

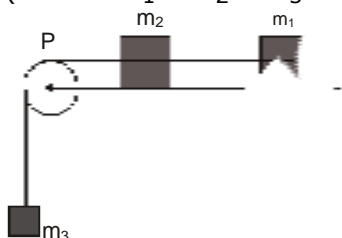
PHYSICS

- If force (F), velocity (V) and time (T) are taken as fundamental units, the dimensions of mass are
 A. $[FVT^{-1}]$ B. $[FVT^{-2}]$
 C. $[FV^{-1}T^{-1}]$ D. $[FV^{-1}T]$
- A projectile is fired from the surface of the earth with a velocity of 5ms^{-1} and angle θ with the horizontal. Another projectile fired from another planet with a velocity of 3ms^{-1} at the same angle follows a trajectory which is identical with the trajectory of the projectile fired from the earth. The value of the acceleration due to gravity on the planet is : (given = 9.8ms^{-2})
 A. 3.5 B. 5.9
 C. 16.3 D. 110.8

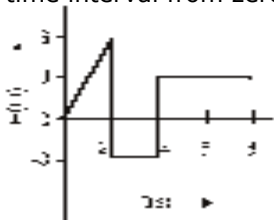
- A particle is moving such that its position coordinates (x, y) are (2m, 3m) at time $t = 0$, (6m, 7m) at time $t = 2\text{s}$ and (13m, 14m) at time $t = 5\text{s}$,

Average velocity vector (\vec{v}_{av}) from $t = 0$ to $t = 5\text{s}$ is :

- A. $\frac{1}{5}(13\hat{i} + 14\hat{j})$ B. $\frac{7}{3}(\hat{i} + \hat{j})$
 C. $2(\hat{i} + \hat{j})$ D. $\frac{11}{5}(\hat{i} + \hat{j})$
- A system consists of three masses m_1 , m_2 and m_3 connected by a string passing over a pulley P. The mass m_1 hangs freely and m_2 and m_3 are on a rough horizontal table (the coefficient of friction = μ). The pulley is frictionless and of negligible mass. The downward acceleration of mass m_1 is :
 (Assume $m_1 = m_2 = m_3 = m$)



- A. $\frac{g(1-g\mu)}{9}$ B. $\frac{2g\mu}{3}$
 C. $\frac{g(1-2\mu)}{3}$ D. $\frac{g(1-2\mu)}{2}$
- The force 'F' acting on a particle of mass 'm' is indicated by the force-time graph shown below. The change in momentum of the particle over the time interval from zero to 8 s is :



- A. 24 Ns B. 20 Ns
 C. 12 Ns D. 6 Ns

- A balloon with mass 'm' is descending down with an acceleration 'a' (where $a < g$). How much mass should be removed from it so that it starts moving up with an acceleration 'a' ?

$$\frac{2ma}{g+a} \qquad \frac{2ma}{g-a}$$

A. $\frac{g+a}{ma}$ B. $\frac{g-a}{ma}$
 C. $g+a$ D. $g-a$

- A body of mass (4m) is lying in x-y plane at rest. It suddenly explodes into three pieces. Two pieces, each of mass (m) move perpendicular to each other with equal speeds (u). The total kinetic energy generated due to explosion is :

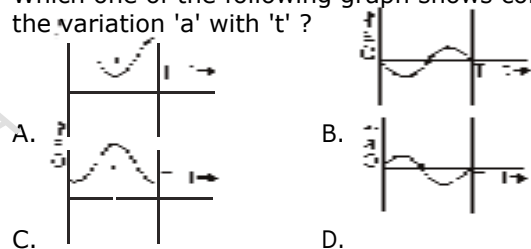
$$2mu^2 \qquad \frac{3}{2}mu^2$$

A. mu^2 B. $\frac{3}{2}mu^2$
 C. $2mu^2$ D. $4mu^2$

- The oscillation of a body on a smooth horizontal surface is represented by the equation, $X = A \cos(\omega t)$

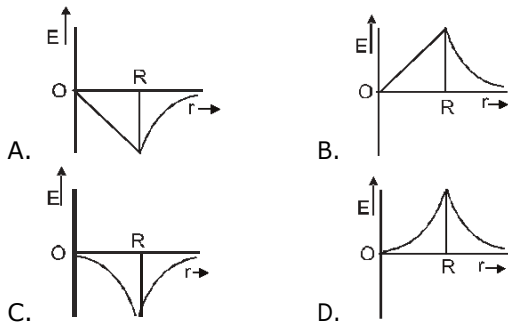
where X = displacement at time t
 ω = frequency of oscillation

Which one of the following graph shows correctly the variation 'a' with 't' ?



Here a = acceleration at time t
 T = time period

- A solid cylinder of mass 50 kg and radius 0.5 m is free to rotate about horizontal axis. A massless string is wound round the cylinder with one end attached to it and other hanging freely. Tension in the string required to produce an angular acceleration of 2 revolutions s^{-2}
 A. 25 N B. 50 N
 C. 78.5 N D. 157 N
- The ratio of the acceleration for a solid sphere (mass 'm' and radius 'R') rolling down an incline of angle ' θ ' without slipping and slipping down the incline without rolling is :
 A. 5:7 B. 2:3
 C. 2:5 D. 7:5
- A black hole is an object whose gravitational field is so strong that even light cannot escape from it. To what approximate radius would earth (mass = 5.98×10^{24} kg) have to be compressed to be a black hole ?
 A. 10^{-9} m B. 10^{-6} m
 C. 10^{-2} m D. 100 m
- Dependence of intensity of gravitational field (E) of earth with distance (r) from centre of earth is correctly represented by :



13. Copper of fixed volume 'V' is drawn into wire of length ' λ '. When this wire is subjected to a constant force 'F', the extension produced in the wire is ' e '. Which of the following graph is a straight line ?

