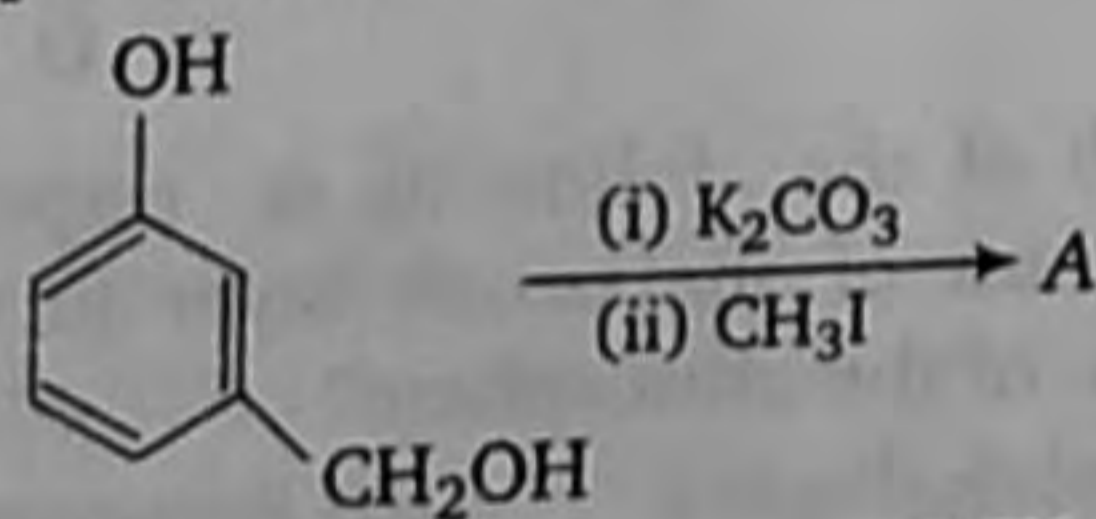
45. Using anhydrous AlCl_3 as catalyst, which one of the following reactions produce ethylbenzene (PhEt)?

- (a) $\text{H}_3\text{C}-\text{CH}_2\text{OH} + \text{C}_6\text{H}_6$
(b) $\text{CH}_3-\text{CH}=\text{CH}_2 + \text{C}_6\text{H}_6$
(c) $\text{H}_2\text{C}=\text{CH}_2 + \text{C}_6\text{H}_6$
(d) $\text{H}_3\text{C}-\text{CH}_3 + \text{C}_6\text{H}_6$

46. Which of the following contains cobalt?

- (a) Vitamin A (b) Vitamin C
(c) Vitamin B₁₂ (d) Vitamin K

47. The product A is



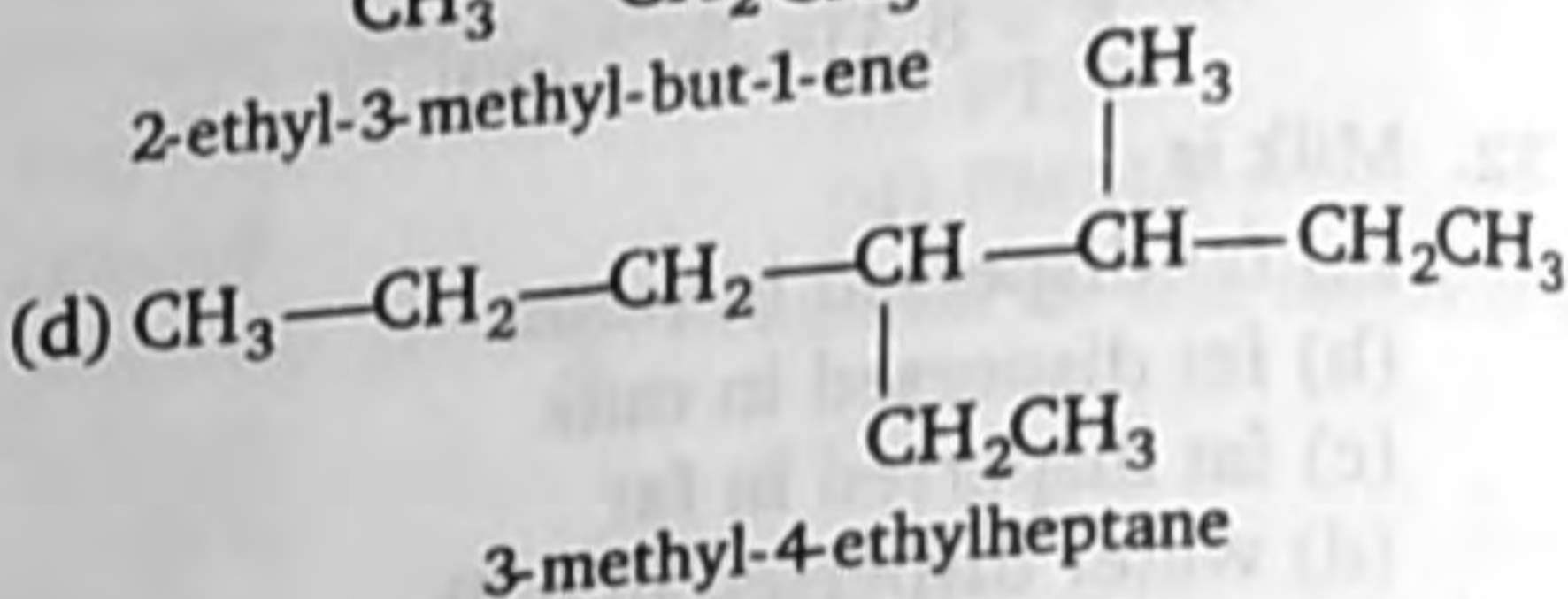
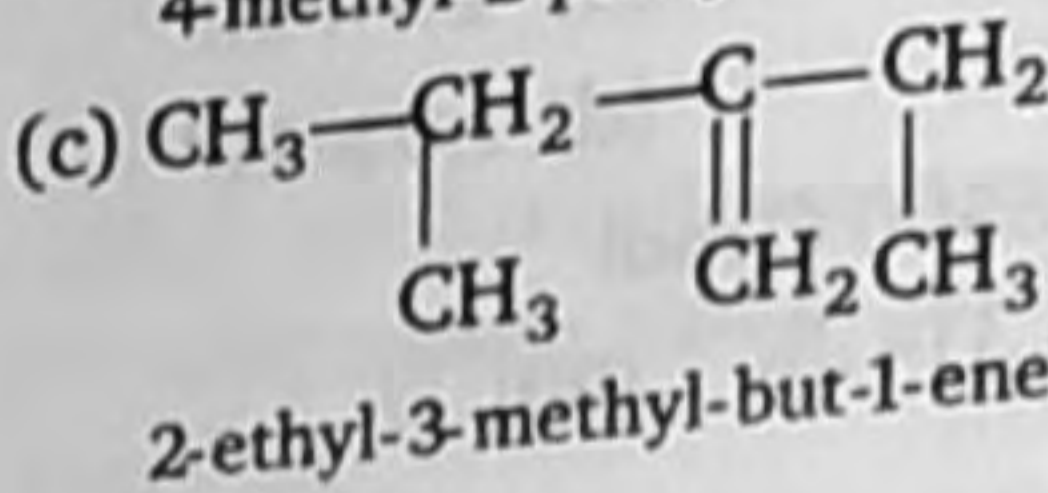
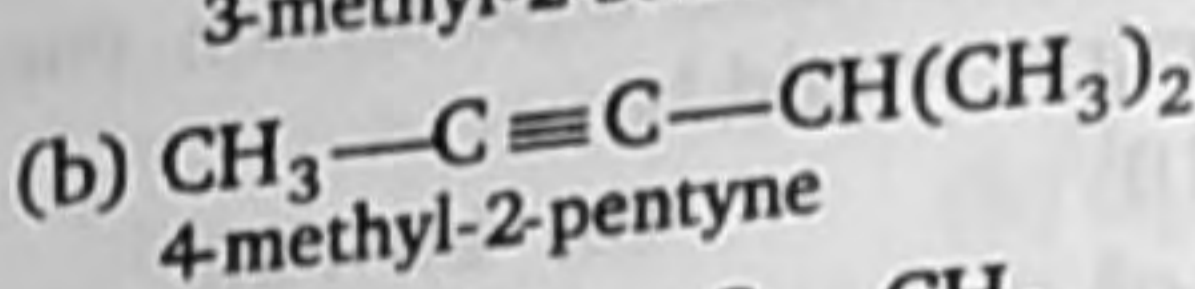
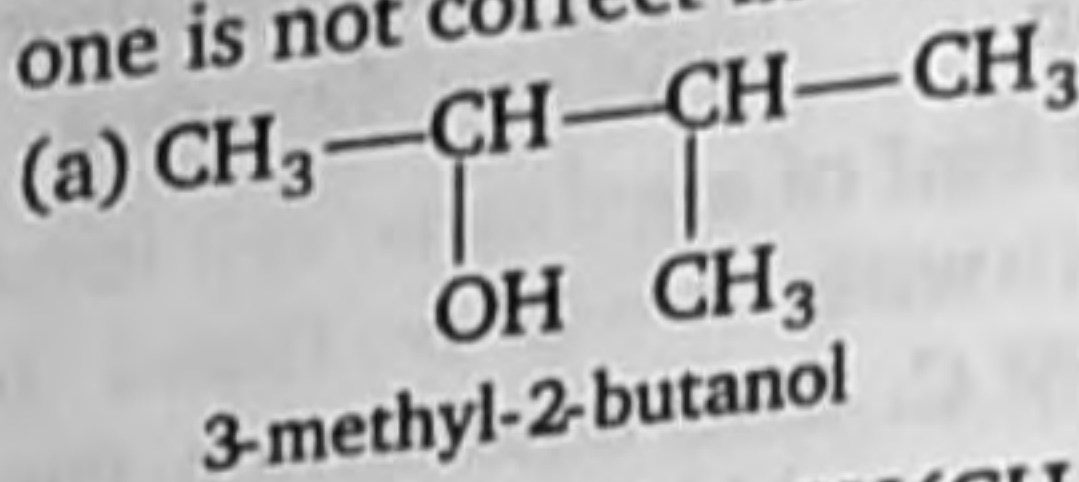
48. Alizarin is a

