

JIPMER Question Paper 2016

Duration : 2 : 30 Hrs

Exam JIPMER		Total Questions 200			
Marks for Correct Answer 4	Negative Marks 1	Physics 60	Chemistry 60	Biology 60	English 20

Physics

1. A fish rising vertically to the surface of water in a lake uniformly at the rate of 2 m/s. observes a kingfisher diving vertically towards the water at a rate of 10 m/s. If refractive index of water $n=4/3$, what will be the actual velocity of the kingfisher

- (a) 10 m/s
- (b) 8 m/s
- (c) 6 m/s
- (d) 9 m/s

Correct: c

2. The distance x (in μm) covered by a molecule starting from point A at time $t = 0$ and stopping at another point B in given by the equation

$$x = t^2 \left(2 - \frac{t}{3} \right)$$

The distance between A and B (in μm) is closed to

- (a) 10.7
- (b) 20.7
- (c) 40.7
- (d) 50.7

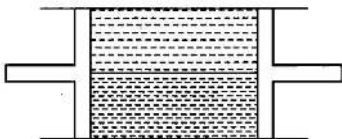
Correct: a

3. A cylinder of radius R and length L is placed in a uniform electric field E parallel to the cylinder axis. The total flux for the surface of the cylinder is given by

- (a) $2\pi R^2 E$
- (b) $\frac{\pi R^2}{E}$
- (c) $\frac{R}{E}$
- (d) zero

Correct: d

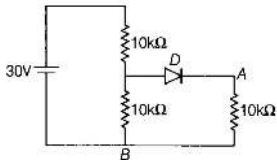
4. A cylindrical tube of uniform cross-sectional area A is fitted with two air tight frictionless pistons. The pistons are connected to each other by a metallic wire. Initially, the pressure of the gas is p , and temperature is t_0 , atmospheric pressure is also p_0 . Now, the temperature of the gas is increased to $2T_0$, the tension of wire will be



- (a) $2p_0 A$
- (b) $p_0 A$
- (c) $\frac{p_0 A}{2}$
- (d) $4p_0 A$

Correct: b

5. In the given figure, potential difference between A and B is 30V



- (a) 0
 (b) 5 V
 (c) 10 V
 (d) 15 V

Correct: c

6. A block slides down on an incline of angle 30° with an acceleration. Find the kinetic friction coefficient.

- (a) $\frac{1}{2\sqrt{2}}$
 (b) 0.6
 (c) $\frac{1}{2\sqrt{3}}$
 (d) $\frac{1}{\sqrt{2}}$

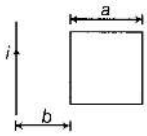
Correct: c

7. A long straight wire is carrying current I in $+z$ direction. The $x - y$ plane contains a closed circular loop carrying current I_2 and not encircling the straight wire. The force on the loop will be

- (a) $\mu_0 I I_2 / 2\pi$
 (b) $\mu_0 I_1 I_2 / 4\pi$
 (c) Zero
 (d) Depends on the distance of the loop from the wire

Correct: d

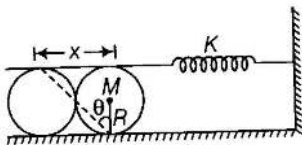
8. In the given figure what will be the coefficient of mutual inductance



- (a) $\frac{\mu_0 a}{2\pi} \ln\left(1 + \frac{a}{2b}\right)$
 (b) $\frac{\mu_0 a}{\pi} \ln\left(1 + \frac{b}{2a}\right)$
 (c) $\frac{\mu_0 a}{2\pi} \ln\left(1 + \frac{a}{b}\right)$
 (d) $\frac{\mu_0 a}{2\pi} \ln\left(1 + \frac{b}{a}\right)$

Correct: c

9. A solid cylinder is attached to a horizontal massless spring as shown in figure. If the cylinder rolls without slipping, the time period of oscillation of the cylinder is



- (a) $2\pi\sqrt{\frac{x}{g}}$
 (b) $2\pi\sqrt{\frac{2M}{3K}}$
 (c) $2\pi\sqrt{\frac{3M}{8K}}$
 (d) $2\pi\sqrt{\frac{3M}{2K}}$

Correct: c

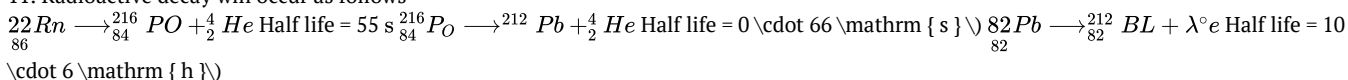
10. Three equal charges, each having a magnitude of $2.0 \times 10^{-6} \text{ C}$ are placed at the three corners of a right angled triangle of sides 3 cm, 4 cm and 5 cm. The force (in magnitude) on the charge at the right angled corner is

- (a) 50 N
 (b) 26 N

- (c) 29N
(d) 45.9N

Correct: d

11. Radioactive decay will occur as follows



If a certain mass of radon (Rn=220) is allowed to decay in a certain container; then after 5 minutes the element with the greater mass will be

- (a) radon
(b) polonium
(c) lead
(d) bismuth

Correct: c

12. The intensity of each of the two slits in Young's double slit experiment is I_0 . Calculate the minimum separation between the points on the screen, where intensities are $2I_0$, and I_0 . If fringe width is b

- (a) $b/5$
(b) $b/8$
(c) $b/12$
(d) $b/4$

Correct: c

13. The x and y coordinates of a particle moving in a plane are given by $x(t) = a \cos(pt)$ and $y(t) = b \sin(pt)$ where $a, b (< a)$ and p are positive constants of appropriate dimensions and t is time. Then, which of the following is not true?

- (a) The path of the particle is an ellipse.
(b) Velocity and acceleration of the particle are perpendicular to each other $t = \frac{\pi}{2p}$
(c) Acceleration of the particle is always directed towards a fixed point.
(d) Distance travelled by the particle in time interval between $t=0$ and $t = \frac{\pi}{2p}$ is a

Correct: d

14. Two wires are stretched through same distance. The force constant of second wire is half as that of the first wire. The ratio of work done to stretch first wire and second wire will be

- (a) 2:1
(b) 1:2
(c) 3:1
(d) 1:3

Correct: a

15. The rms speed (in m/s) of oxygen molecules of the gas at temperature 300 K, is

- (a) 483
(b) 504
(c) 377
(d) 346

Correct: a

16. A lead bullet penetrates into a solid object and melts. Assuming that 50% of its kinetic energy was used to heat it, the initial speed of the bullet is (the initial temperature of the bullet is 25°C and its melting point is 300°C). Latent heat of fusion of lead = $2.5 \times 10^4 \text{ J/kg}$ and specific heat capacity of lead = $125 \text{ J/kg} \cdot \text{K}$

- (a) 100m/s
(b) = 490m/s
(c) 520m/s
(d) 360m/s

Correct: b

17. The planets with radii R_1 and R_2 have densities ρ_1, ρ_2 respectively. Their atmospheric pressures are p_1 and p_2 respectively. Therefore, the ratio of masses of their atmospheres, neglecting variation of g within the limits of atmosphere is

- (a) $\rho_1 R_2 p_1 / \rho_2 R_1 p_2$
(b) $p_1 R_2 \rho_2 / p_2 R_1 \rho_1$
(c) $p_1 R_1 \rho_1 / p_2 R_2 \rho_2$

(d) $p_1 R_1 \rho_2 / p_2 R_2 \rho_1$

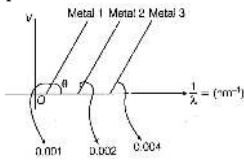
Correct: d

18. A thin symmetrical double convex lens of refractive index $\mu_2 = 1.5$ is placed between a medium of refractive index $\mu_1 = 1.4$ to the left and another medium of refractive index $(\mu_3) = 1.6$ to the right. Then, the system behaves as

- (a) a convex lens
- (b) a concave lens
- (c) a glass plate
- (d) a convexo concave lens

Correct: c

19. The graph $\frac{1}{\lambda}$ and stopping potential (V) of three metals having work function $\phi_1, \phi_2,$ and ϕ_3 , in an experiment of photoelectric effect is plotted as shown in the figure. Which one of the following statement is/are correct? [Here λ is the wavelength of the incident ray]



- (i) Ratio of work functions on $\phi_1 : \phi_2 : \phi_3 = 1 : 2 : 4$
 - (ii) Ratio of work functions on $\phi_1 : \phi_2 : \phi_3 = 4 : 2 : 1$
 - (iii) $\tan \theta \propto \frac{hc}{e}$, where h = Planck's constant, c = speed of light
 - (iv) The violet colour-light can eject photoelectrons from metals 2 and 3
- (a) (i), (iii)
 - (b) (i), (iv)
 - (c) (ii), (iii)
 - (d) (i), (ii) and (iv)

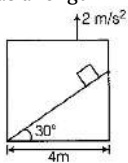
Correct: a

20. The wavelength λ of a photon and the de-Broglie wavelength of an electron have the same value. Find the ratio of energy of photon to the kinetic energy of electron in terms of mass m , speed of light c and planck constant.