- A. e versus $1/\lambda$. B. e versus λ^2
 C. e versus $1/\lambda^2$ D. e versus λ

14. A certain number of spherical drops of a liquid of radius 'r' coalesce to form a single drop of radius 'R' and volume 'V'. If 'T' is the surface tension of the liquid then:

- A. Energy = $4VT \left(\frac{1}{r} - \frac{1}{R} \right)$ is released.
 B. Energy = $3VT \left(\frac{1}{r} + \frac{1}{R} \right)$ is released.
 C. Energy = $3VT \left(\frac{1}{r} - \frac{1}{R} \right)$ is released.
 D. Energy is neither released nor absorbed.

15. Steam at 100°C is passed into 20g of water at 10°C . When water acquires a temperature of 80°C , the mass of water present will be:

- [Take specific heat of water = $1 \text{ cal g}^{-1} \text{ }^\circ\text{C}^{-1}$ and latent heat of steam = 540 cal g^{-1}]
 A. 24 g B. 31.5 g
 C. 42.5 g D. 22.5 g

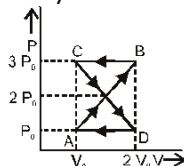
16. Certain quantity of water cools from 70°C to 60°C in the first 5 minutes and to 54°C in the next 5 minutes. The temperature of the surroundings is;

- A. 45°C B. 20°C
 C. 42°C D. 10°C

17. A mono atomic gas at a pressure P, having a volume V expands isothermally to a volume 2V and then adiabatically to a volume 16V. The final pressure of the gas is : (take $\gamma = 5/3$)

- A. 64 P B. 32 P
 C. P/64 D. 16P

18. A thermodynamics system undergoes cyclic process ABCDA as shown in Fig. The work done by the system in the cycle is:



- A. P_0V_0 B. $2P_0V_0$
 C. $\frac{P_0V_0}{2}$ D. Zero

19. The mean free path of molecules of a gas (radius 'r') is inversely proportional to:

- A. r^3 B. r^2
 C. r D. r^{-1}

20. If n_1 , n_2 and n_3 are the fundamental frequencies of three segments into which a string is divided, then the original fundamental frequency n of the string is given by:

- A. $\frac{1}{n} = \frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3}$
 B. $\frac{\sqrt{1}}{n} = \frac{\sqrt{1}}{n_1} + \frac{\sqrt{1}}{n_2} + \frac{\sqrt{1}}{n_3}$
 C. $\sqrt{n} = \sqrt{n_1} + \sqrt{n_2} + \sqrt{n_3}$
 D. $n = n_1 + n_2 + n_3$

21. The number of possible natural oscillations of air column in a pipe closed at one end of length 85 cm whose frequencies lies below 1250 Hz are:

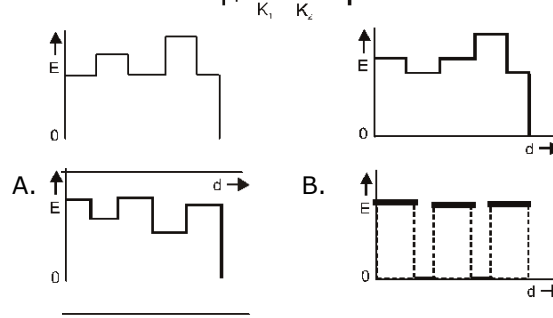
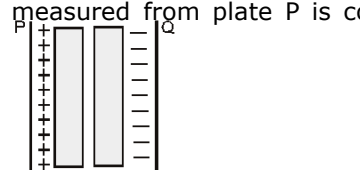
- (velocity of sound = 340 ms^{-1})
 A. 4 B. 5
 C. 7 D. 6

22. A speeding motorcyclist sees traffic jam ahead of him. He slows down to 36km/hour. He finds that traffic has eased and a car moving ahead of him at 18 km/hour is honking at a frequency of 1392 Hz. If the speed of sound is 343 m/s, the frequency of the honk as heard by him will be:

- A. 1332 Hz B. 1372 Hz
 C. 1412 Hz D. 1454 Hz

23. Two thin dielectric slabs of dielectric constants K_1

and K_2 ($K_1 < K_2$) are inserted between plates of a parallel plate capacitor, as shown in the figure. The variation of electric field 'E' between the plates with distance 'd' as measured from plate P is correctly shown by:



24. A conducting sphere of radius R is given a charge Q. The electric potential and the electric field at the centre of the sphere respectively are:

- A. Zero and $\frac{4\pi\epsilon_0 R^2}{Q}$
 B. $\frac{4\pi\epsilon_0 R}{Q}$ and Zero
 C. $\frac{4\pi\epsilon_0 R}{Q}$ and $\frac{4\pi\epsilon_0 R^2}{Q}$
 D. Both are zero.