- (a) nitro dye
(b) azo dye

(c) anthraquinone dye

(d) phthalein dye

49. Names of some compounds are given. Which one is not correct in IUPAC system?



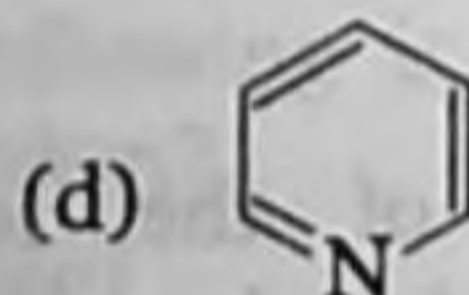
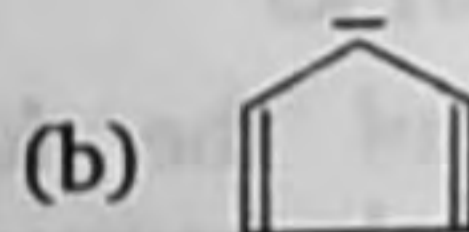
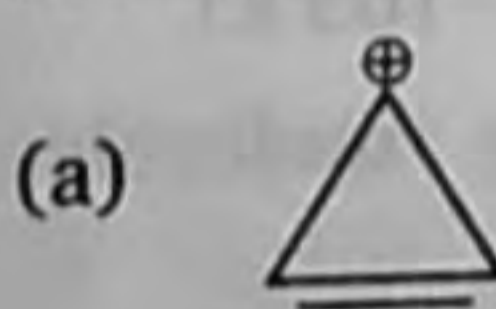
50. Which of the following is the electron deficient molecule?

- (a) B_2H_6 (b) C_2H_6
(c) PH_3 (d) SiH_4

51. At 25°C the dissociation constant of a base, BOH is 1.0×10^{-12} . The concentration of hydroxyl ions in 0.01 M aqueous solution of the base would be

- (a) $2.0 \times 10^{-6} \text{ mol L}^{-1}$
(b) $1.0 \times 10^{-5} \text{ mol L}^{-1}$
(c) $1.0 \times 10^{-6} \text{ mol L}^{-1}$
(d) $1.0 \times 10^{-7} \text{ mol L}^{-1}$

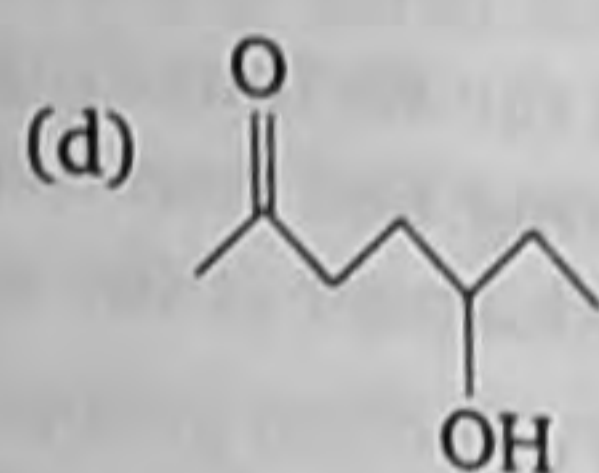
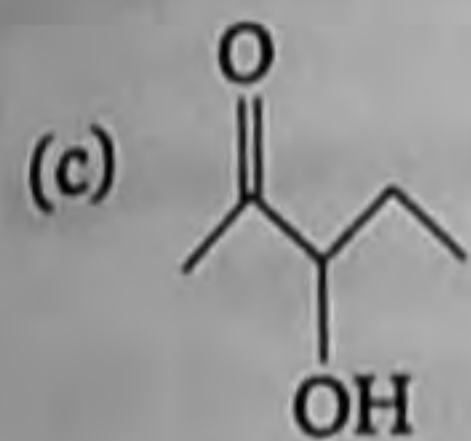
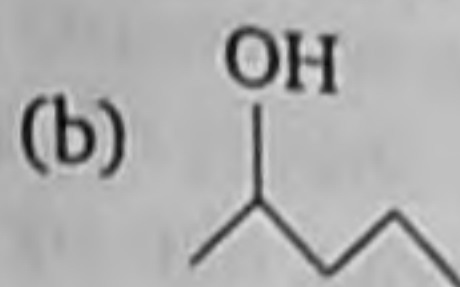
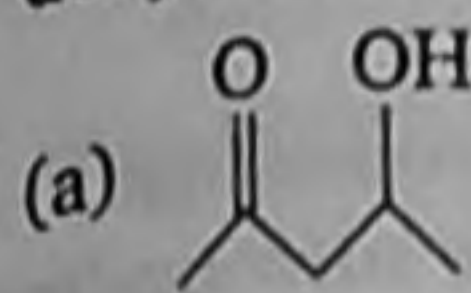
52. Which of the following compounds is not aromatic?