- (a) $\frac{\lambda mc}{h}$
- (b) $\frac{hmc}{\lambda}$
- (c) $\frac{2hmc}{\lambda}$
- (d) $\frac{2\lambda mc}{h}$

Correct: d

21. A particle slides down on a smooth incline of inclination 30° , fixed in an elevator going up with an acceleration $2m/s^2$. The box of incline has a length $4m$. The time taken by the particle to reach the bottom will be



- (a) $\frac{8}{9} \sqrt{3} s$
- (b) $\frac{9}{8} \sqrt{3} s$
- (c) $\frac{4}{3} \sqrt{\frac{\sqrt{3}}{2}} s$
- (d) $\frac{3}{4} \sqrt{\frac{\sqrt{3}}{2}} s$

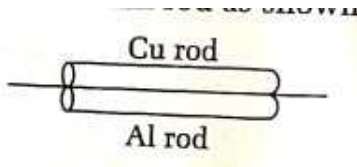
Correct: c

22. The upper half of an inclined plane of inclination is perfectly smooth while the lower half rough. A block starting from rest at the top of the plane will again come to rest at the bottom if the coefficient of friction between the block and the lower half of the plane is given by

- (a) $\mu = 2 \tan \theta$
- (b) $\mu = \tan \theta$
- (c) $\mu = 2 / (\tan \theta)$
- (d) $\mu = 1 / \tan \theta$

Correct: a

23. A copper rod of length 20 cm and cross-sectional area 2 mm is joined with a similar aluminium rod as shown below



The resistance of pair of rods is ($\rho_{Al} = 2.6 \times 10^{-8} \Omega\text{-m}$ and $\rho_{Cu} = 1.7 \times 10^{-8} \Omega\text{-m}$)

- (a) $1.0\text{m}\Omega$
- (b) $2.0\text{m}\Omega$
- (c) $3.0\text{m}\Omega$
- (d) None of these

Correct: a

24. A cylinder rolls up an inclined plane, reaches some height and then rolls down (without slipping throughout these motions). The directions of the frictional force acting on the cylinder are

- (a) up the incline while ascending and down the incline while descending.
- (b) up the incline while ascending as well as descending.
- (c) down the incline while ascending and up the incline while descending.
- (d) down the incline while ascending as well as descending.

Correct: b

25. A liquid is allowed into a tube of truncated cone shape. Identify the correct statement from the following.

- (a) The speed is high at the wider end and low at the narrow end.
- (b) The speed is low at the wider end and high at the narrow end.
- (c) The speed is same at both ends in a streamline flow.
- (d) The liquid flows with uniform velocity in the tube.

Correct: b

26. A system consist of a cylinder surrounded by a cylindrical shell. A cylinder is a radius R and is made of material of thermal conductivity K, whereas a cylindrical shell has inner radius R and outer radius 2R and is made of material of thermal conductivity twice as that of cylinder. Assuming the system in steady state and negligible heat loss across the cylindrical surface, find the effective thermal conductivity of the system, if the two ends of the combined system are maintained at two different temperatures.

- (a) $3K$
- (b) $2/3 K$
- (c) $7K/4$
- (d) $5K/4$

Correct: c

27. The displacement of a particle along the x-axis is given by $x = a \sin^2 \omega t$

The motion of the particle corresponds to

- (a) simple harmonic motion of frequency ω/π
- (b) simple harmonic motion of frequency $3\omega/2\pi$
- (c) non simple harmonic motion
- (d) simple harmonic motion of frequency $\omega/2\pi$

Correct: c

28. Find the increase in pressure required to decrease the volume of water sample by 0.01%. Bulk modulus of water = $2.1 \times 10^9 \text{Nm}^{-2}$

- (a) $4.3 \times 10^4 \text{N/m}^2$
- (b) $1.8 \times 10^7 \text{N/m}^2$
- (c) $2.1 \times 10^5 \text{N/m}^2$
- (d) $3.7 \times 10^4 \text{N/m}^2$

Correct: c

29. Two identical glass spheres filled with air are connected by a horizontal glass tube. The glass tube contains a pellet of mercury at its mid-point. Air in one sphere is at 0°C and the other is at 20°C . If both the vessels are heated through 10°C , then neglecting the expansions of the bulbs and the tube

- (a) the mercury pellet gets displaced towards the sphere at lower temperature.
- (b) the mercury pellet gets displaced towards the sphere at higher temperature.
- (c) the mercury pellet does not get displaced at all.
- (d) the temperature rise causes the pellet to expand without any displacement.

Correct: c

30. A nucleus ${}^A_Z X$ has mass represented by $m(A, Z)$, If m_p and m_n denote the mass of proton and neutron respectively and BE the binding energy (in MeV) then,

- (a) $BE = [m(A, Z) - Zm_p - (A - Z)m_n] c^2$
- (b) $BE = [Zm_p + (A - Z)m_n - m(A, Z)] c^2$
- (c) $BE = [Zm_p + Am_n - m(A, Z)] c^2$
- (d) $BE = m(A, Z) - Zm_p - (A - Z)m_n$

Correct: b

31. A body at rest slides down a 30° inclined plane. The time taken by it to slide down is twice the time it takes when it slides down the same distance in the absence of friction. The coefficient of friction between the body and the inclined plane is

- (a) 0.43
- (b) 0.37
- (c) 0.64
- (d) 0.75

Correct: a

32. A piece of blue glass heated to a high temperature and a piece of red glass at room temperature are taken inside a dimly-lit room. Then,

- (a) the blue piece will look blue and the red piece will look red as usual.
- (b) the red piece will look brighter red and the blue piece will look ordinary blue.
- (c) the blue will look brighter as compared to the red piece.
- (d) both the pieces will look equal red.

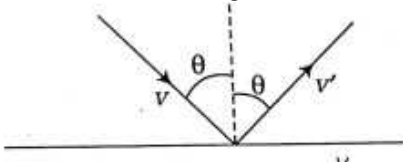
Correct: c

33. A certain charge Q is divided into two parts q and $Q - q$. How the charge Q and q must be related so that when q and $(Q - q)$ is placed at a certain distance apart experience maximum electrostatic repulsion?

- (a) $Q = 2q$
- (b) $Q = 3q$
- (c) $Q = 4q$
- (d) $Q = 4q + c$

Correct: a

34. A ball of mass m hits the floor with a speed v making an angle of incidence θ with the normal. The coefficient of restitution is e . The speed of reflected ball and the angle of reflection of the ball will be



- (a) $V' = V, \theta = \theta'$
- (b) $v' = \frac{v}{2}, \theta = 2\theta'$
- (c) $v' = 2v, \theta = 2\theta'$
- (d) $v' = \frac{3v}{2}, \theta = \frac{2\theta'}{3}$

Correct: a

35. The charges on two spheres are $+7\mu C$ and $-5\mu C$ respectively. They experience a force F . If each of them is given an additional charge of $-2\mu C$ then the new force of attraction will be

- (a) F
- (b) $\frac{F}{2}$
- (c) $\frac{F}{\sqrt{3}}$
- (d) $2F$

Correct: a

36. A beam of light composed of red and green rays is incident obliquely at a point on the face of a rectangular glass slab. When coming out on the opposite parallel face, the red and green rays emerge from

- (a) two points propagating in two different non-parallel directions.
- (b) two points propagating in two different parallel directions.
- (c) one point propagating in two different directions.
- (d) one point propagating in the same direction.