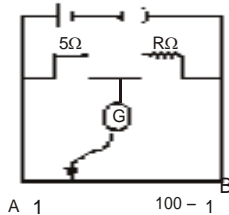
25. In a region the potential is represented by $V(x, y, z) = 6x - 8xy - 8y + 6yz$, where V is in volts and x, y, z , are in meters. The electric force experienced by a charge of 2 coulomb situated at point (1, 1, 1) is :

A. $6\sqrt{10}$ N B. 30N
C. 24N D. $4\sqrt{10}$ N

26. Two cities are 150 km apart. Electric power is sent from one city to another city through copper wires. The fall of potential per km is 8 volt and the average resistance per km is 0.5 The power loss in the wire is:

A. 19.2 W B. 19.2 kW
C. 19.2 J D. 12.2 kW

27. The resistance in the two arms of the meter bridge are 5 and R , respectively. When the resistance R is shunted with an equal resistance, the new balance point is at 1.6. The resistance ' R ' is :



A. 10 B. 15
C. 20 D. 25

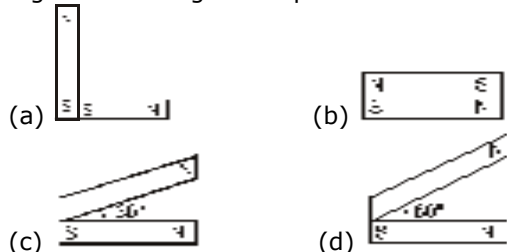
28. A potentiometer circuit has been set up for finding the internal resistance of a given cell. The main battery, used across the potentiometer wire, has an emf of 2.0 V and a negligible internal resistance. The potentiometer wire itself is 4 m long. When the resistance, R , connected across the given cell, has values of .

(i) infinity (ii) 9.5

The 'balancing lengths, on the potentiometer wire are found to be 3m and 2.85 m, respectively. The value of internal resistance of the cell is :

A. 0.25 B. 0.95
C. 0.5 D. 0.75

29. Following figures show the arrangement of bar magnets in different configurations. Each magnet has magnetic dipole. Which configuration has highest net magnetic dipole moment?



(c) (d)
A. a B. b
C. c D. d

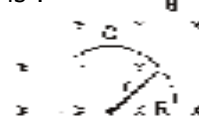
30. In an ammeter 0.2% of main current passes through the galvanometer. If resistance of galvanometer is G , the resistance of ammeter will be :

A. $\frac{1}{499}G$ B. $\frac{499}{500}G$
C. $\frac{1}{500}G$ D. $\frac{500}{499}G$

31. Two identical long conducting wires AOB and COD are placed at right angle to each other, with one above other such that 'O' is their common point for the two. The wires carry I_1 and I_2 currents, respectively. Point 'I' is lying at distance 'd' from 'O' along a direction perpendicular to the plane containing the wires. The magnetic field at the point 'P' will be :

A. $\frac{\mu_0}{2\pi d} \left(\frac{I_1}{2} \right)$ B. $\frac{\mu_0}{2\pi d} (I_1 + I_2)$
C. $\frac{\mu_0}{2\pi d} (I_1 - I_2)$ D. $\frac{\mu_0}{2\pi d} (I_1 + I_2)$

32. A thin semicircular conducting the ring (PQR) of radius ' r ' is falling with its plane vertical in a horizontal magnetic field B , as shown in figure. The potential difference developed across the ring when its speed is v , is :



A. Zero
B. $Bvnr/2$ and P is at higher potential
C. πrBv and R is at higher potential
D. $2rBv$ and R is at higher potential

33. A transformer having efficiency of 90% is working on 200 V and 3 kW power supply. If the current in the secondary coil is 6 A the voltage across the secondary coil and the current in the primary coil respectively are :

A. 300 V, 15 A B. 450 V, 15 A
C. 450 V, 13.5 A D. 600 V, 15 A

34. Light with an energy flux of $25 \times 10^4 \text{ Wm}^{-2}$ falls on a perfectly reflecting surface at normal incidence. If the surface area is 15 cm^2 , the average force exerted on the surface is :

A. $1.25 \times 10^{-6} \text{ N}$ B. $2.50 \times 10^{-6} \text{ N}$
C. $1.20 \times 10^{-6} \text{ N}$ D. $3.0 \times 10^{-6} \text{ N}$

35. A beam of light of $\lambda = 600 \text{ nm}$ from a distant source falls on a single slit 1 mm wide and the resulting diffraction pattern is observed on a screen 2 m away. The distance between first dark fringes on either side of the central bright fringe is :

A. 1.2 cm B. 1.2 mm
C. 2.4 cm D. 2.4 mm

36. In the Young's double slit experiment the intensity of light at a point on the screen where the path difference is λ is K , (λ being the wave length of light used). The intensity at a point where the path difference is $\lambda/4$, will be :

A. K B. $K/4$
C. $K/2$ D. zero

37. If the focal length of objective lens is increased then magnifying power of :
A. microscope will increase but that of telescope decrease
B. microscope and telescope both will increase
C. microscope and telescope both will decrease
D. microscope will decrease but that of telescope will increase.

38. The angle of a prism is 'A'. One of its refracting surfaces is silvered. Light rays falling at an angle of incidence 2A on the first surface returns back through the same path after suffering reflection at the silvered surface. The refractive index μ , of the prism is :

A. $2\sin A$ B. $2 \cos A$

C. $\frac{1}{2} \cos A$ D. $\tan A$

39. When the energy of the incident radiation is increased by 20%, the kinetic energy of the photoelectrons emitted from a metal surface increased from emitted 0.5 eV to 0.8eV. The work function of the metal is :

A. 0.65 eV B. 1.0 eV
C. 1.3 eV D. 1.5 eV

40. If the kinetic energy of the particle is increased to 16 times its previous value, the percentage change in the de-Broglie wavelength of the particle is :

A. 25 B. 75
C. 60 D. 50

41. Hydrogen atom in ground state is excited by a monochromatic radiation of $\lambda = 975 \text{ \AA}$. Number of spectral lines in the resulting spectrum emitted will be :

A. 3 B. 2
C. 6 D. 10

42. The Binding energy per nucleon of ${}^7_3\text{Li}$ and ${}^4_2\text{He}$ nucleon are 5.60 MeV and 7.06 MeV, respectively.