53. Two nodal planes are present in

- (a) $\pi^* 2p_x$
(b) $\sigma 2p_z$
(c) $\pi 2p_x$
(d) $\pi 2p_y$

54. Which of the following will be most readily dehydrated under acidic conditions?



55. A solid compound 'X' on heating gives CO_2 gas and a residue. The residue mixed with water to give 'Y'. On passing an excess of CO_2 through 'Y' in water clear solution 'Z' is obtained. On boiling 'Z' compound 'X' is reformed. The compound 'X' is

- (a) $\text{Ca}(\text{HCO}_3)_2$ (b) CaCO_3
 (c) Na_2CO_3 (d) K_2CO_3

56. Four successive members of the first row transition elements are listed below with their atomic numbers. Which one of them is expected to have the highest third ionization enthalpy?

- (a) Vanadium ($Z = 23$)
 (b) Chromium ($Z = 24$)

(c) Iron ($Z = 26$)

(d) Manganese ($Z = 25$)

57. What is the oxidation state of phosphorus in Ca_3P_2 ?

- (a) +3 (b) -3
 (c) +5 (d) -5

58. The energy of second Bohr orbit of the hydrogen atom is -328 kJ mol^{-1} ; hence the energy of fourth Bohr orbit would be

- (a) -41 kJ mol^{-1}
 (b) $-1312 \text{ kJ mol}^{-1}$
 (c) -164 kJ mol^{-1}
 (d) -82 kJ mol^{-1}

59. For d -electron, the orbital angular momentum is

- (a) $\frac{\sqrt{6} h}{2\pi}$ (b) $\frac{\sqrt{2} h}{2\pi}$
 (c) $\frac{h}{2\pi}$ (d) $\frac{2h}{\pi}$

60. Which one of the following forms micelles in aqueous solution above certain concentration?

- (a) Urea
 (b) Dodecyl trimethyl ammonium chloride
 (c) Pyridinium chloride
 (d) Glucose

Biology

1. Which of the following propagates through leaf-tip?

- (a) Walking fern
 (b) Sprout-leaf plant
 (c) *Marchantia*
 (d) Moss

2. Common indicator organism of water pollution is

- (a) *Lemna paucicostata*
 (b) *Eichhornia crassipes*
 (c) *Escherichia coli*
 (d) *Entamoeba histolytica*

3. According to Oparin, which one of the following was not present in the primitive atmosphere of the earth?

- (a) Methane (b) Oxygen
 (c) Hydrogen (d) Water vapour

4. Which one of the following precedes re-formation of the nuclear envelope during M-phase of the cell cycle?

- (a) Decondensation from chromosomes and reassembly of the nuclear lamina
 (b) Transcription from chromosomes and reassembly of the nuclear lamina
 (c) Formation of the contractile ring and formation of the phragmoplast
 (d) Formation of the contractile ring and transcription from chromosomes

5. In transgenics, expression of transgene in target tissue is determined by

- (a) enhancer
 (b) transgene
 (c) promoter
 (d) reporter

6. Restriction endonuclease
 (a) cuts the DNA molecule randomly
 (b) cuts the DNA molecule at specific sites
 (c) restricts the synthesis of DNA inside the nucleus
 (d) synthesizes DNA
7. Earthworms are
 (a) ureotelic when plenty of water is available
 (b) uricotelic when plenty of water is available
 (c) uricotelic under conditions of water scarcity
 (d) ammonotelic when plenty of water is available
8. Which one of the following has an open circulatory system?
 (a) *Pheretima* (b) *Periplaneta*
 (c) *Hirudinaria* (d) *Octopus*
9. Biradial symmetry and lack of cnidoblasts are the characteristics of
 (a) Starfish and sea anemone
 (b) *Ctenoplana* and *Beroe*
 (c) *Aurelia* and *Paramecium*
 (d) *Hydra* and starfish
10. In order to obtain virus-free plants through tissue culture, the best method is
 (a) protoplast culture (b) embryo rescue
 (c) anther culture (d) meristem culture
11. Both sickle cell anaemia and Huntington's chorea are
 (a) bacteria-related diseases
 (b) congenital disorders
 (c) pollutant-induced disorders
 (d) virus-related diseases
12. Which one of the following pairs is not correctly matched?
 (a) Vitamin B₁₂ – Pernicious anaemia
 (b) Vitamin B₆ – Loss of appetite
 (c) Vitamin B₁ – Beri-beri
 (d) Vitamin B₂ – Pellagra
13. Injury to vagus nerve in human is not likely to affect
 (a) tongue movements
 (b) gastrointestinal movements
 (c) pancreatic secretion
 (d) cardiac movements
14. Environment consists of
 (a) living objects of the surroundings
 (b) non-living objects of the surrounding
 (c) non-living objects, events and influences of the surroundings
 (d) living and non-living objects, events and influences of the surroundings
15. Study of pollen grains is called
 (a) Spermology (a) Anatomy
 (b) Palynology (d) Aerobiology
16. The major source of pollution up to 80% of total air pollution in metropolitan cities is
 (a) automobiles (traffic)
 (b) industries
 (c) pesticides
 (d) radioactivity and noise
17. Ultimate source of variations is
 (a) natural selection
 (b) sexual reproduction
 (c) mutations
 (d) hormonal actions
18. Which of the following statement is correct?
 (a) Xylem is made up of all living cells.
 (b) Xylem is made up of living and non-living cells.
 (c) Xylem is made up of non-living cells.
 (d) Xylem does not contain cells.
19. The boundry/transition between two or more communities sharply defined is called
 (a) epilimnion (b) biome
 (c) anticline (d) ecotone
20. Unit of distance between genes in a chromosome is known as
 (a) c-DNA (b) Morgan
 (c) Centi Morgan (d) Spacer
21. Age of the plant can be calculated by
 (a) measuring its height
 (b) counting leaf bases
 (c) counting annual rings
 (d) All of the above
22. In detritus food chain transfer of food is
 (a) detrite (dead organic matter)
 detrivores → decomposers

- (b) detritite → microbes → detritivores → decomposers
 (c) detritivores → organic matter → microbes → decomposers
 (d) grass → detritivores → decomposers
23. Criss-cross inheritance means
 (a) X-chromosome from male will pass to a male of next generation
 (b) X-chromosome from a male will pass to a female of next generation
 (c) X-chromosome from female will pass to female of next generation
 (d) None of the above
24. Cohesion force theory was proposed by
 (a) JC Bose (1850)
 (b) Dixon and Jolly (1950)
 (c) Benson and Calvin (1855)
 (d) Dixon and Jolly (1894)
25. The cell cultured *in vitro* gives rise to complete plant. This ability of plant cell is known as
 (a) growth (b) development
 (c) regeneration (d) totipotency
26. Living fossils means
 (a) primitive organized organisms
 (b) extinct organisms
 (c) organisms with ancestral characters and time has not changed them
 (d) connecting link between two groups
27. Biggest source of energy on earth surface is
 (a) coal (b) tides
 (c) atoms (d) solar radiation
28. The process of photosynthesis is
 (a) reductive, exergonic and catabolic
 (b) reductive, endergonic and catabolic
 (c) reductive, exergonic and anabolic
 (d) reductive, endergonic and anabolic
29. Which is the correct sequence of code transfer involved in the formation of polypeptide?
 (a) DNA-tRNA-rRNA-mRNA
 (b) rRNA-DNA-mRNA-rRNA
 (c) mRNA-tRNA-DNA-amino acid
 (d) DNA-mRNA-tRNA-amino acid
30. Cancer is the 'Bank of life' which of the following tumour form is non-cancerous?
 (a) Benign tumour (b) Malignant tumour
 (c) Carcinogens (d) All of these
31. The 'Cri-du-chat' syndrome is caused by change in chromosome structure involving
 (a) deletion (b) duplication
 (c) inversion (d) translocation
32. When synapsis is complete all along the chromosome, the cell is said to have entered a stage called
 (a) zygotene (b) pachytene
 (c) diplotene (d) diakinesis
33. How does pruning help in making the hedge dense?
 (a) It induces the differentiation of new shoots from the rootstock
 (b) It frees axillary buds from apical dominance
 (c) The apical shoot grows faster after pruning
 (d) It releases wound hormones
34. Which one of the following statements is correct?
 (a) Neurons regulate endocrine activity, but not *vice versa*.
 (b) Endocrine glands regulate neural activity and nervous system regulates endocrine glands.
 (c) Neither hormones control neural activity nor the neurons control endocrine activity.
 (d) Endocrine glands regulate neural activity but not *vice versa*.
35. Evolutionary history of an organism is known as
 (a) phylogeny
 (b) ancestry
 (c) paleontology
 (d) ontogeny
36. Sertoli cells are regulated by the pituitary hormone known as
 (a) FSH (b) GH
 (c) prolactin (d) LH

