# AIIMS MBBS Entrance Exam 2015
Physics (Solved Paper)

1. A particle is projected with an angle of projection θ to the horizontal line passing through the points (P, Q) and (Q, P) referred to horizontal and vertical axes (can be treated as x-axis and y-axis respectively).
   The angle of projection can be given by

   (a) $\tan^{-1}\left[\dfrac{P^2 + PQ + Q^2}{PQ}\right]$

   (b) $\tan^{-1}\left[\dfrac{P^2 + Q^2 - PQ}{PQ}\right]$

   (c) $\tan^{-1}\left[\dfrac{P^2 + Q^2}{2PQ}\right]$

   (d) $\sin^{-1}\left[\dfrac{P^2 + Q^2 + PQ}{2PQ}\right]$

2. Determine the height above the dashed line XX′ attained by the water stream coming out through the hole is situated at point B in the diagram given below. Given that h = 10 m, L = 2 m and d = 30°.
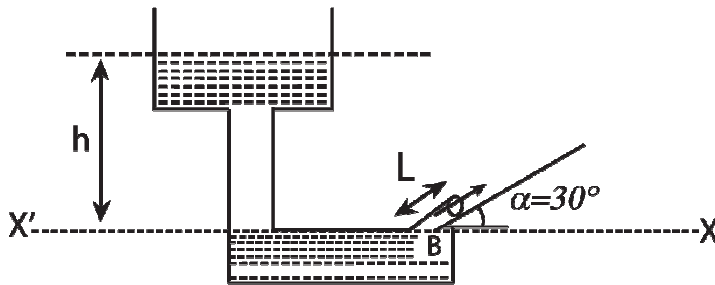
   (a) 10 m
   (b) 7.1 m
   (c) 5 m
   (d) 3.2 m

3. If the magnetizing field on a ferromagnetic material is increased, its permeability

(a) decreased

(b) increased

(c) is unaffected

(d) may be increased or decreased

4. A ball is dropped from a bridge 122.5 m above a river. After the ball has been falling for 2s, a second ball is thrown straight down after it. What must the initial velocity of the second ball be so that both hit the water at the same time?

(a) 40 m/s

(b) 55.5 m/s

(c) 26.1 m/s

(d) 9.6 m/s

5. A body of mass 40 kg resting on rough horizontal surface is subjected to a force P which is just enough to start the motion of the body. If $\mu_s = 5, \mu_x = 0.4$, $g = 10$ m/s^2 and the force P is continuously applied on the body, then the acceleration of the body is

(a) zero

(b) $1 \, m/s^2$

(c) $2 \, m/s^2$

(d) $2.4 \, m/s^2$

6. The self inductance of a coil having 500 turns is 50 mH. The magnetic flux through the cross-sectional area of the coil while current through it is 8 mA is found to be

(a) 4×10^{-4} Wb

(b) 0.04 Wb

(c) 4 µWb

(d) 40 mWb

7. A uniform metallic rod rotates about its perpendicular bisector with constant angular speed. If it is heated uniformly to raise its temperature slightly, then

(a) its speed of rotation increases

(b) its speed of rotation decreases

(c) its speed of rotation remains same

(d) its speed increases because its moment of inertia increases

8. A uniform disc is acted by two equal forces of magnitude F. One of them, acts tangentially to the disc, while other one is acting at the central point of the disc. The friction between disc surface and ground surface is nF. If r be the radius of the disc, then the value of n would be (in N)

(a) 0

(b) 1.2

(c) 2.0

(d) 3.2

9. While keeping area of cross-section of a solenoid same, the number of turns and length of solenoid one both doubled. The self inductance of the coil will be

(a) halved

(b) doubled

(c) 1/4times the original value

(d) unaffected

10. Consider the circular loop having current i and with central point O. The magnetic field at the central point O is
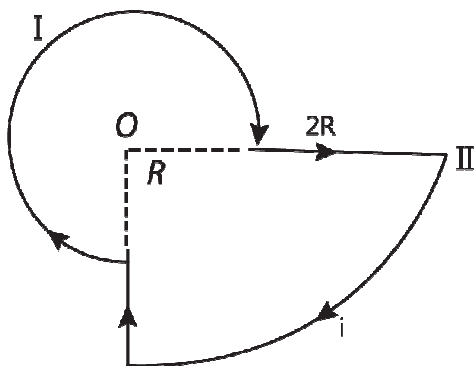
(a) $\dfrac{2\mu_0 i}{3\pi R}$ acting downward

(b) $\dfrac{5\mu_0 i}{12R}$ acting downward

(c) $\dfrac{6\mu_0 i}{11R}$ acting downward

(d) $\dfrac{3\mu_0 i}{7R}$ acting upward

11. The Boolean expression $P + \bar{P}Q$, where P and Q are the inputs of the logic circuit, represents
   (a) AND gate
   (b) NAND gate
   (c) NOT gate
   (d) OR gate