In the nuclear reaction ${}^7_3\text{Li} + {}^1_1\text{H} \rightarrow {}^4_2\text{He} + {}^4_2\text{He} + Q$, the value of energy Q released is :

A. 19.6 MeV B. -2.4 MeV
C. 8.4 MeV D. 17.3 MeV

43. A radio isotope 'X' with a half life 1.4×10^9 years decays to 'Y' which is stable. A sample of the rock from a cave was found to contain 'X' and 'Y' in the ratio 1 : 7. The age of the rock is :

A. 1.96×10^9 years
B. 3.92×10^9 years
C. 4.20×10^9 years
D. 8.40×10^9 years

44. The given graph represents V – I characteristic for a semiconductor device.

Which of the following statement is correct ?

A. It is V –I characteristic for solar cell where, point A represents open circuit voltage and point B short circuit current.

B. It is for a solar cell and points A and B represent open circuit voltage and current, respectively.

C. It is for a photodiode and points A and B represent open circuit voltage and current respectively.

D. It is for a LED and points A and B represent open circuit voltage and short circuit current, respectively.

45. The barrier potential of a p-n junction depends on :
(a) type of semi conductor material

(b) amount of doping

(c) temperature

Which one of the following is correct?

A. (a) and (b) only B. (b) only
C. (b) and (c) only D. (a), (b) and (c)

CHEMISTRY

46. What is the maximum number of orbitals that can be identified with the following quantum number $n = 3, \lambda = 1, m = 0$

A. 1 B. 2
C. 3 D. 4

47. Calculate the energy in corresponding to light of wavelength 45 nm : (Planck's constant $h = 6.63 \times 10^{-34} \text{ Js}$; speed of light $c = 3 \times 10^8 \text{ ms}^{-1}$)

A. 6.67×10^{10} B. 6.67×10^{11}
C. 4.42×10^{-10} D. 4.42×10^{-10}

48. Equal masses of H_2, O_2 and methane have been taken in a container of volume V at temperature 27°C in identical conditions. The ratio of the

volumes of gases $\text{H}_2:\text{O}_2$: methane would be -

A. 8 : 16 : 1 B. 16 : 8 : 1
C. 16 : 1 : 2 D. 8 : 1 : 2

49. If a the length of the side of a cube, the distance between the body centered atom one corner atom in the cube will be:

A. $\frac{2}{3}a$ B. $\frac{4}{3}a$
C. $\frac{3}{4}a$ D. $\frac{3}{2}a$

50. Which property of colloids is not dependent on the charge on colloidal particles ?

A. Coagulation B. Electrophoresis
C. Electro-osmosis D. Tyndall effect

51. Which of the following salts will give highest pH in water?

A. KCl B. NaCl
C. Na_2CO_3 D. CuSO_4

52. Of the following 0.10m aqueous solutions, which one will exhibit the largest freezing point depression?

A. KCl B. $\text{C}_6\text{H}_{12}\text{O}_6$
C. $\text{Al}_2(\text{SO}_4)_3$ D. K_2SO_4

53. When 22.4 litres of $\text{H}_2(\text{g})$ is mixed with 11.2 litres of $\text{Cl}_2(\text{g})$, each at STP, the moles of $\text{HCl}(\text{g})$ formed is equal to :

A. 1 mol of $\text{HCl}(\text{g})$ B. 2 mol of $\text{HCl}(\text{g})$
C. 0.5 mol of $\text{HCl}(\text{g})$ D. 1.5 mol of $\text{HCl}(\text{g})$

54. When 0.1 mol is oxidised the quantity of electricity required to completely to is :

A. 96500 C B. $2 \times 96500 \text{ C}$
C. 9650 C D. 96.50 C

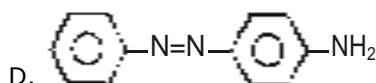
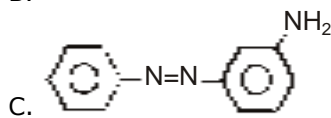
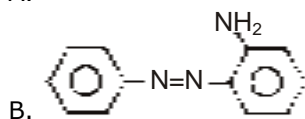
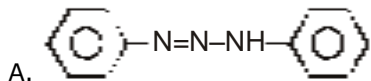
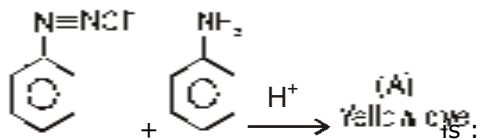
55. Using the Gibbs change, $G^\circ = + 63.3 \text{ kJ}$, for the following reaction, $\text{Ag}_2\text{CO}_3(\text{g}) \rightleftharpoons 2\text{Ag}^+(\text{aq}) +$

(aq) the K_{sp} of $\text{Ag}_2\text{CO}_3(\text{s})$ in water at 25°C is $(R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1})$

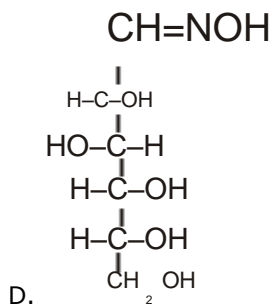
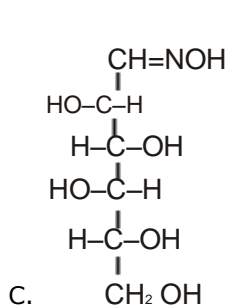
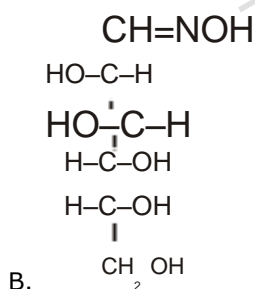
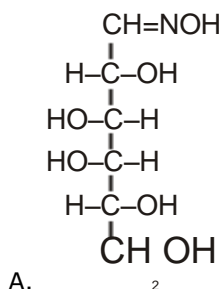
A. 3.2×10^{-20} B. 8.0×10^{-12}
C. 2.9×10^{-3} D. 7.9×10^{-2}