37. Pulmonary artery differs from pulmonary vein in having
 (a) no endothelium
 (b) strong valves
 (c) Brunner's cell
 (d) thick muscular walls
38. Cerebellum portion of brain is
 (a) concerned with maintenance of posture/equilibrium
 (b) responsible for olfactory functions
 (c) controls optic functions
 (d) Both (a) and (c)
39. Which of the following type of mutation involves the reverse order of genes in a chromosome?
 (a) Deletion
 (b) Duplication
 (c) Inversion
 (d) Reciprocal translocation
40. Which one of the following can help in the diagnosis of a genetical disorder?
 (a) ELISA
 (b) ABO blood group
 (c) PCR
 (d) NMR
41. Initiation of polypeptide chain is through
 (a) methionine
 (b) glycine
 (c) lysine
 (d) leucine
42. Which one of the following is incorrect about the characteristics of protobionts (co-aservates) and microspheres as envisaged in the abiogenic origin of life?
 (a) They were able to reproduce
 (b) They could separate combinations of molecules from the surroundings
 (c) They are partially surrounded by the surroundings
 (d) They could maintain an internal environment
43. At which stage of HIV infection does one usually shows symptoms of AIDS?
 (a) When viral DNA is produced by reverse transcriptase
 (b) When HIV replicates rapidly in helper T-lymphocytes and damages large number of cells
 (c) Within these 15 days of sexual contact with an infected person
 (d) When the infecting retrovirus enters the host cells
44. When CO₂ concentration in blood increases, breathing becomes
 (a) shallower and slow
 (b) there is no effect on breathing
 (c) slow and deep
 (d) faster and deeper
45. A free living nitrogen fixing cyanobacterium which can also form symbiotic association with the water fern *Azolla* is
 (a) *Tolypothrix*
 (b) *Chlorella*
 (c) *Nostoc*
 (d) *Anabaena*
46. Which of the following hormones is not a secretion product of human placenta?
 (a) Human chorionic gonadotropin
 (b) Prolactin
 (c) Oestrogen
 (d) Progesterone
47. The international unit used in biology to measure size of objects is
 (a) μm (micrometer)
 (b) nm (nanometer)
 (c) Å (angstrom)
 (d) All are used
48. Out of 1.7 million species of living organisms known to us, insects contributes to about
 (a) 0.7 million
 (b) 70000
 (c) 70 lakh
 (d) one lakh
49. Primitive earth had
 (a) reducing atmosphere (without free oxygen)
 (b) oxidizing atmosphere (free oxygen)
 (c) Both (a) and (b)
 (d) None of the above
50. The white fibres are resistant to stretching and formed of a substance, the protein collagen, which on boiling with water yields
 (a) gelatin
 (b) elastin
 (c) ossein
 (d) chondrin
51. Which one of the following is not used in production of yoghurt?
 (a) *Streptococcus lactis*
 (b) *S. thermophilus*
 (c) *Lactobacillus bulgaricus*
 (d) *Acetobacter aceti*

52. Viagra is an anti impotent drug. Its chemical salt is
 (a) sildenafil citrate
 (b) nitrous oxide
 (c) nitroglycerene
 (d) digitoxyline
53. Two mating types of a variety of *Paramecium* are
 (a) morphologically different and physiologically similar
 (b) morphologically similar and physiologically different
 (c) physiologically similar
 (d) physiologically different
54. Correct sequence among the following is
 (a) Palaeozoic → Mesozoic → Coenozoic
 (b) Mesozoic → Archaeozoic → Proterozoic
 (c) Palaeozoic → Archaeozoic → Coenozoic
 (d) Archaeozoic → Palaeozoic → Proterozoic
55. The epithelial cells lining the stomach of vertebrates is protected from damage by HCl because
 (a) HCl is too dilute
 (b) the epithelial cells are resistant to the action of HCl
 (c) HCl is neutralized by alkaline gastric juice
 (d) the epithelial cells are covered with a mucous secretion
56. *In situ* conservation of genetic diversity is done in the form of
 (a) national parks
 (b) biosphere reserves
 (c) wildlife sanctuaries
 (d) All of the above
57. Pyrenoids are centre of
 (a) fat storage
 (b) starch storage
 (c) protein formation
 (d) enzyme formation
58. 'Damping off a seedling' is due to
 (a) Nematode
 (b) *Albugo candida*
 (c) *Fusarium oxysporium*
 (d) *Pythium debaryanum*
59. Which one is not a vestigial organ of man?
 (a) Nictitating membrane
 (b) Epiglottis or ileum
 (c) Vermiform appendix
 (d) Muscles or ear pinnae
60. Reason, will, memory, intelligence and emotions are governed by
 (a) cerebellum
 (b) mid brain
 (c) medulla oblongata
 (d) cerebral hemispheres

General Aptitude and Current Issues

Directions Select the related word/letter/number from the given alternatives.

1. Life : Death :: Beginning : ?
 (a) Era (b) End
 (c) Time (d) Commence
2. Arrange the following words according to English Dictionary.
 1. Advertise 2. Admit
 3. Addition 4. Adhesive
 (a) 1, 2, 3, 4 (b) 3, 4, 2, 1
 (c) 3, 2, 4, 1 (d) 4, 1, 2, 3
3. Which one set of letters when sequentially placed at the gaps in the given letter series shall complete it?
 KLM _ , KL _ N, K _ MN, _ LMN
 (a) NMLK
 (b) KLMN
 (c) LKNM
 (d) KLNM
4. Find the wrong number in the given series.
 6, 14, 31, 64, 137, 280
 (a) 31 (b) 64
 (c) 137 (d) 280

5. Pointing to a girl in a bus, a man tells his friend, "She is the daughter of the only son of my father's wife". How is the girl related to the man?

- (a) Cousin (b) Daughter
(c) Mother (d) Sister

6. There are five friends Suresh, Kaushal, Madhur, Amit and Ramesh. Suresh is shorter than Kaushal but taller than Ramesh. Madhur is the tallest. Amit is a little shorter than Kaushal but little taller than Suresh. If they stand in the order of their heights, who will be the shortest?

- (a) Amit (b) Madhur
(c) Ramesh (d) Kaushal

7. From the given alternatives, select the word which cannot be formed using the letters of the given word.

- HISTORICAL
(a) RICHES (b) CHARIOT
(c) CHART (d) CHAOS

Directions (Q.Nos. 8-9) Select the missing number from the given responses.

8.

8	72	9
6	66	11

- (a) 64 (b) 60
(c) 52 (d) 54

9.

14	25	42
2	4	6
3	3	?

- (a) 3 (b) 4
(c) 6 (d) 7

10. X walks Southwards and then turns right, then left and then right. In which direction is he moving now?

- (a) South (b) North
(c) West (d) South-West

11. Kalpana travelled from point B straight to C, a distance of 8 ft. She turned left and walked 5 ft away. Again, she turned left and walked 7 ft and finally turned left and walked 5 ft. How far is she from the starting point?