Correct: b

37. A body is moving along a rough horizontal surface with an initial velocity of 10ms^{-1} . If the body comes to rest after travelling a distance of 12m, then the coefficient of sliding friction will be

- (a) 0.5
- (b) 0.2
- (c) 0.4
- (d) 0.6

Correct: c

38. The maximum numbers of possible interference maxima for slit separation equal to twice the wavelength in Young's double slit experiment is

- (a) infinite
- (b) five
- (c) three
- (d) zero

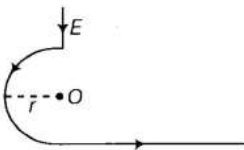
Correct: b

39. A circular current carrying coil has a radius R. The distance from the centre of the coil, on the axis, where B will be 1/8 of its value at the centre of the coil is

- (a) $\frac{R}{\sqrt{3}}$
- (b) $\sqrt{3}R$
- (c) $2\sqrt{3}R$
- (d) $\frac{2R}{\sqrt{3}}$

Correct: b

40. In the given figure, what is the magnetic field induction at point O.



- (a) $\frac{\mu_0 I}{4\pi r}$
- (b) $\frac{\mu_0 I}{4r} + \frac{\mu_0 I}{2\pi r}$
- (c) $\frac{\mu_0 I}{4r} + \frac{\mu_0 I}{4\pi r}$
- (d) $\frac{\mu_0 I}{4r} - \frac{\mu_0 I}{4\pi r}$

Correct: c

41. The electron of an H-atom is revolving around the nucleus in circular orbit having radius $\frac{h^2}{4\pi m e^2}$ with $\left(\frac{2\pi e^2}{h}\right)$. The current produced due to the motion of electron is

- (a) $\frac{2\pi m^2 e^2}{3h^2}$
- (b) zero
- (c) $\frac{2\pi^2 m^2}{h^2}$
- (d) $\frac{4\pi^2 m e^5}{h^3}$

Correct: d

42. An energy of 68.0 eV is required to excite a hydrogen-like atom in its second Bohr energy level to third energy level the charge of nucleus is Ze. The wavelength of a radiation required to eject the electron from first orbit to infinity is

- (a) 2.2 nm
- (b) 2.85 nm
- (c) 3.2 nm
- (d) 2.5 nm

Correct: d

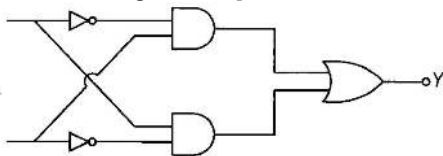
43. A source emits electromagnetic waves of wavelength 3m . One beam reaches the observer directly and other after reflection from a water surface, travelling 1.5m extra distance and with intensity reduced to 1/4 as compared to intensity due to the direct beam alone. The resultant intensity will be

- (a) (1/4) fold
- (b) (3/4) fold

- (c) (5/4) fold
- (d) (9/4) fold

Correct: d

44. The following circuit represents



- (a) OR gate
- (b) XOR gate
- (c) AND gate
- (d) NAND gate

Correct: b

45. A ${}^7\text{Li}$ target is bombarded with a proton beam current of 10^{-4} A for one hour to produce ${}^7\text{Be}$ of activity 1.8×10^8 disintegrations per second. Assuming that one ${}^7\text{Be}$ radioactive nuclei is produced by bombarding 1000 protons, its half-life is

- (a) 0.87×10^7 s
- (b) 0.2×10^7 s
- (c) 0.67×10^8 s
- (d) 0.87×10^6 s

Correct: c

46. A positively charged ball hangs from a silk thread. We put a positive test charge q_0 , at a point and measure F/q_0 then it can be predicted that the electric field strength E

F/q_0

- (a) $> F/q_0$
- (b) $= F/q$
- (c) $< F/q_0$
- (d) cannot be estimated

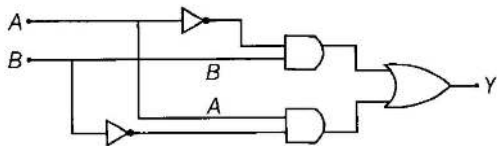
Correct: a

47. Capacitor C_1 , of capacitance $1\mu\text{F}$ and capacitor C_2 , of capacitance $2\mu\text{F}$ are separately charged fully by a common battery. The two capacitors are then separately allowed to discharged through equal resistors at time $t = 0$

- (a) the current in each of the two discharging circuits is zero at $t = 0$
- (b) the currents in the two discharging circuits at $t = 0$ are equal but non-zero
- (c) the currents in the two discharging circuits at $t = 0$
- (d) Capacitor C_1 , loses 40% of its initial charge sooner than C_2 , loses 40% of initial charge.

Correct: b

48. The truth table for the following logic circuit



- (a)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0
- (b)

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	1

- (c) $\begin{vmatrix} A & B & Y \\ 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{vmatrix}$
- (d) $\begin{vmatrix} A & B & Y \\ 0 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 1 & 1 & 1 \end{vmatrix}$

Correct: a

49. To reduce the range of voltmeter, its resistance need to be reduced. A voltmeter has resistance R , and range V . Which of the following resistances when connected in parallel will convert it into a voltmeter of range V/n ?

- (a) nR_0
 (b) $(n + 1)R_0$
 (c) $(n - 1)R$
 (d) None of these

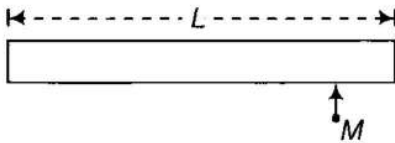
Correct: d

50. A galvanometer of resistance 25Ω shows a deflection of 5 divisions when a current of 2 mA is passed through it. If a shunt of 4Ω is connected and there are 20 divisions on the scale, then the range of the galvanometer is

- (a) 1A
 (b) 58A
 (c) 58mA
 (d) 30mA

Correct: c

51. A stick of length L and mass M lies on a frictionless horizontal surface on which it is free to move in any way. A ball of mass m moving with speed V collides elastically with the stick as shown in fig below. If after the collision, the ball comes to rest, then what should be the mass of the ball?



- (a) $m = 2M$
 (b) $m = M$
 (c) $m = M/2$
 (d) $m = M/4$

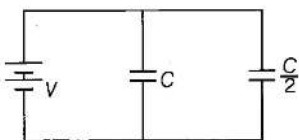
Correct: d

52. The length of a given cylindrical wire is increased by 150%. Due to the consequent decrease in diameter the change in the resistance of the wire will be

- (a) 200%
 (b) 525%
 (c) 300%
 (d) 400%

Correct: b

53. Two condensers, one of capacity C and the other of capacity, are connected to a V -volt battery, as shown.



The work done in charging fully both the condensers is

- (a) CV^2
 (b) $\frac{1}{4}CV^2$
 (c) $\frac{3}{4}CV^2$
 (d) $\frac{1}{2}CV^2$

Correct: c

54. A capacitor is charged and then made to discharge through a resistance. The time constant is τ . In what time will the potential difference across the capacitor decrease by 10%?

- (a) $\tau \ln 0.1$
- (b) $\tau \ln 0.9$
- (c) $\tau \ln \frac{10}{9}$
- (d) $\tau \ln \frac{11}{10}$

Correct: c

55. A slab consists of portions of different materials of same thickness and having the conductivities K_1 and K_2 . The equivalent thermal conductivity of the slab is

- (a) $K_1 + K_2$
- (b) $\sqrt{K_1 + K_2}$
- (c) $\frac{2K_1K_2}{K_1+K_2}$
- (d) $\sqrt{\frac{K_1K_2}{K_1+K_2}}$

Correct: c

56. A solid sphere of mass M and radius $2R$ rolls down an inclined plane of height h without slipping. The speed of its centre of mass when it reaches the bottom is

- (a) $\sqrt{\frac{6}{7}gh}$
- (b) $\sqrt{3gh}$
- (c) $\sqrt{\frac{10}{7}gh}$
- (d) $\sqrt{\frac{4}{3}gh}$

Correct: c

57. An iceberg of density 900kgm^{-3} is floating in water of density 1000kgm^{-3} . The percentage of volume of iceberg outside the water is

- (a) 20%
- (b) 35%
- (c) 10%
- (d) 11%

Correct: c

58. The potential of an atom is given by $V = V_0 \log_e(r/r_0)$ where r_0 is a constant and r is the radius of the orbit. Assuming Bohr's model to be applicable, which variation of r with n is possible (n being principal quantum number)?