56. The weight of silver (at.wt. = 108) displaced by a quantity of electricity which displaces 5600 mL of O_2 at STP will be :
- A. 5.4 g B. 10.8 g
C. 54.0 g D. 108.0g
57. Which of the following statements is correct for the spontaneous adsorption of a gas ?
- A. ΔS is negative and therefore, ΔH should be highly positive
B. ΔS is negative and therefore, ΔH should be highly negative
C. ΔS is positive and therefore, ΔH should be negative
D. ΔS is positive and therefore, ΔH should also be highly positive
58. For the reversible reaction :
- $$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) + \text{heat}$$
- The equilibrium shifts in forward direction -
- A. by increasing the concentration of $NH_3(g)$
B. by decreasing the pressure
C. by decreasing the concentrations of $N_2(g)$ and $H_2(g)$
D. by increasing pressure and decreasing temperature
59. For the reaction :
- $$X_2O_4(l) \rightarrow 2XO_2(g)$$
- $U = 2.1 \text{ k cal}$, $s = 20 \text{ cal K}^{-1}$ at 300 K
 300 K if $U = 2.1 \text{ k cal}$, $s = 20 \text{ cal K}^{-1}$
Hence ΔG is
- A. 2.7 k cal B. -2.7 k cal
C. 9.3 k cal D. -9.3 k cal
60. For a given exothermic reaction, K_p and K_p' are the equilibrium constants at temperatures T_1 and T_2 respectively. Assuming that heat of reaction is constant in temperatures range between T_1 and T_2 , it is readily observation that:
- A. $K_p > K_p'$ B. $K_p < K_p'$
C. $K_p = K_p'$ D. $K_p = \frac{1}{K_p'}$
61. Which of the following orders of ionic radii is correctly represented?
- A. $H^+ > H^- > H^{2-}$
B. $Na^+ > F^{2-} > O^{2-}$
C. $F^{3-} > O^{2-} > Na^+ > Al^{3+}$
D. $N^- > Mg^{2+} > Al^{3+}$
62. 1.0 g of magnesium is burnt with 0.56 g O_2 in a closed vessel. Which reaction is left in excess and how much? (At. wt. Mg = 24; O = 16)
- A. Mg, 0.16 g B. O_2 , 0.16 g
C. Mg, 0.44 g D. O_2 , 0.28 g
63. The pair of compounds that can exist together is:
- A. $FeCl_3$, $SnCl_2$ B. $HgCl_2$, $SnCl_2$
C. $FeCl_2$, $SnCl_2$ D. $FeCl_3$, KI
64. Be^{2+} is isoelectronic with which of the following ions?
- A. H^+ B. Li^+
C. Na^+ D. Mg^{2+}
65. Which of the following molecules has the maximum dipole moment ?
- A. CO_2 B. CH_4
C. NH_3 D. NF_3
66. Which one of the following species has plane triangular shape ?
- A. N_3 B. NO_3^-
C. NO_2 D. CO_2
67. Acidity of diprotic acids in aqueous solutions increases in the order:
- A. $H_2S < H_2Se < H_2Te$
B. $H_2Se < H_2S < H_2Te$
C. $H_2Te < H_2S < H_2Se$
D. $H_2Se < H_2Te < H_2S$
68. (a) $H_2O_2 + O_3 \rightarrow H_2O + 2O_2$
(b) $H_2O_2 + Ag_2O \rightarrow 2Ag + H_2O + O_2$
Role of hydrogen peroxide in the above reactions is respectively:
- A. oxidizing in (a) and reducing in (b)
B. reducing in (a) and oxidizing in (b)
C. reducing in (a) and (b)
D. oxidizing in (a) and (b)
69. Artificial sweetner which is stable under cold conditions only is:
- A. Saccharine B. Sucralose
C. Aspartame D. Alitame
70. In acidic medium, H_2O_2 changes $Cr_2O_7^{2-}$ to CrO_5 which has two (-O - O-) bonds Oxidation state of Cr in CrO_5 is :
- A. +5 B. +3
C. +6 D. -10
71. The reaction of aqueous $KMnO_4$ with H_2O_2 in acidic conditions gives:
- A. Mn^{4+} and O_2 B. Mn^{2+} and O_2
C. Mn^{2+} and O_3 D. Mn^{4+} and MnO_2
72. Among the following complexes the one which shows Zero crystal field stabilizations energy(CFSE)
- A. $[Ni(H_2O)_6]^{3+}$ B. $[Fe(H_2O)_6]^{3+}$
C. $[Co(H_2O)_6]^{2+}$ D. $[Co(H_2O)_6]^{3+}$
73. Magnetic moment 2.83 BM is given by which of the following ions?
(At. nos. Ti=22, Cr=24, Mn=25, Ni=28)
- A. Ti^{3+} B. Ni^{2+}
C. Cr^{3+} D. Mn^{2+}
74. Which of the following complexes is used to be as an anticancer agent ?
- A. mer- $[Co(NH_3)_3Cl]$
B. Cis - $[Pt Cl_2(NH_3)_2]$
C. cis - $K_2[Pt Cl_2Br_2]$
D. Na_2CoCl_4