- (a) 3 ft (b) 4 ft
(c) 1 ft (d) 5 ft

12. Two statements are given followed by two Conclusions I and II. You have to consider the statements to be true even if they seem to be at variance from commonly known facts. You are to decide which of the given conclusions, if any, follow from the given statements. Indicate your answer.

Statements Teaching is an art.
Drawing is also an art.

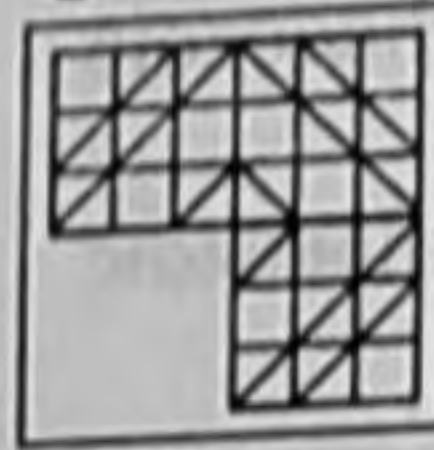
Conclusions

- I. All artists are teachers.
II. All artists know to draw pictures.

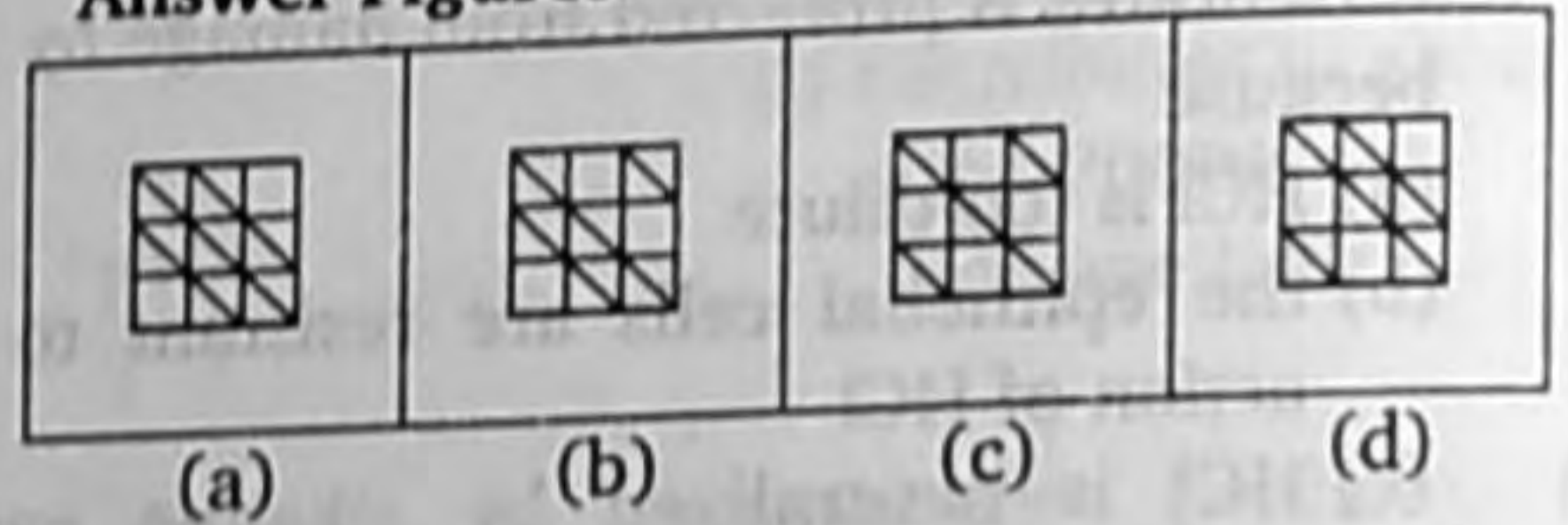
- (a) Only Conclusion I follows
(b) Only Conclusion II follows
(c) Neither Conclusion I nor II follows
(d) Both Conclusions I and II follow

13. Which answer figure will complete the pattern in the question figure?

Question Figure

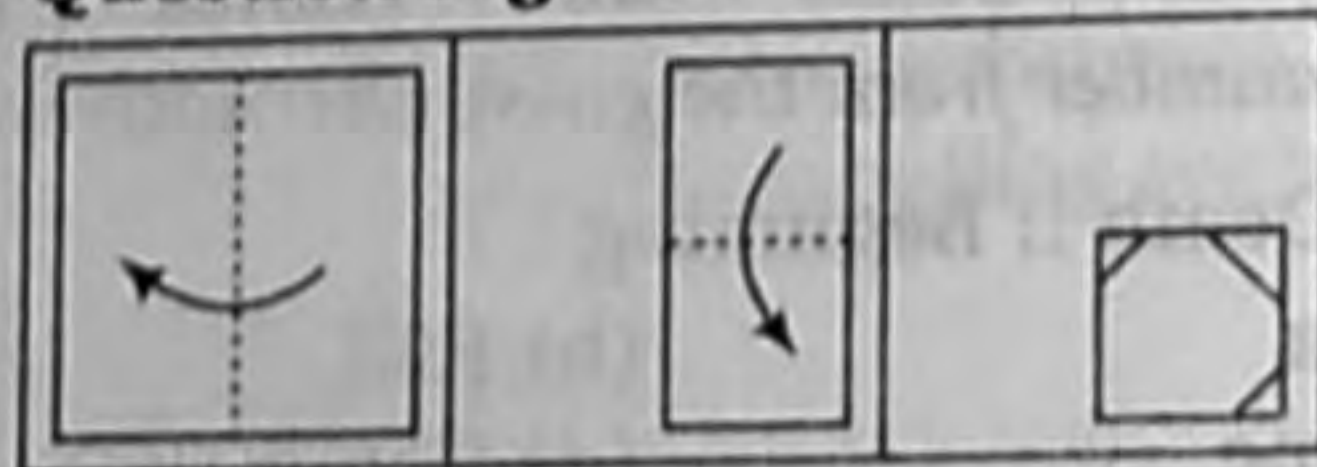


Answer Figures

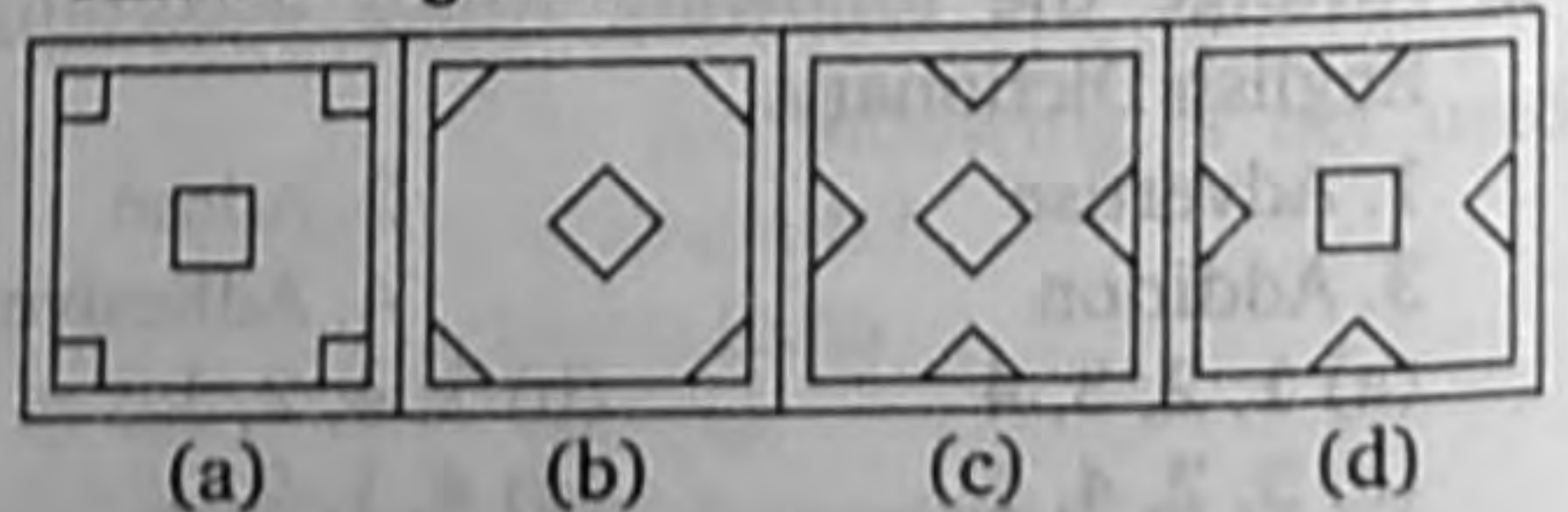


14. A piece of paper is folded and cut as shown below in the question figures. From the given answer figures, indicate how it will appear when opened?