- (a) $r_n \propto n$
- (b) $r_n \propto 1/n$
- (c) $r_n \propto n^2$
- (d) $r_n \propto 1/n^2$

Correct: a

59. The volume of an ideal gas is doubled in an isothermal process. Then, which of the following is true?

- (a) Work done by the gas is positive
- (b) Work done by the gas is negative
- (c) Internal energy of the system decreases
- (d) Internal energy of the system increases

Correct: a

60. A prism of a certain angle deviates the red and blue rays by 8 and 12, respectively. Another prism of the same angle deviates the red and blue rays by 10 and 14, respectively. The prisms are small angled and made of different materials. The dispersive power of the materials of the prisms are in the ratio

- (a) 5:6
- (b) 9:11
- (c) 6:5
- (d) 11:9

Correct: c

Chemistry

61. Given that the reduced temperature, $\theta = \frac{T}{T_c}$

the reduced pressure, $\pi = \frac{P}{P_c}$

the reduced volume, $\phi = \frac{V}{V_c}$

Thus, it can be said that the reduced equation of state may be given as

(a) $\left(\frac{\pi}{3} + \frac{1}{\phi}\right) (3\phi - 1) = \frac{8}{3}\theta$

(b) $\left(\frac{\pi}{4} + \frac{1}{\phi}\right) (3\theta - 1) = \frac{3}{8}\phi$

(c) $\left(\frac{\pi}{3} + \frac{1}{\phi}\right) (\phi - 1) = \frac{3}{8}\theta$

(d) $\left(\frac{\pi}{3} + \frac{1}{\phi^2}\right) (3\phi - 1) = \frac{8}{3}\theta$

Correct: d

62. What will be the number of waves formed by a Bohr electron in one complete revolution in its second orbit?

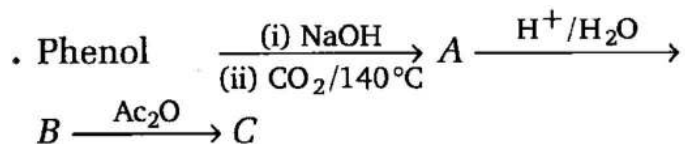
(a) Three

(b) Two

(c) One

(d) Zero

Correct: b



63.

In the above reaction, end product 'C' is

(a) salicylaldehyde

(b) salicylic acid

(c) phenyl acetate

(d) aspirin

Correct: d

64. The normality of 10% (w/v) of acetic acid is

(a) 1 N

(b) 1.3 N

(c) 1.7 N

(d) 1.9 N

Correct: c

65. Solid NaHCO_3 , will be neutralised by 40.0 mL of 0.1M H_2SO_4 solution. What would be the weight of solid NaHCO_3 in gram?

(a) 0.672 g

(b) 6.07 g

(c) 17 g

(d) 20 g

Correct: a

66. Iso-propyl chloride + Δ $\xrightarrow{\text{s}}$ 2-ethoxy propane + NaCl. The compound (A) is

(a) C_2H_6

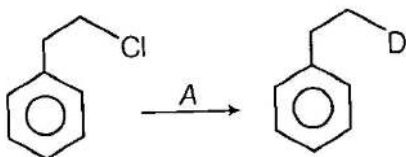
(b) CH_3OH

(c) CH_3NH_2

(d) CH_3ONa

Correct: b

67. In the following conversion,



Identify 'A' from the following option

- (a) NaBD_4
- (b) LiAD_4
- (c) $\text{Mg, ether / D}_2\text{O}$
- (d) $\text{BH}_3, \text{D}_2\text{O}$

Correct: c

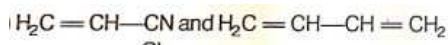
68. 1-butyne on oxidation with hot alkaline KMnO_4 would yield. Which of the following as end product?

- (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$
- (b) $\text{CH}_3\text{CH}_2\text{COOH}$
- (c) $\text{CH}_3\text{CH}_2\text{COOH} + \text{CO}_2 + \text{H}_2\text{O}$
- (d) $\text{CH}_3\text{CH}_2\text{COOH} + \text{HCOOH}$

Correct: c

69. Buna-N, a synthetic rubber is copolymer of

- (a) $\text{H}_2\text{C}=\text{CH}-\text{CH}=\text{CH}_2$ and $\text{H}_3\text{C}_6-\text{CH}=\text{CH}_2$
- (b)



- (c) $\text{H}_2\text{C}=\text{CH}-\overset{\text{Cl}}{\text{C}}=\text{CH}_2$ and $\text{H}_2\text{C}=\text{CH}-\text{CH}=\text{CH}_2$

- (d) $\text{H}_2\text{C}=\text{CN}-\text{CN}$ and $\text{H}_2\text{C}=\text{CH}-\overset{\text{Cl}}{\text{C}}=\text{CH}_2$

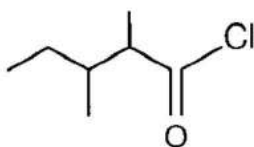
Correct: b

70. Which of the following is the major product in the reaction of HOBr with propene?

- (a) 2-bromo, 1-propanol
- (b) 3-bromo, 1-propanol
- (c) 2-bromo, 2-propanol
- (d) 1-bromo, 2-propanol

Correct: d

71. Which of the following is the correct IUPAC name?



- (a) 3, 4-dimethyl pentanoyl chloride
- (b) 1-chloro-1-oxo-2, 3- dimethyl pentane
- (c) 2-ethyl-3-methyl butanoyl chloride
- (d) 2, 3-dimethyl pentanoyl chloride

Correct: d

72. Consider the following solutions,

A = 0.1 M glucose,

B = 0.05 M NaCl

C = 0.05 M BaCl₂,

D = 0.1 M AlCl₃

Which of the following pairs is isotonic?

(a) A and B

(b) A and D

(c) A and C

(d) B and C

Correct: a

73. Which of the following compound is not coloured?

(a) Cu_2C

(b) $\text{Na}_2\text{Cd} \cdot \text{Cl}_4$

(c) FeSO_4

(d) Vl_3

Correct: b

74. $[\text{CuCl}_4]^{2-}$ exists while $[\text{CuI}_4]^{2-}$ does not exist, because

(a) I^- is stronger reductant than Cl^-

(b) I^- is weaker reductant than Cl^-

(c) I^- is stronger oxidant than Cl^-

(d) None of the above

Correct: a

75. When CO_2 is bubbled through a solution of barium peroxide in water then

(a) carbonic acid is formed

(b) O_2 is released

(c) H_2O_2 is formed

(d) no reaction occurs

Correct: c

76. Which of the following is correctly arranged in order of increasing weight?

(a) 0.0105 equivalent of $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ < 0.625g of Fe < 0.006g atom of Ag < 60×10^{21} atoms of Zn

(b) 0.625 g of Fe < 0.0105 equivalent of $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ < 6.0×10^{21} atoms of Zn < 0.006g atom of Ag

(c) 0.625 g of Fe < 6.0×10^{21} atoms of Zn < 0.006 g atom of Ag < 0.0105 equivalent of $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$

(d) 0.0105 equivalent of $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ < 0.006g atom of Ag < 6.0×10^{21} atoms of Zn < 0.625 g of Fe

Correct: c

77. The shape of gaseous SnCl_2 , is

(a) tetrahedral

(b) linear

(c) angular

(d) T-shape

Correct: c

78. Aqueous solution of AlCl₃, is acidic towards. litmus while of NaCl is not. The correct reason behind this is

(a) AlCl₃, furnishes OH^- ion in the solution

(b) AlCl₃, furnishes H^+ in the solution

(c) AlCl₃, furnishes both H^+ well as OH^- ion in the solution

(d) AlCl₃ is the salt of strong base and strong acid

Correct: b

79. When a lead storage battery is discharged;

(a) SO_2 is evolved

(b) lead sulphate is consumed

(c) lead is formed

(d) sulphuric acid is consumed

Correct: d

80. Combustion of glucose takes place according to the equation, $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$

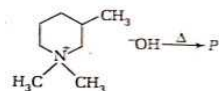
$\Delta H = -72k - cal$

The energy required for combustion of 1.6 g of glucose is

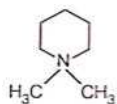
- (a) 0.064k cal
- (b) 0.64k - cal
- (c) 6.4k - cal
- (d) 64k cal

Correct: b

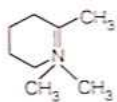
81.
The major product P will be



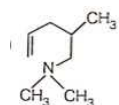
(a)



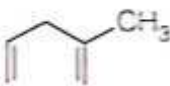
(b)



(c)



(d)



Correct: c

82. For the formation of Cr_2O_3 and Al_2O_3 , values of $\Delta_f G$ are $540kJmol^{-1}$ and $-827kJmol^{-1}$ respectively. What will be the possibility for reaction of Cr_2O_3 by Al?