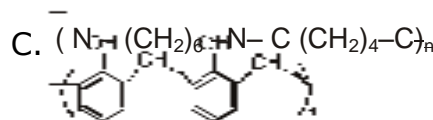
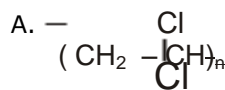
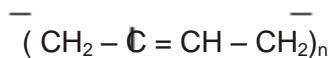
75. Reason of lanthanoid contraction is:
 A. Negligible screening effect of 'f' orbitals
 B. Increasing nuclear charge
 C. Decreasing nuclear charge
 D. Decreasing screening effect
76. In the following reaction, the product (A)



77. Which of the following will be most stable diazonium salt ?
- A. $\text{CH}_3\text{N}_2^+\text{X}^-$
 B. $\text{C}_6\text{H}_5\text{N}_2^+\text{X}^-$
 C. $\text{CH}_3\text{CH}_2\text{N}_2^+\text{X}^-$
 D. $\text{C}_6\text{H}_5\text{CH}_2\text{N}_2^+\text{X}^-$
78. D(+) glucose reacts with hydroxyl amine and yield an oxime. The structure of the oxime would be:



79. Which of the following hormones is produced under the condition of stress which stimulates glycogenolysis in the liver of human being ?
 A. Thyroxin
 B. Insulin
 C. Adrenaline
 D. Estradiol
80. Which one of the following is an example of a thermosetting polymer?



- D. $(\text{C}_6\text{H}_4)_n$
81. Which of the following organic compounds polymerizes to form the polyester Dacron?

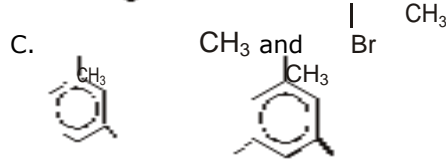
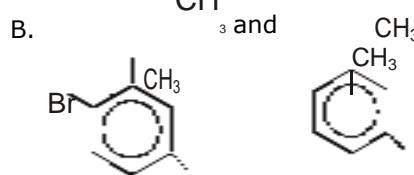
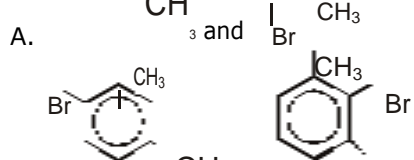
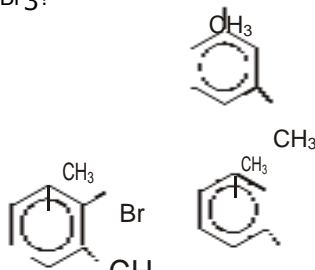
- A. Propylene and para $\text{HO} - (\text{C}_6\text{H}_4) - \text{OH}$
 B. Benzoic acid and ethanol
 C. Terephthalic acid and ethylene glycol
 D. Benzoic acid and para $\text{HO} - (\text{C}_6\text{H}_4) - \text{OH}$
82. Which one of the following is not a common component of Photochemical Smog?
 A. Ozone
 B. Acrolein
 C. Peroxyacetyl nitrate
 D. Chlorofluorocarbons
83. In the Kjeldahl's method for estimation of nitrogen present in soil sample, ammonia evolved from

0.75g of sample neutralized 10ml. of 1M H_2SO_4

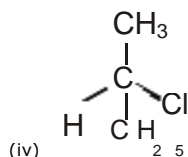
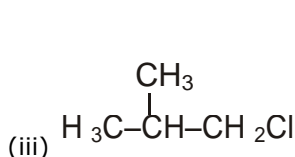
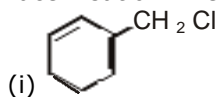
The percentage of nitrogen in the soil is:

- A. 37.33
 B. 45.33
 C. 35.33
 D. 43.33

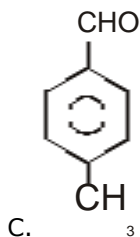
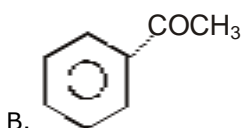
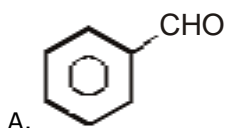
84. What product are formed when the following compound is treated with Br_2 in the presence of FeBr_3 ?



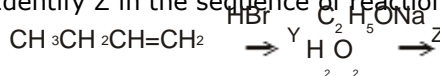
85. Which of the following compounds will undergo racemisation when solution of KOH hydrolysis?



- A. (i) and (ii)
 B. (ii) and (iv)
 C. (iv) only
 D. (i) and (iv)
86. Among the following sets of reaction which one produces anisole?
- A. CH_3CHO ; RMgX
 B. $\text{C}_6\text{H}_5\text{OH}$; NaOH ; CH_3I
 C. $\text{C}_6\text{H}_5\text{OH}$; neutral FeCl_3
 D. $\text{C}_6\text{H}_5 - \text{CH}_3$; CH_3COCl ; AlCl_3
87. Which of the following will not be soluble in sodium hydrogen carbonate ?
- A. 2, 4, 6-trinitrophenol
 B. Benzoic acid
 C. o-Nitrophenol
 D. Benzenesulphonic acid
88. Which one is most reactive towards Nucleophilic addition reaction ?