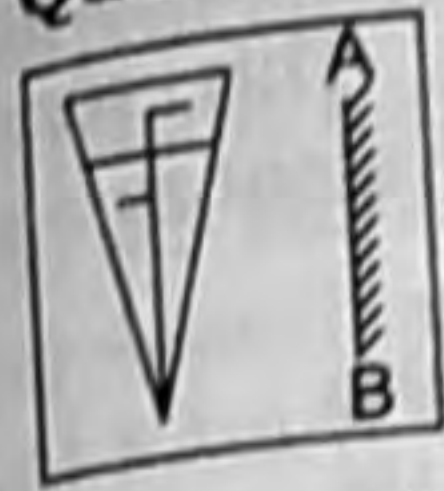
Question Figures



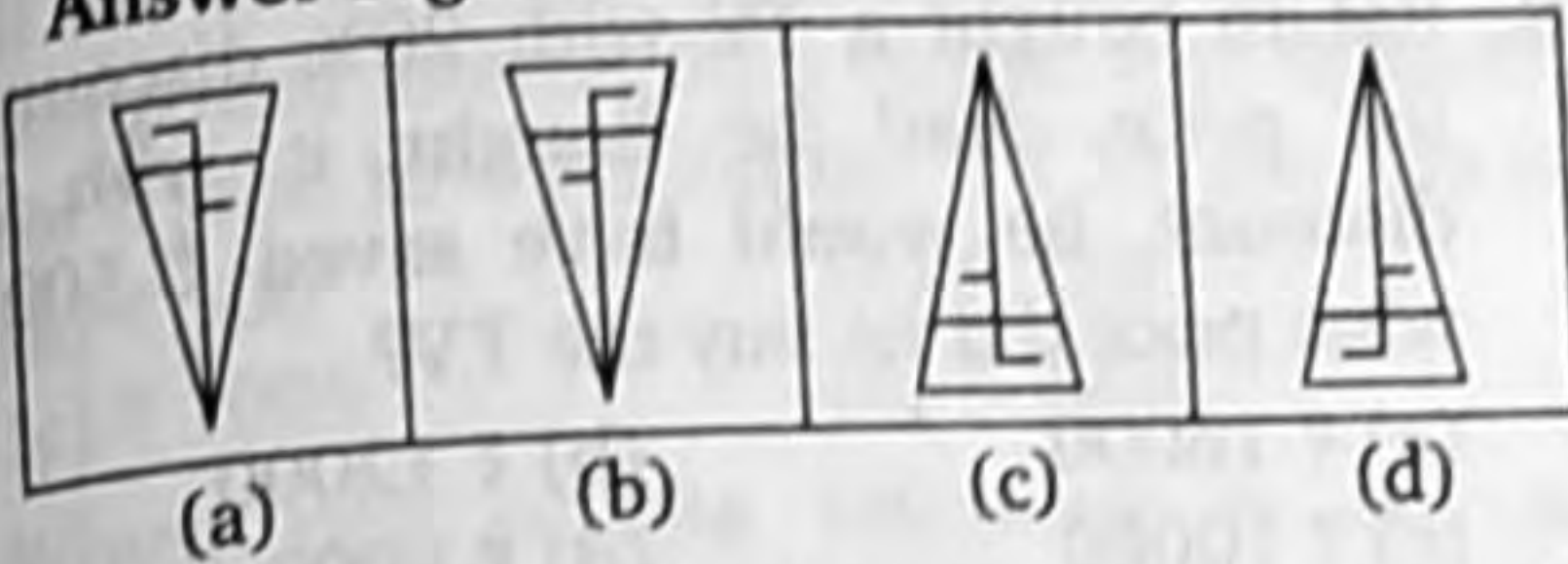
Answer Figures



15. Which of the answer figure is exactly the mirror image of the given figure, when the mirror is held on the line AB?



Question Figure



Directions (Q.Nos. 16-17) Some parts of the sentence have errors and some are correct. Find out which part of a sentence has an error corresponding to the appropriate letter (a), (b) and (c). If a sentence is free from errors, mark the answer (d).

16. Supposing if (a)/ it rains (b)/ what shall we do? (c)/ No error (d)
17. The captain along with his team (a)/ are practising very hard (b)/ for the forthcoming match. (c)/ No error (d)

Directions (Q.Nos. 18-20) Out of the four alternatives, choose the one which best expresses the meaning of the given word and mark it in the answer sheet.

18. Defer
 (a) Indifferent (b) Defy
 (c) Differ (d) Postpone
19. Cease
 (a) Begin (b) Stop
 (c) Create (d) Dull
20. Pious
 (a) Religious (b) Sympathetic
 (c) Afraid (d) Faithful

Directions (Q.Nos. 21-22) Choose the word opposite in meaning to the given word and mark it in the answer sheet.

21. Stingy
 (a) Clean (b) Tight
 (c) Generous (d) Cheap

22. Barren
 (a) Fertile (b) Rich
 (c) Prosperous (d) Positive

Directions (Q.Nos. 23-24) Four alternatives are given for the idiom/phrase. Choose the alternative which best expresses the meaning of the idiom/phrase and mark it in the answer sheet.

23. To look down one's nose
 (a) To show anger
 (b) To retaliate
 (c) To insult in the presence of others
 (d) To regard with contempt

24. To shed crocodile tears
 (a) To weep profusely
 (b) To pretend grief
 (c) To grieve seriously
 (d) To mock something

Directions (Q.Nos. 25-26) A part of the sentence is underlined which may need improvement. Alternatives are given at (a), (b) and (c) below, which may be better option. In case no improvement is needed, your answer is (d).

25. The cheapest electronic good are manufactured in China
 (a) electrical good (b) electrical good
 (c) electronic goods (d) No improvement

26. I have been living in Delhi from 1989.
 (a) eversince
 (b) since
 (c) in
 (d) No improvement

Directions (Q.Nos. 27-28) Out of the four alternatives, choose the one which can be substituted for the given words/sentence.

27. Murder of a man
 (a) Regicide (b) Fratricide
 (c) Homicide (d) Genocide
28. Use of force or threats to get someone to agree to something
 (a) Coercion
 (b) Conviction
 (c) Confession
 (d) Cajolement

Directions (Q.Nos. 29-30) In the following questions, group of four words are given. In each group, one word is correctly spelt. Find the correctly spelt word and mark it in the answer sheet.