- (a) Reduction of Cr_2O_3 , by Al will take place
- (b) Oxidation of Cr_2O_3 by Al will take place
- (c) Neither oxidation nor reduction will take place
- (d) Reaction is not feasible

Correct: a

83. In which of the following compounds, sulphur show maximum oxidation number?

- (a) H_2SO_4
- (b) SO_3
- (c) $H_2S_2S_2$
- (d) All have same oxidation number for sulphur

Correct: d

84. For the chemical reaction, $2O_3 \rightleftharpoons 3O_2$, The reaction proceed as follows

$O_3 \rightleftharpoons O_2 + O$ (fast)

$O + O_3 \rightarrow 2O_2$ (slow)

The rate law expression will be

- (a) $r = k'[O_3]^2$
- (b) $r = k'[O_3]^2 [O_2]^{-1}$

(c) $r = k' [\text{O}_3][\text{O}_2]$

(d) Unpredictable

Correct: b

85. Beryllium differs in properties from other elements of its own group but shows resemblance with aluminium because of

- (a) relatively bigger ionic radius and high polarising power of Be
- (b) relatively smaller ionic radius and high polarising power of Be
- (c) relatively bigger ionic radius is the only reason behind this
- (d) None of the above

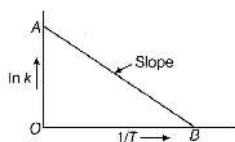
Correct: b

86. When KMnO_4 acts as an oxidising agent and ultimately forms MnO_4^{2-} , MnO_2 , Mn_2O_3 and Mn^{2+} then the number of electrons transferred in each case respectively are

- (a) 1, 3, 4, 5
- (b) 3, 2, 1, 4
- (c) 1, 5, 3, 7
- (d) 4, 3, 2, 1

Correct: a

87. In the following graph.



The slope of line AB gives the information of the

- (a) value of $\frac{E_a}{2.303}$
- (b) value of $\frac{2.303}{E_a}$
- (c) value of $-\frac{E_a}{2.303R}$
- (d) value of $-\frac{E_a}{2.303RT}$

Correct: c

88. When excess of NaOH solution is added to aqueous solution of iodine, the colour of solution becomes

- (a) blue
- (b) yellow
- (c) colourless
- (d) pale green

Correct: c

89. Which one among the following is added to soap to impart antiseptic property?

- (a) Sodium lauryl sulphate
- (b) Sodium dodecyl benzene sulphonates
- (c) Rosin
- (d) Bithional

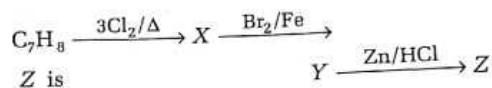
Correct: d

90. Choose the correct statement from the following

- (a) NH_4^+ and CH_4 are not isoelectronic species
- (b) BF_3 does not have dipole moment
- (c) $\text{O} - \text{Cl} - \text{O}$ obeys octet rule
- (d) O^- in O_3 is sp^3 -hybridised

Correct: b

91. In the reaction



Z is

- (a) o-bromotoluene
- (b) m-bromotoluene
- (c) p-bromotoluene
- (d) 3-bromo-2, 2, 6-trichlorotoluene

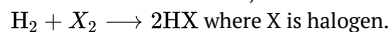
Correct: b

92. When I^- is oxidised by MnO_4^- in alkaline medium, I^- converts into

- (a) IO_3^-
- (b) I_2
- (c) IO_4^-
- (d) IO^-

Correct: a

93. Consider the reaction,



The reactivity of halogens decrease in the order of

- (a) $Cl_2 > F_2 > Br_2 > I_2$
- (b) $I_2 > Br_2 > F_2 > Cl_2$
- (c) $F_2 > Cl_2 > Br_2 > I_2$
- (d) $I_2 > Br_2 > Cl_2 > F_2$

Correct: b

94. When 750 mL of 0.5 M HCl is mixed with 250 mL of 2M NaOH solution, the value of pH will be

- (a) pH=7.
- (b) pH >7
- (c) pH <7
- (d) pH= 0

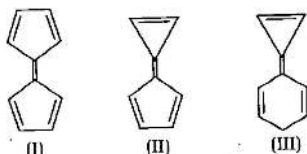
Correct: b

95. The most stable carbonium ion among the following is

- (a) $C_6H_5 - \overset{+}{C}H_2CH_3$
- (b) $CH_3 - \overset{+}{C}H_2$
- (c) $C_6H_5 - \overset{+}{C} - C_6H_5$
- (d) $C_6H_5CH_2^+$

Correct: c

96. Consider the following structures.



Choose the correct statement regarding the above structures.

- (a) Dipole moment varies as $II > III > I$
- (b) II is more stable than I
- (c) I is the most reactive among three
- (d) All of the above

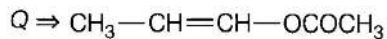
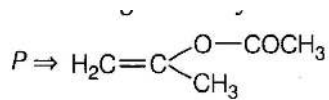
Correct: c

97. In cyanide extraction process of silver from argentite ore, the oxidising and reducing agents are respectively.

- (a) O_2 and CO_2
- (b) O_2 and Zn dust
- (c) HNO_3 and Zn dust
- (d) HNO_3 and CO

Correct: b

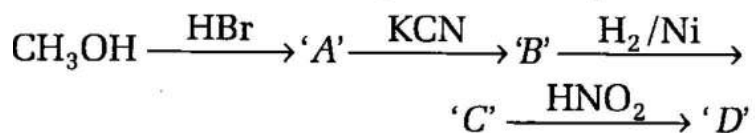
98. The product of acid hydrolysis of (P) and (Q) can be distinguished by



- (a) Lucas reagent
 (b) 2, 4-DNP
 (c) Fehling's solution
 (d) NaHSO₃

Correct: c

99. Consider the following reaction sequence

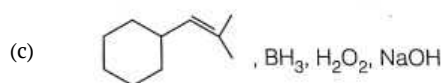
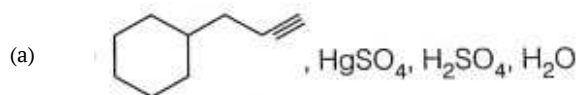
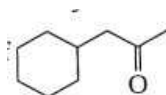


Choose the correct option regarding the different products obtained in the above reaction sequence.