89. Identify Z in the sequence of reactions:



- A. $\text{CH}_3-(\text{CH}_2)_3-\text{O}-\text{CH}_2\text{CH}_3$
 B. $(\text{CH}_3)_2\text{CH}_2-\text{O}-\text{CH}_2\text{CH}_3$
 C. $\text{CH}_3(\text{CH}_2)_4-\text{O}-\text{CH}_3$
 D. $\text{CH}_3\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O}-\text{CH}_2\text{CH}_3$
90. Which of the following organic compounds has same hybridization as its combustion product - (CO_2) ?
- A. Ethane
 B. Ethyne
 C. Ethene
 D. Ethanol

BIOLOGY

91. Which one of the following shows isogamy with non-flagellated gametes?
- A. Sargassum
 B. Ectocarpus
 C. Ulothrix
 D. Spirogyra

92. Five kingdom system of classification suggested by R.H. Whittaker is not based on:
- A. Presence or absence of a well defined nucleus
 B. Mode of reproduction
 C. Mode of nutrition.
 D. Complexity of body organization
93. Which one of the following fungi contains hallucinogens ?
- A. *Morchella esculenta*
 B. *Amanita muscaria*
 C. *Neurospora sp.*
 D. *Ustilago sp.*
94. Archaeobacteria differ from eubacteria in:
- A. Cell membrane structure
 B. Mode of nutrition
 C. Cell shape
 D. Mode of reproduction
95. Which one of the following is wrong about *Chara*?
- A. Upper oogonium and lower round antheridium
 B. Globule and nucule present on the same plant
 C. Upper antheridium and lower oogonium
 D. Globule is male reproductive structure
96. Which of the following is responsible for peat formation?
- A. *Marchantia*
 B. *Riccia*
 C. *Funaria*
 D. *Sphagnum*
97. Placenta and pericarp are both edible portions in :
- A. Apple
 B. Banana
 C. Tomato
 D. Potato
98. When the margins of sepals or petals overlap one another without any particular direction, the condition is termed as:
- A. Vexillary
 B. Imbricate
 C. Twisted
 D. Valvate
99. You are given a fairly old piece of dicot stem and a dicot root. Which of the following anatomical structures will your use to distinguish between the two?
- A. Secondary xylem
 B. Secondary phloem
 C. Protoxylem
 D. Cortical cells
100. Which one of the following statements is correct?
- A. The seed in grasses is not endospermic.
 B. Mango is a parthenocarpic fruit
 C. A proteinaceous aleurone layer is present in maize grain.
 D. A sterile pistil is called a staminode.
101. Tracheids differ from the tracheary elements in :
- A. Having casparian strips
 B. Being imperforate
 C. Lacking nucleus
 D. Being lignified
102. An example of edible underground stem is:
- A. Carrot
 B. Groundnut
 C. Sweet potato
 D. Potato
103. Which structures perform the function of mitochondria in bacteria ?
- A. Nucleoid
 B. Ribosomes
 C. Cell wall
 D. Mesosomes
104. The solid linear cytoskeletal elements having a diameter of 6 nm and made up of a single type of monomer are known as :
- A. Microtubules
 B. Microfilaments
 C. Intermediate filaments
 D. Lamins

105. The osmotic expansion of a cell kept in water is chiefly regulated by :
- A. Mitochondria B. Vacuoles
C. Plastids D. Ribosomes
106. During which phase(s) of cell cycle, amount of DNA in a cell remains at 4 C level if the initial amount is denoted as 2C ?
- A. G₀ and G₁ B. G₁ and S
C. Only G₂ D. G₂ and M
107. Match the following and select the correct answer : List - I
- A) Centriole
B) Chlorophyll
C) Cristae
D) Ribozymes
- List - II
- (i) Infoldings in mitochondria
(ii) Thylakoids
(iii) Nucleic acids
(iv) Basal body cilia or flagella
- A. A-iv, B-ii, C-I, D-iii B. A-I, B-ii, C-iv, D-iii
C. A-I, B-iii, C-ii, D-iv D. A-iv, B-iii, C-I, D-ii
108. Dr F. Went noted that if coleoptile tips were removed and placed on agar for one hour, the agar would produce a bending when placed on one side of freshly - cut coleoptile stumps. Of what significance is this experiment?
- A. It made possible the isolation and exact identification of auxin.
B. It is the basis for quantitative determination of small amounts of growth- promoting substances.
C. It supports the hypothesis that IAA is auxin.
D. It demonstrated polar movements of auxins
109. Deficiency symptoms of nitrogen and potassium are visible first in :
- A. Senescent leaves B. Young leaves
C. Roots D. Buds
110. In which one of the following processes CO₂ is not released ?
- A. Aerobic respiration in plants
B. Aerobic respiration in animals
C. Alcoholic fermentation
D. Lactate fermentation
111. Anoxygenic photosynthesis is characteristic of:
- A. *Rhodospirillum* B. *Spirogyra*
C. *Chlamydomonas* D. *Ulva*
112. A few normal seedling of tomato were kept in a dark room. After few days they were found to have become white- coloured like albions, Which of the following terms will you use to describe them ?
- A. Mutated B. Embolised
C. Etiolated D. Defoliated
113. Which one of the following growth regulators is known as stress hormone ?
- A. Abscissic acid B. Ethylene
C. GA₃ D. Indole acetic acid
114. Geitonogamy involves
- A. Fertilization of a flower by the pollen from another flower of the same plant
B. Fertilization of a flower by the pollen from another same flower.
C. Fertilization of a flower by the pollen from a flower of another plant in the same population
D. Fertilization of a flower by the pollen from a flower of another plant belonging to a distant population
115. Male gametophyte with least number of cells is present in :
- A. Pteris B. Funaria
C. Liliium D. Pinus
116. An aggregate fruit is one which developed from
- A. Multicarpellary syncarpous gynoecium
B. Multicarpellary apocarpous gynoecium
C. Complete inflorescence
D. Multicarpellary superior ovary
117. Pollen tablets are available in the market for:
- A. In vitro fertilization
B. Breeding programmes
C. Supplementing food
D. Ex situ conservation
118. Function of filiform apparatus is to :
- A. Recognize the suitable pollen at stigma
B. Stimulate division of generative cell
C. Producer nector
D. Guide the entry of pollen tube
119. Non- albuminous seed is produced in:
- A. Maize B. Castor
C. Wheat D. Pea
120. Which of the following shows coiled RNA strand and capsomeres?
- A. Polio virus B. Tobacco mosaic virus
C. Measles virus D. Retro virus
121. Which one of the following is wrongly matched?
- A. Transcription - Writing information from DNA to t- RNA
B. Translation - Using information in m - RNA to make protein
C. Repressor protein- Binds to a operator to stop enzyme synthesis
D. Operon - Structural genes, operator and promoter.
122. Transformation was discovered by :
- A. Meseson and Stahl
B. Hershey and chase
C. Griffith
D. Waston and crick
123. Fruit colour in squash is an example of :
- A. Recessive epistasis
B. Dominant epistasis
C. Complementary genes
D. Inhibitory genes
124. Viruses have :
- A. DNA enclosed in a protein coat
B. Prokaryotic nucleus
C. Single Chromosome
D. Both DNA and RNA
125. The first human hormone produced by recombinant DNA technology is :
- A. Insulin B. Estrogen
C. Thyroxin D. Progesterone
126. An analysis of chromosomal DNA using the Southern hybridization technique does not use:
- A. Electrophoresis B. Blotting
C. Autoradiography D. PCR