29. (a) Livelihood (b) Livelyhood
(c) Livlihood (d) Livelyhud
30. (a) Foyere (b) Foayer
(c) Foyer (d) Fouyer
31. If the sum of five consecutive integers is S , then the largest of those integers in terms of S is
(a) $\frac{S-10}{5}$ (b) $\frac{S+4}{4}$
(c) $\frac{S+5}{4}$ (d) $\frac{S+10}{5}$
32. The greatest among the numbers $3\sqrt{2}$, $3\sqrt{7}$, $6\sqrt{5}$, $2\sqrt{20}$ is
(a) $3\sqrt{2}$ (b) $3\sqrt{7}$
(c) $6\sqrt{5}$ (d) $2\sqrt{20}$
33. The denominator of a fraction is 3 more than its numerator. If the numerator is increased by 7 and the denominator is decreased by 2, we obtain 2. The sum of numerator and denominator of the fraction is
(a) 5 (b) 13
(c) 17 (d) 19
34. 47 is added to the product of 71 and an unknown number. The new number is divisible by 7, giving the quotient 98. The unknown number is a multiple of
(a) 2 (b) 5
(c) 7 (d) 3
35. The least number which, when divided by 16, 18, 20 and 25 leaves 4 as remainder in each case but when divided by 7 leaves no remainder is
(a) 17004 (b) 18000
(c) 18002 (d) 18004
36. A can do a work in 5 days less than the time taken by B to do it. If both of them together take $11\frac{1}{9}$ days, then the time taken by B alone to do the same work (in days) is
(a) 15 (b) 20
(c) 25 (d) 30
37. The price of a certain television set is discounted by 10% and the reduced price is then discounted by 10%. This series of successive discounts is equivalent to a single discount of
(a) 20% (b) 19%
(c) 18% (d) 11%
38. Rahim bought a TV with 20% discount on list price. Had he bought it with 25% discount, he would have saved ₹ 500. At what price did he buy the TV?
(a) ₹ 16000 (b) ₹ 12000
(c) ₹ 10000 (d) ₹ 8000
39. If $\frac{a}{3} = \frac{b}{2}$, then value of $\frac{2a+3b}{3a-2b}$ is
(a) $\frac{12}{5}$ (b) $\frac{5}{12}$
(c) 1 (d) $\frac{12}{7}$
40. A shopkeeper bought pens at the rate of 7 for ₹10 and sold them at a profit of 40%. How many pens would a customer get for ₹ 10?
(a) 6 (b) 4
(c) 5 (d) 3
41. If the cost price of 10 articles is equal to the sales price of 16 articles, then the gain or loss per cent is
(a) 28% profit (b) $37\frac{1}{2}$ % profit
(c) 28% loss (d) $37\frac{1}{2}$ % loss
42. Three persons A, B and C whose salaries together amount to ₹ 72000, spend 80, 85 and 75 per cent of their salaries respectively. If their savings are in the ratio 8 : 9 : 20, then A's salary is
(a) ₹ 20000 (b) ₹ 16000
(c) ₹ 22000 (d) ₹ 18000
43. Two solutions of 90% and 97% purity are mixed, resulting in 21 L of mixture of 94% purity. The quantity of the second solution in the resulting mixture, in litres, is
(a) 15 (b) 12
(c) 9 (d) 6

44. A boat travels 24 km upstream in 6 h and 20 km downstream in 4 h. Then, the speed of boat in still water and the speed of water current are respectively
 (a) 4 km/h and 3 km/h
 (b) 4.5 km/h and 0.5 km/h
 (c) 4 km/h and 2 km/h
 (d) 5 km/h and 2 km/h
45. If the difference between simple interest and compound interest on a certain sum of money for 3 yr at 10% per annum is ₹ 31, the sum is
 (a) ₹ 500 (b) ₹ 750
 (c) ₹ 1000 (d) ₹ 1250
46. Which one of the following is not an objective of fiscal policy in India?
 (a) Full employment
 (b) Price stability
 (c) Equitable distribution of wealth and incomes
 (d) Regulation of international trade
47. Which one of the following is not a quantitative credit control measure of a Central Bank?
 (a) Bank Rate Policy
 (b) Open Market Operations
 (c) Cash Reserve Ratio
 (d) Moral Suasion
48. In which market structure is the demand curve of the market represented by the demand curve of the firm?
 (a) Monopoly
 (b) Oligopoly
 (c) Duopoly
 (d) Perfect competition
49. 'Mixed Farming' means
 (a) sowing of both cash and food crops
 (b) sowing of two or more crops in the same field
 (c) sowing of two or more plants in alternate years
 (d) rearing of cattle and agriculture
50. Which of the following is deducted from NNP to arrive at NI?
 (a) Indirect tax
 (b) Capital consumption allowance
 (c) Subsidy
 (d) Interest
51. Whom did Bal Gangadhar Tilak refer to as his Political Guru?
 (a) Swami Vivekanand (b) Ram Mohan Roy
 (c) Sisir Kumar Ghosh (d) Dadabhai Naoroji
52. Who introduced 'doctrine of lapse'?
 (a) Lord Wellesley (b) Lord Curzon
 (c) Lord Dalhousie (d) Lord Lytton
53. Tides are caused by the gravitational pull of the
 (a) Earth on the Moon
 (b) Earth on the Sun
 (c) Sun and Moon on the Earth
 (d) Moon on the Earth
54. Dry farming in India is extensively practised in
 (a) Canara Plains (b) Deccan Plateau
 (c) Coromandal Plains (d) Ganga Plains
55. The Kullu Valley is situated between
 (a) Ladakh and Pirpanjal
 (b) Ranjoti and Nag Tibba
 (c) Lesser Himalayas and Siwalik
 (d) Dhauladhar and Pirpanjal
56. Terrace farming is done
 (a) on the slope of hills
 (b) in dry regions
 (c) on roof tops
 (d) on mountain tops
57. The colour change in the Chameleon is due to the presence of
 (a) haemoglobin
 (b) chromatophore
 (c) chlorophyll
 (d) pneumatophore
58. The deficiency of iodine leads to
 (a) hyperthyroidism (b) goitre
 (c) midgut (d) diabetes
59. Two richest known sources of edible protein are
 (a) meat and eggs
 (b) some algae and other microorganisms
 (c) soyabean and groundnut
 (d) milk and leafy vegetables
60. The saliva helps in the digestion of
 (a) proteins (b) starch
 (c) fibres (d) fats

61. Which of the following correctly explains the phenomenon of 'Test Tube Baby'?
- When every process of embryo formation is in the test tube
 - When the embryo develops in a test tube
 - When the fertilization is external and development is internal
 - When the fertilization is internal and development is external
62. Heart attack occurs due to
- bacterial attack on the heart
 - stopping of heart beat
 - lack of supply of blood to the heart itself
 - impairment of heart's working due to unknown reasons
63. Direct conversion of solar energy with the use of a photovoltaic cell results in the production of
- optical energy
 - electrical energy
 - thermal energy
 - mechanical energy
64. A man inside an artificial satellite feels weightlessness because the force of attraction due to earth is
- zero at that place
 - is balanced by the force of attraction due to moon
 - equal to the centripetal force
 - non-effective due to particular design of the satellite
65. When a detergent is added to pure water, its surface tension
- increases
 - decreases
 - remains constant
 - becomes infinite
66. 'Supernova' is
- a comet
 - an asteroid
 - an exploding star
 - a black hole
67. The device that converts computer output for transmission over telephone lines is called
- interface
 - interpreter
 - modem
 - I/O port
68. A 'bug' in a programme is a
- statement
 - error
 - signature
 - Both (b) and (c)
69. Wood spirit is
- methyl alcohol
 - ethyl alcohol
 - butyl alcohol
 - propyl alcohol
70. Which of the following processes is used for the production of Biodiesel?
- Transamination
 - Transcription
 - Transesterification
 - Translation
71. One property of ammonia is
- it is insoluble in water
 - it is a odourless gas
 - it is a yellowish gas
 - its aqueous solution turns red litmus to blue
72. Of the following, which one pollutes the air of a big city?
- Copper
 - Chromium
 - Lead
 - Calcium
73. Ultraviolet light of Sun's radiation is prevented from reaching the Earth's atmosphere by the layer of
- Oxygen
 - Hydrogen
 - Ozone
 - Helium
74. Greater population can be supported on the Earth only if we eat more
- mutton
 - eggs
 - plant products
 - beef
75. Varahamihira is
- an astronaut
 - a space shuttle
 - a power station
 - an ancient astronomer
76. "Fire fighting clothes" are made from
- mica
 - asbestos
 - talc
 - steatite
77. Tummalapalli in Andhra Pradesh has recently come on the world map for its largest
- uranium deposits
 - tungsten deposits
 - coal deposits
 - bauxite ore deposits
78. As per the provisional result of the 2011 Census, the density of population in India is
- 325
 - 352
 - 372
 - 382