- (a) 'D' is an alcohol consisting one carbon more than the starting alcohol. (b) Product 'B' is formed via S_N2-pathway
 (c) 'C' is an amine
 (d) All of the above

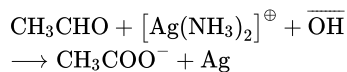
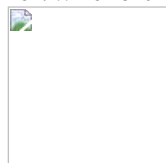
Correct: b

100. Choose the correct alkyne and reagents for the preparation of



Correct: a

101. Which of the following statements is incorrect regarding the reaction?

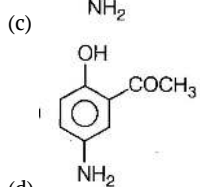
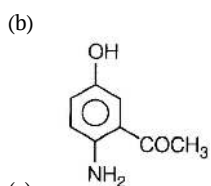
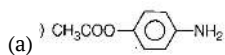
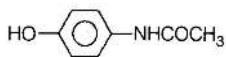
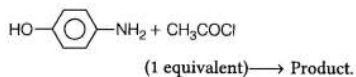


- (a) The equivalent weight of CH₃CHO is 22
 (b) Three moles of OH⁻ are required in the above reaction
 (c) CH₃CHO is an oxidising agent -

(d) Reduction of $[\text{Ag}(\text{NH}_3)_2]^\ominus$ occurs

Correct: c

102. The main product formed in the following reaction is



Correct: a

103. $\text{C}_3\text{H}_9\text{N}$ reacts with Hinsberg reagent and the product is insoluble in alkali but soluble in ether. This nitrogen containing compound is

- (a) primary amine
- (b) secondary amine
- (c) tertiary amine
- (d) methyl isocyanide

Correct: b

104. Match the particle with its characteristic.

Column I- {A} α -particle {B.} Isobar {C.} γ -ray {D.} β -particle

Column II- (p) Slow moving (q) High penetration power (r) Same atomic mass (s) Consists of electron

- (a) A-p, B- r, C- q, D- s
- (b) A-p, B- q, C- r, D- s
- (c) A-r, B- s, C- p, D- q
- (d) A-s, B- r, C- p, D- q

Correct: a

105. Polymer formation from monomers starts by

- (a) condensation reaction between monomers
- (b) coordination reaction between monomers
- (c) conversion of one monomer into other monomer
- (d) hydrolysis of monomers

Correct: a

106. Match the type of series given in Column I with the wavelength range given in Column II and choose the correct option.

Column I	Column II
A. Lyman	1. Ultraviolet
B. Paschen	2. Near infrared
C. Balmer	3. Far infrared
D. Pfund	4. Visible

- (a) A- 1, B-2 ,C-4 ,D-3
 (b) A- 4, B-3 ,C-2 ,D-1
 (c) A- 3, B-1 ,C-2 ,D-4
 (d) A- 4, B-3 ,C-2 ,D-1

Correct: a

107. Sugars are separated by using the solvent BAW (n-butanol acetic acid –H₂O and detected by spraying the plate with

- (a) aniline hydrogen phthalate solution
 (b) hydrogen peroxide solution
 (c) crystals of I²
 (d) cupric oxide

Correct: a

108. The electrons identified by quantum numbers n and l, are as follows

- I. n =4, l=1
 II. n = 4, l = 0
 III. n =3, l= 2
 IV, n =3, l = 1

If we arrange them in order of increasing energy, i.e. from lowest to highest, the correct order is

- (a) IV < II < III < I
 (b) II < IV < I < III
 (c) I < III < II < IV
 (d) III < I < IV < II

Correct: a

109. Which of the following statement(s) is not correct?

- (a) Suspended particulate matter is an important pollutant released by diesel vehicles
 (b) Soot particles (size < 5 μ) cause fibrosis of the lung living
 (c) H₂SO₄ particulates have size of 500 – 1000 nm
 (d) Photochemical smog is formed by oxides of sulphur, smoke and dust particles

Correct: d

110. Which of the following sodium compound/compound(s) are formed when an organic compound containing both nitrogen and sulphur is fused with sodium?

- (a) Cyanide and sulphide
 (b) Thiocyanate
 (c) Sulphite and cyanide
 (d) Nitrate and sulphide

Correct: b

111. The effective neutron capture radius of a nucleus having a cross-section of 1.0 barr is

[Given, 1 barr = 1.0 × 10⁻²⁴ cm²]

- (a) 5.6 × 10⁻¹³ cm
 (b) 4.3 × 10⁻¹³ cm
 (c) 2.3 × 10⁻¹¹ cm
 (d) 5.6 × 10⁻²⁴ cm

Correct: a

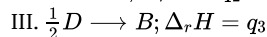
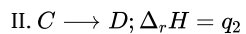
112. Eutrophication of a lake means, it

- (a) is low in nutrients
 (b) is high in nutrients
 (c) has a high temperature
 (d) has excess amount of organic matter

Correct: b

113. A hypothetical reaction A → 2B proceeds through the following sequence of steps

I. A → C; Δ_rH = q₁



The heat of hypothetical reaction is

(a) $q_1 + q_2 - 2q_3$

(b) $q_1 + q_2 + 2q_3$

(c) $q_1 + 2q_2 - 2q_3$

(d) $q_1 - q_2 + 2q_3$

Correct: b

114. Flux is used to

(a) remove all type of impurities

(b) reduce metal oxide

(c) remove carbonate and sulphate

(d) remove silica and undesirable metal oxides

Correct: d

115. Sulphur reacts with chlorine in 1:2 ratio and forms X. Hydrolysis of X gives a sulphur compound Y. The hybridisation of central atom in the anion Y is

(a) sp^3

(b) sp^2

(c) sp^3d

(d) sp

Correct: a

116. Polypropylene can be obtained by polymerisation of

(a) $CH_2 = CH - CH_2 - Cl$

(b) $CH_2 = CH - Cl$

(c) $CH_3 - Cl$

(d) $CH_3 - CHCl_2$

Correct: c

117. Which of the following fibres is made of polyamides?

(a) Dacron

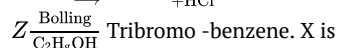
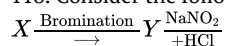
(b) Orion

(c) Nylon

(d) Rayon

Correct: c

118. Consider the following reaction, Bromination



(a) benzoic acid

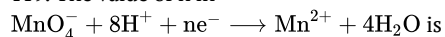
(b) salicylic acid

(c) phenol

(d) aniline

Correct: d

119. The value of n in



(a) 5

(b) 4

(c) 2

(d) 3

Correct: a

120. Number of oxygen atoms shared per SiO_4^{4-} tetrahedron in

I. two dimensional sheet structured silicates

II. cyclic silicates and

III. single strand chain silicates respectively are

(a) 3, 3, 2

(b) 3, 2, 2

- (c) 4, 3, 1
- (d) 4, 3, 2

Correct: b

Biology

121. Which of the following is the most primitive ancestor of man ?

- (a) Ramapithecus
- (b) Homo habilis
- (c) Australopithecus
- (d) Homo sapiens neanderthalensis

Correct: a

121. 'GIFT' refers to

- (a) Gamete In vitro Fertilisation Technique
- (b) Gamete Inter Fallopian Tube
- (c) Gamete Intra Fallopian Transfer
- (d) Gamete In vitro Fertilisation Transfer

Correct: c

123. Statement I Microtubules are formed only in animal cells. Statement II Microtubules are made up of a protein called myosin. Choose the correct option

- (a) Statement I is correct and statement II is incorrect.
- (b) Statement II is correct and statement I is incorrect.
- (c) Both statements are correct.
- (d) Both statements are incorrect.

Correct: d

124. Which one of the following is not correctly matched?

- (a) Diphtheria -Corynebacterium
- (b) Elephantiasis -Wuchereria
- (c) Plague -Paramyxo
- (d) Lockjaw -Clostridium

Correct: c

125. Torsion of visceral mass is seen in animals belonging to class

- (a) Cephalopoda
- (b) Scaphopoda
- (c) Amphineura
- (d) Gastropoda

Correct: d

126. The best description of natural selection is

- (a) the reproductive success of the members of a population best adapted to environment
- (b) it acts when the resources are unlimited
- (c) a change in the proportion of variations within a population
- (d) it follows Hardy-Weinberg principle

Correct: a

127. Occupational lung diseases that occurs in humans, among those given below is

- (a) dyspnea
- (b) anthracosis
- (c) atelectasis
- (d) cyanosis

Correct: b

128. Pick the hormone which is not secreted by human placenta.

- (a) hCG
- (b) hPL

- (c) Prolactin
- (d) Oestrogen

Correct: c

129. Lens of eyes is derived from

- (a) ectoderm
- (b) mesoderm
- (c) endoderm
- (d) Both (b) and (c)

Correct: a

130. Oxygen dissociation curve of haemoglobin is

- (a) sigmoid
- (b) hyperbolic
- (c) linear
- (d) hypobolic

Correct: a

131. Who received Nobel Prize in 2008 for the discovery of HIV?

- (a) Harald Zur Hausen
- (b) Luc Montagnier
- (c) Jack Szostak
- (d) Carol Greider

Correct: b

132. Cotyledons and testa are edible parts of

- (a) ground nut and pomegranate
- (b) walnut and tamarind
- (c) french bean and coconut
- (d) cashew nut and litchi

Correct: a

133. Intrinsic and extrinsic pathways of blood clotting are interlinked at the activation steps of which of the following factors?