127. In vitro clonal propagation in plants in characterized by :
- PCR and RAPD
 - Northern blotting
 - Electrophoresis and HPLC
 - Microscopy
128. An alga which can be employed as food for human beings :
- Ulothrix
 - Chlorella
 - Spirogyra
 - Polysiphonia
129. Which vector can clone only a small fragment of DNA?
- Bacterial artificial chromosome
 - Yeast artificial chromosome
 - Plasmid
 - Cosmid
130. An example of ex situ conservation is :
- National Park
 - Seed Bank
 - Wildlife sanctuary
 - Sacred Grove
131. A location with luxuriant growth of lichens on the trees indicates that the :
- Trees are very healthy
 - Trees are heavily infested
 - Location is highly polluted
 - Location is not polluted
132. Match the following and select the correct option : List - I
- Earthworm
 - Succession
 - Ecosystem service
 - Population growth
- List - II
- Pioneer species
 - Detrivore (iii)
- Natality
- Pollination
- a-(i) b-(ii) c-(iii) d-(iv)
 - a-(iv) b- (i) c- (iii) d- (ii)
 - a-(iii) b- (ii) c- (iv) d- (i)
 - a-(ii) b- (i) c- (iv) d- (iii)
133. A species facing extremely high risk of extinction in the immediate future is called :
- Vulnerable
 - Endemic
 - Critically Endangered
 - Extinct
134. The zone of atmosphere in which the ozone layer is
- Ionosphere
 - Mesosphere
 - Stratosphere
 - Troposphere
135. The organization which published the Red List of species is :
- ICFRE
 - IUCN
 - UNEP
 - WWF
136. Select the Taxon mentioned that represents both marine and fresh wter species :
- Echionoderms
 - Ctenophroa
 - Cephalocoradata
 - Cnidaria
137. Which one of the following living organisms completely lacks a cell wall?
- Cyanobacteria
 - Sea- fan (*Gorgonia*)
 - Saccharomyces
 - Blue- green algae
138. *Planaria* possess high capacity of :
- metamorphosis
 - regeneration
 - alternation of generation
 - bioluminescence
139. A marine cartilaginous fish that can produce electric current is:
- Pristis
 - Torpedo
 - Trygon
 - Scoliodon
140. Choose the correctly matched pair:
- Tendon-Specialized connective tissue
 - Adipose tissue-Dense connective tissue
 - Areolar tissue- Loose connective tissue
 - Cartilage-Loose connective tissue
141. Choose the correctly matched pair:
- Inner lining of salivary ducts - Ciliated epithelium
 - Moist surface of buccal cavity - Glandular epithelium
 - Tubular parts of nephrons - Cuboidal epithelium
 - Inner surface of bronchioles - Squamous epithelium
142. In 'S' phase of the cell cycle:
- amount of DNA doubles in each cell.
 - amount of DNA remains same in each cell.
 - chromosome number is increased
 - amount of DNA is reduced to half in each cell.
143. The motile bacteria are able to move by:
- fimbriae
 - flagella
 - cilia
 - pili
144. Select the option which is not correct with respect to enzyme action:
- Substrate binds with enzyme at its active site.
 - Addition of lot of succinate does not reverse the inhibition of succinic dehydrogenase by malonate
 - A non- competitive inhibitor binds the enzyme at a site distinct from that which binds the substrate
 - Malonate is a competitive inhibitor of succinic dehydrogenase
145. Which one of the following is a non-reducing carbohydrate?
- Maltose
 - Sucrose
 - Lactose
 - Ribose 5-phosphate
146. The enzyme recombinase is required at which stage of meiosis:
- Pachytene
 - Zygotene
 - Diplotene
 - Diakinesis
147. The initial step in the digestion of milk in human is carried out by ?
- Lipase
 - Trypsin
 - Rennin
 - Pepsin
148. Fructose is absorbed into the blood through mucosa cells of intestine by the process called
- active transport
 - facilitated transport
 - simple diffusion
 - co-transport mechanism
149. Approximately seventy percent of carbon-dioxide absorbed by the blood will be transported to the lungs:
- as bicarbonate ions
 - in the form of dissolved gas molecules
 - by binding to R.B.C.
 - as carbamino-haemoglobin