79. 'Rath Yatra' at Puri is celebrated in honour of
 (a) Lord Rama (b) Lord Shiva
 (c) Lord Jagannath (d) Lord Vishnu
80. Gagan Narang, whose name has been recommended for 'Rajiv Gandhi Khel Ratna Award' is a famous
 (a) motor car racer (b) cricketer
 (c) air rifle shooter (d) footballer
81. The five permanent members of the United Nations Security Council are
 (a) Canada, China, France, USA, UK
 (b) China, France, Russia, USA, UK
 (c) Japan, Germany, Russia, USA, UK
 (d) Germany, China, Russia, USA, UK
82. Which city has the headquarters of two railway zones in India?
 (a) Hubli (b) New Delhi
 (c) Mumbai (d) Jabalpur
83. Who acts as the Chairman of the State Planning Board?
 (a) Governor
 (b) Chief Minister
 (c) Leader of the opposition
 (d) Speaker
84. Air bladder in fish acts as
 (a) accessory respiratory organ
 (b) hydrostatic organ
 (c) both accessory respiratory organ and hydrostatic organ
 (d) primary respiratory organ
85. Which of the following is called 'Blue Planet'?
 (a) Saturn (b) Earth
 (c) Jupiter (d) Mars
86. In cauliflower plant, the useful part is
 (a) underground stem
 (b) root
 (c) young inflorescence
 (d) leaves
87. Aurobindo Ghosh was arrested in connection with
 (a) Alipore Bomb Case
 (b) Kolhapur Bomb Case
 (c) Lahore Conspiracy Case
 (d) Kakori Case
88. 'Manchester' of South India is
 (a) Coimbatore (b) Madurai
 (c) Bengaluru (d) Chennai
89. The acid stored in batteries is
 (a) sulphuric acid (b) nitric acid
 (c) hydrochloric acid (d) acetic acid
90. Heavy metal pollution of water is caused by
 (a) paints (b) wood burning
 (c) acid plants (d) domestic sewage
91. Which of the following 'Public Undertakings' has not been conferred with 'Maharatna' Status?
 (a) SAIL (b) BHEL
 (c) ONGC (d) Coal India Limited
92. Who is known as the 'Indian Bismarck'?
 (a) Vallabhbhai Patel
 (b) Subhash Chandra Bose
 (c) Bhagat Singh
 (d) Bal Gangadhar Tilak
93. Which one of the four regions above the Earth has smallest height (km)?
 (a) Stratosphere
 (b) Mesosphere
 (c) Thermosphere
 (d) Troposphere
94. Which State of India shows the lowest population as per Census 2011?
 (a) Manipur (b) Tripura
 (c) Puducherry (d) Sikkim
95. 'Rail Bandhu' is
 (a) Website of each railway division
 (b) the onboard medical officer in every train to attend to medical emergencies
 (c) security guard in every AC coach of Rajdhani/ Shatabdi and AC Durgam Express
 (d) an onboard magazine of Indian Railways to be available in Rajdhani/Shatabdi/AC Durgam Express
96. Which one of the following ceased to be a Fundamental Right under the Constitution?
 (a) Right to Education
 (b) Right to Work
 (c) Right to Property
 (d) Right to Equality before Law

- (c) MG Ranade
(d) Keshab Chandra Sen
97. Coffee Research Institute of India is located at
(a) Yercaud (b) Wayanad
(c) Coorg (d) Coimbatore
98. How many major seaports are there in India?
(a) 6 (b) 9
(c) 10 (d) 12
99. The members of the Rajya Sabha are elected for a term of
(a) two years (b) four years
(c) five years (d) six years
100. When was National Emergency imposed by the President of India on the grounds of internal disorder?
(a) 1962 (b) 1965
(c) 1971 (d) 1975
101. Which one of the following is an example for Monopoly?
(a) SPIC
(b) Indian Railways
(c) HMT
(d) Hindustan Unilever Limited
102. A black body can absorb radiations of
(a) lower wavelengths only
(b) intermediate wavelengths only
(c) higher wavelengths only
(d) all wavelengths
103. The only Hindu courtier of Akbar who accepted Deen-e-Illahi was
(a) Todermal (b) Birbal
(c) Tansen (d) Man Singh
104. The chemical which is used in art and craft and can cause anemia and leukaemia is
(a) benzene (b) dioxine
(c) phthalate (d) aldrin
105. Which Party was established by Subhash Chandra Bose after he came out of Indian National Congress?
(a) Indian National Army
(b) Republican Party
(c) Forward Block
(d) Socialist Party
106. The Rama Krishna Mission was established by
(a) Vivekananda
(b) Rama Krishna
107. The year of accession of Kanishka to throne was
(a) AD 108 (b) AD 78
(c) AD 58 (d) AD 128
108. Total number of muscles present in our body is
(a) 565 (b) 656
(c) 665 (d) 556
109. Which of the following Mughal Emperors is credited with composition of Hindi songs?
(a) Babar (b) Akbar
(c) Jahangir (d) Shahjahan
110. WTO came into existence in the year
(a) 1977 (b) 1985
(c) 1995 (d) 1950
111. Hydraulic machines work under the Principle of
(a) Newton's Law (b) Joules Law
(c) Pascal's Law (d) Floatation Law
112. Who invented aeroplane?
(a) Orville Wright and Wilbur Wright
(b) Sir Frank Whittle
(c) Michael Faraday
(d) Christian Huygens
113. World Bank helps countries with loans for the purpose of
(a) reconstruction and development
(b) stimulating private investment
(c) tailing foreign exchange crises
(d) meeting deficits in government budget
114. Which is not a Central Service?
(a) Indian Police Service ((IPS)
(b) Indian Foreign Service (IFS)
(c) Indian Audit and Accounts Service (IAAS)
(d) Indian Revenue Service (IRS)
115. The first Indian State which was created on a linguistic basis following along drawn agitation is
(a) Andhra Pradesh
(b) Asom
(c) Tamil Nadu
(d) Karnataka

- 116.** The Great Barrier reef is
- (a) conglomeration of Corals in Australian waters
 - (b) mountains range in Utah, USA
 - (c) salt hills of Afghanistan
 - (d) sub-oceanic mountain in South China Sea

- 117.** The Panama Canal links
- (a) Mediterranean Sea with Red Sea
 - (b) Atlantic Ocean with Indian Ocean
 - (c) Indian Ocean with Mediterranean
 - (d) Atlantic Ocean with Pacific Ocean

- 118.** C, BASIC, COBOL, and Java are examples of language.
- (a) low level
 - (b) computer
 - (c) system programming
 - (d) high - level

- 119.** is approximately one billion bytes.
- (a) Kilobyte
 - (b) Bit
 - (c) Gigabyte
 - (d) Megabyte

- 120.** The wildlife week is celebrated from
- (a) 2-8 October
 - (b) 1-7 June
 - (c) 16-22 April
 - (d) 14 -20 January