- (a) Factor IX
- (b) Factor IV
- (c) Factor X
- (d) Factor XIII-a

Correct: c

134. Golden ages of reptiles and fishes are respectively

- (a) Mesozoic and Devonian
- (b) Jurassic and Permian
- (c) Triassic and Silurian
- (d) Palaeozoic and Mesozoic

Correct: a

135. The portion of the endometrium that covers the embryo and is located between the embryo and the uterine cavity is the

- (a) decidua basalis
- (b) decidua umbilicus
- (c) decidua capsularis
- (d) decidua functionalis

Correct: c

136. The globular head of myosin contains

- (a) calcium ions in large quantities
- (b) troponin
- (c) ATPase enzyme
- (d) ATP

Correct: c

137. The powerhouse of cell is first discovered by

- (a) C Benda in 1897
- (b) Kolliker in 1850
- (c) Claude in 1880
- (d) Kingsburg in 1882

Correct: b

138. Gastrula is the embryonic stage in which

- (a) cleavage occurs
- (b) blastocoel forms
- (c) germinal layers form
- (d) villi form

Correct: c

139. Dense regular connective tissue is present in

- (a) ligament and tendons
- (b) joint capsule and Wharton's Jelly
- (c) periosteum and endosteum
- (d) pericardium and heart valves

Correct: a

140. Which one of the following pair is not correct?

- (a) Mongolian idiocy - 21st chromosome
- (b) Patau syndrome - 13th chromosome
- (c) Cri-Du-Chat - 11th chromosome
- (d) Edward syndrome - 18th chromosome

Correct: c

141. Note the following features and choose the ones applicable to *Wuchereria bancrofti*.

- I. Coelozoic parasite
 - II. Histozoic parasite
 - III. Monogenetic parasite
 - IV. Digenetic parasite
 - V. Monomorphic, acoelomate parasite
 - VI. Dimorphic, pseudocoelomate parasite
- (a) II, III, V
 - (b) II, III, VI
 - (c) II, IV, VI
 - (d) I, III, VI

Correct: c

142. An irregular mode of reproduction resulting in the development of an embryo without fertilisation is called

- I. parthenogenesis
- II. apogamy
- III. sporophytic budding

Select the correct answer using the code given below.

- (a) Only I
- (b) Only II
- (c) II and III
- (d) I, II and III

Correct: d

143. Which type of immunoglobulin is/are abundantly found in foetus?

- (a) IgE
- (b) IgG
- (c) IgM
- (d) IgD

Correct: b

144. IUCN stands for

- (a) Indian Union for Conservation of Nature

- (b) International Union for Conservation of Nature
- (c) Indian Union for Chemical Nomenclature
- (d) International Union for Conservation of Nutrients

Correct: b

145. Source of commercial chewing gum latex is

- (a) *Hevea brasiliensis*
- (b) *Carica papaya*
- (c) *Ficus elastica*
- (d) *Achras sapota*

Correct: c

146. Which one of the following statements is correct?

- (a) Hard outer layer of pollen is called intine
- (b) Sporogenous tissue is haploid
- (c) Endothelium produces the microspores
- (d) Tapetum nourishes the developing pollen

Correct: d

147. Variation in gene frequencies within population can occur by chance rather than by natural selection. This is referred to as

- (a) genetic flow
- (b) genetic drift
- (c) random mating
- (d) genetic load

Correct: b

148. Which hormone produces calorogenic effect?

- (a) Thyroxine
- (b) FSH
- (c) Insulin
- (d) All of these

Correct: a

149. If two persons with 'AB' blood group marry and have sufficiently large number of children, these children could be classified as 'A' blood group, 'AB' blood group 'B' blood group in 1:2:1 ratio. Modern technique of protein electrophoresis reveals presence of both 'A' and 'B' type proteins in 'AB' blood group individuals. This is an example of

- (a) codominance
- (b) incomplete dominance
- (c) partial dominance
- (d) complete dominance

Correct: a

150. Which of the following DNA sequences qualifies to be designated as a palindrome?

- (a) 5'-GACCAG-3' in one strand
- (b) 3'-GACCAG-5' in one strand
- (c) 5'-GACGAG-3' 3'-CIGGIC-5'
- (d) 5'-AGCGCT-3, 3'-TCGCGA-5'

Correct: d

151. Match the following Columns.

Column 1 (Organism)

- A. Echidna
- B. Peripatus
- C. Neopilina
- D. Protopterus

Column II (Connecting link)

- 1. between Annelida and Mollusea
- 2. between Reptiles and Mammals
- 3. between Annelida and Arthropoda
- 4. between Pisces and Amphibian

- (a) 4 3 2 1
- (b) 2 3 1 4

- (c) 3 1 2 4
- (d) 4 2 1 3

Correct: b

152. Humoral immunity is mediated by

- (a) R-cells
- (b) T-cells
- (c) NK-cells
- (d) plasma cells

Correct: d

153. In the lac operon model, lactose molecules function as ·

- (a) inducers, which bind with the operator gene
- (b) repressors, which bind with the operator gene
- (c) inducers, which bind with the repressor protein
- (d) corepressors, which bind with repressor protein

Correct: c

154. Which one of the following antibodies plays an important role as mediator in allergic response?

- (a) Ig E
- (b) Ig G
- (c) Ig D
- (d) Ig A

Correct: a

155. The ornithine cycle removes two waste products from the blood in liver. These products are

- (a) CO₂ and urea
- (b) ammonia and urea
- (c) CO₂ and ammonia
- (d) ammonia and uric acid

Correct: b

156. Macromolecule chitin is

- (a) nitrogen containing polysaccharide
- (b) phosphorous containing polysaccharide
- (c) sulphur containing polysaccharide
- (d) simple polysaccharide

Correct: a

157. Consider these following sentences and choose the correct ones.

- I. Each gene contains a specific promoter region and a leader sequence for guiding the beginning of transcription.
- II. Only one strand of DNA, called template strand is copied by RNA polymerase this strand runs in 3' 5' direction.
- III. RNA polymerase adds complementary nucleotides forming single strand mRNA in 3' 5' direction.
- IV. Section of DNA that has been transcribed is rewound into its original configuration.

- (a) II, III and IV
- (b) II and IV
- (c) I, II and IV
- (d) I, II, III and IV

Correct: d

158. The one advantage of cleistogamy is

- (a) it leads to greater genetic diversity
- (b) seed dispersal is more efficient and wide spread
- (c) seed set is not dependent on pollinators
- (d) each visit of a pollinator results in transfer of hundreds of pollen grains

Correct: c

159. Taxonomic key is one of the taxonomic tools in the identification and classification of plants and animals. It is used in the preparation of

- (a) monographs
- (b) flora
- (c) Both (a) and (b)

(d) None of these

Correct: b

160. Match the following columns.

Column I	Column II
A. Pinocytosis	1. <i>Euglena gracilis</i>
B. Holozoic	2. <i>Paramecium</i>
C. Parasitic	3. <i>Amoeba proteus</i>
D. Mixotrophic	4. <i>Monocystis</i>

A B C D

(a) 3 2 4 1

(b) 2 3 4 1

(c) 4 3 1 2

(d) 1 4 2 3

Correct: a

161. During meiosis-I, the bivalent chromosomes clearly appear as tetrads during

(a) diakinesis

(b) diplotene

(c) pachytene

(d) zygotene

Correct: c

162. Which one of the following combinations is incorrect?

(a) Rio convention Air pollution

(b) Kyoto protocol Climate change

(c) Montreal protocol Ozone depletion

(d) Ramsar convention Wetland conservation

Correct: a

163. Organ of Jacobson' helps in

(a) touch

(b) vision

(c) smell

(d) hearing

Correct: c

164. Consider these sentences regarding to the structure and nature of DNA.

I. DNA has two pyrimidine bases which contain single ring structure.

II. In DNA, composition of bases should be $\frac{A+T}{G+C} = 1$

III. Each base pair of DNA is 3.4 \AA apart from othes base pair.

IV. The nucleosome model DNA packaging was proposed by Kornberg and Thomas. Choose the correct statements from given options.

(a) I and III

(b) I, II and III

(c) II, III and IV

(d) I, III and IV

Correct: d

165. Independent assortment of gene occurs due to the orientation of chromosomes at

(a) metaphase-I of mitosis

(b) metaphase-I of meiosis

(c) metaphase-II of meiosis

(d) any phase of the cell division

Correct: b

166. All monerons

(a) contain DNA and RNA

(b) demonstrate a long circular strand of DNA, not formed enclosed in a nuclear membrane

(c) are bacteria

(d) All of the above

Correct: d

167. Which one of the following options is not a sexually transmitted disease?

- (a) AIDS
- (b) Hepatitis-B
- (c) Pertussis
- (d) Syphilis

Correct: c

168. The chromosome in which centromere is situated close to one end are

- (a) metacentric
- (b) acrocentric
- (c) telocentric
- (d) sub-metacentric

Correct: b

169. Pyloric sphincter guards the opening between

- (a) stomach and duodenum
- (b) cardia and fundus
- (c) oesophagus and stomach
- (d) fundus and pylorus

Correct: a

170. Select the correct combination of statements regarding Myasthenia gravis

- I. It is an auto immune disorder.
- II. It causes insufficient acetylcholine binding that effects muscular contraction.
- III. Antibodies are developed against acetylcholine.
- IV. Antibodies are developed against acetylcholine receptors.
- V. It causes drooping of eyelids.

- (a) I, III, IV, VI
- (b) I, III, V, 11
- (c) I, II, IV, VI
- (d) II, III, IV, V

Correct: c

171. Pappus helps in dispersal of pollen in

- (a) Asteraceae
- (b) Brassicaceae
- (c) Malvaceae
- (d) Solanaceae

Correct: a

172. The method of directly injecting a sperm into ovum in assisted reproductive technology is called

- (a) GIFT
- (b) ZIET
- (c) ICSI
- (d) ET

Correct: c

173. Appearance of antibiotic resistant bacteria is an example of

- (a) adaptive radiation
- (b) transduction
- (c) pre-existing variation
- (d) divergent evolution in the population

Correct: c

174. The fact that DNA is a genetic material was established by the experiment of

- (a) Meselson and Stahl
- (b) Hershey and Chase
- (c) Avery, Macleod and McCarty
- (d) Rosalind Franklin and Kornberg

Correct: b

175. Munch hypothesis is based on

- (a) translocation of food due to Turgor Pressure (TP) gradient and imbibition force
- (b) translocation of food due to Turgor Pressure (TP) gradient
- (c) translocation of food due to imbibition force
- (d) None of the above

Correct: b

176. Organisms who are able to freely interbreed producing fertile offsprings and having similar blueprint for making these organisms are referred to as (a) speceis

- (b) tribe
- (c) genus
- (d) sub-genus

Correct: a

177. Which one of the following hormones is released by posterior lobe of pituitary gland?

- (a) FSH
- (b) ADH
- (c) ACTH
- (d) MSH

Correct: b

178. Identify the wrong combination

- (a) Dryopteris Rhizome
- (b) Cycas Coralloid roots
- (c) Volvox Colonial form
- (d) Marchantia Pseudoelaters

Correct: d

179. Uric acid is the excretory waste of

- (a) adult amphibians
- (b) birds
- (c) amphibian larvae
- (d) mammals

Correct: b

180. Match the following column I with Column II.

Column I	Column II
A. Carcinogen	1. Cancerous tumour
B. Anaphase-I	2. Disjunction
C. Mitosis	3. Synapse
D. Zygotene	4. Plectonemic coiling

- (a) A-1, B-2, C-4, D-3
- (b) A-3, B-1, C-4, D-2
- (c) A-2, B-3, C-1, D-4
- (d) A-4, B-1, C-3, D-2

Correct: a

English

181. Fill up the blanks in the passage given below with the most appropriate word from the options given for each blank.

The ...(1)... age is the age of machines. From the ...(2)... the industrial Revolution began in Europe. Man's life has been changing ...(3)... many ways. At first the change was ...(4).... Now machines have become ...(5)... of our daily lives.

- (a) birth
- (b) time
- (c) beginning
- (d) start

Correct: b

182. Choose the word which best expresses the meaning of the underlined word in the sentence

It was an ignominious defeat for the team.

- (a) shameful
- (b) admirable
- (c) unaccountable
- (d) worthy

Correct: a

183. Fill up the blanks in the passage given below with the most appropriate word from the options given for each blank.

The ...(1)... age is the age of machines. From the ...(2)... the industrial Revolution began in Europe. Man's life has been changing ...(3)... many ways. At first the change was ...(4)... Now machines have become ...(5)... of our daily lives.

- (a) slow
- (b) steady
- (c) fast
- (d) stagnant

Correct: a

184. If ACNE can be coded as 3, 7, 29, 11, then BOIL will be coded as

- (a) 5, 29, 19, 27
- (b) 5, 29, 19, 25
- (c) 5, 31, 21, 25
- (d) 5, 31, 19, 25

Correct: d

185. DEMISE

- (a) slow
- (b) Default
- (c) Death
- (d) Apprehension

Correct: c

186. Fill in the blank.

His speech was disappointing : it ... all the major issues.

- (a) projected
- (b) revealed
- (c) skirted
- (d) analysed

Correct: c

187. Find the odd letter pair from the given alternatives.

- (a) Sport : Ground
- (b) Cinema : Screen
- (c) Drama : Stage
- (d) Rubber : Erase

Correct: d

188. Choose the word which is closest to the opposite in meaning of the following sentence.

The Gupta rulers advocated all cultural activities and thus Gupta period was called the golden era in Indian History.

- (a) fostered
- (b) enriched
- (c) opposed
- (d) spurned

Correct: c

189. Choose the word which is closest to the opposite in meaning of the following sentence.

This is a barbarous act.

- (a) bad
- (b) good
- (c) civilised
- (d) exemplary

Correct: c

190. Though novice in art shows great promise.

- (a) tyro
- (b) inexperienced
- (c) veteran
- (d) green horn

Correct: c

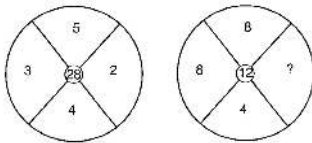
191. Out of the four alternatives, choose the one which best expresses the meaning of the given word.

Instigate

- (a) Initiate
- (b) Incllo
- (c) Force
- (d) Cause

Correct: b

192. In the following question, five figures are given. Out of them, find the three figures that can be joined to form a square.



- (a) 1
- (b) 2
- (c) 4
- (d) 5

Correct: a

193. Choose the word opposite in meaning to the given word.

Epilogue

- (a) Dialogue
- (b) Prelude
- (c) Post script
- (d) Epigram

Correct: b

194. Replace the question mark(?) in the series given below with the correct option.

4, 5, 7, 11, 19, 35, ?

- (a) 67
- (b) 76
- (c) 55
- (d) 45

Correct: b

195. Out of the four alternatives, choose the one which can be substituted for the given words/sentence.

The absence of law and order

- (a) Rebellion
- (b) Anarchy
- (c) Mutiny
- (d) Revolt

Correct: b

196. There are three baskets of fruits. 1st basket has twice the number of fruits in the 2nd basket. 3rd basket has three-fourth of the fruits in the first. The average of the fruits in all the baskets is 30. What is the number of fruits in the first basket?

- (a) 20
- (b) 30
- (c) 35
- (d) 40

Correct: d

197. Shikha is mother-in-law of Ekta who is sister-in-law of Ankit. Pankaj is father of Sanjay, the only brother of Ankit. How is Shikha related to Ankit?

- (a) Mother-in-law
- (b) Aunt
- (c) Wife
- (d) Mother

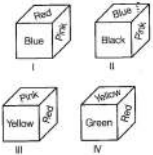
Correct: c

198. In a certain code, MODEL is written as 513 # 2 and DEAR is written as 3 # % 8. How is LOAD written in that code ?

- (a) 23%1
- (b) 21%3
- (c) 25%3
- (d) 21#3

Correct: b

199. From the given four positions of a single dice, find the colour at the face opposite to the face having red colour.



- (a) Yellow
- (b) Pink
- (c) Green
- (d) Black

Correct: a

200. Though novice in art shows great promise

- (a) tyro
- (b) inexperienced
- (c) veteran
- (d) green horn

Correct: c