12. Consider the diagram shown below.
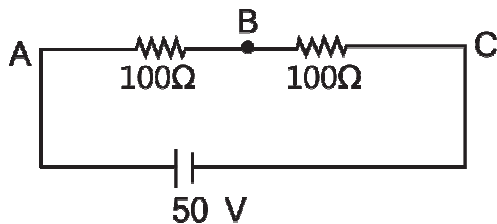
A voltmeter of resistance 150 Ω is connected across A and B. The potential drop across B and C measured by voltmeter is
   (a) 29 V
   (b) 27 V
   (c) 31 V
   (d) 30 V

13. Two spherical nuclei have mass numbers 216 and 64 with their radii R_1 and R_2 respectively. The ratio, $\dfrac{R_1}{R_2}$ is equal to
   (a) 3 : 2
   (b) 1 : 3
   (c) 1 : 2
   (d) 2 : 3

14. A massless rod S having length 2l has equal point masses attached to its two ends as shown in figure. The rod is rotating about an axis passing through its centre and making angle α with the axis. The magnitude of change of momentum of rod i.e. $\left|\dfrac{dL}{dt}\right|$ equals
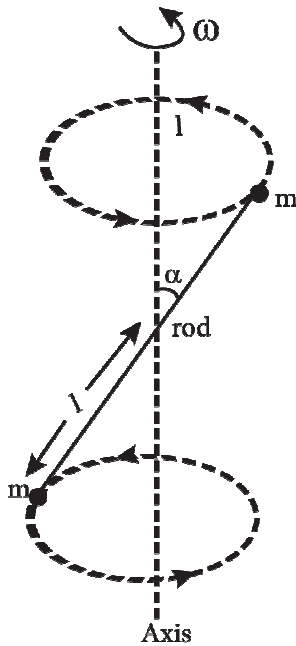
(a) $2\,m\,l^3\omega^2\sin\theta\cdot\cos\theta$

(b) $ml^2\omega^2\sin 2\theta$

(c) $ml^2\sin 2\theta$

(d) $m^{1/2}\,l^{1/2}\omega\,\sin\theta\cdot\cos\theta$

15. A semiconductor having electron and hole motilities μ_n and μ_p respectively. if its intrinsic carrier density is n_i, then what will be the value of hole concentration P for which the conductivity will be minimum at a given temperature?

(a) $n_i\sqrt{\dfrac{\mu_n}{\mu_p}}$

(b) $n_h \sqrt{\dfrac{\mu_n}{\mu_p}}$

(c) $n_i \sqrt{\dfrac{\mu_p}{\mu_n}}$

(d) $n_h \sqrt{\dfrac{\mu_p}{\mu_n}}$

16. In terms of basic units of mass (M), length (L), time (T) and charge (Q), the dimensions of magnetic permeability of vacuum (μ_0) would be

   (a) $[MLQ^{-2}]$

   (b) $[LT^{-1}Q^{-1}]$

   (c) $[ML^2T^{-1}Q^{-2}]$

   (d) $[LTQ^{-1}]$

17. The black body spectrum of an object O_1 is such that its radiant intensity (i.e. intensity per unit wavelength interval) is maximum at a wavelength of 200 nm. Another object O_2 has the maximum radiant intensity at 600 nm. The ratio of power emitted per unit area by source O_1 to that of source O_2 is

   (a) $1 : 81$

   (b) $1 : 9$

   (c) $9 : 1$

   (d) $81 : 1$

18. A beam of light of wavelength 400 nm and power 1.55 mW is directed at the cathode of a photoelectric cell. If only 10% of the incident photons effectively produce photoelectron, then find current due to these electrons.

   [given, hc = 1240 eV-nm, e = 1.6×10^{-19}C)

   (a) $5\mu A$

   (b) $40\ \mu A$

   (c) $50\ \mu A$

   (d) $114\ \mu A$

19. The molar specific heat of a gas as given from the kinetic theory is $\frac{5}{2}R$. If it is not specified whether it is C_P or C_V, one could conclude that the molecules of the gas
    (a) are definitely monoatomic
    (b) are definitely rigid diatomic
    (c) are definitely non-rigid diatomic
    (d) can be monoatomic or rigid diatomic

20. The length of a metal wire is I_1 when the tension in it is T_1 and is I_2 when the tension is T_2. The natural length of the wire is
    (a) $\dfrac{I_1 + I_2}{2}$
    (b) $\sqrt{I_1 I_2}$
    (c) $\dfrac{I_1 T_2 - I_2 T_1}{T_2 - T_1}$
    (d) $\dfrac{I_1 T_2 + I_2 T_1}{T_1 + T_2}$

21. The velocity vector v and displacement vector x of a particle executing SHM are related as
    $\dfrac{v dv}{dx} = -\omega^2 x$ with the initial condition $v = v_0$ at $x = 0$. The velocity v, when displacement is x, is
    (a) $v = \sqrt{v_0^2 + \omega^2 x^2}$
    (b) $v = \sqrt{v_0^2 - \omega^2 x^2}$
    (c) $v = \sqrt[3]{v_0^3 + \omega^3 x^3}$
    (d) $v = v_0 - (\omega^3 x^3 e^{x^3})^{1/3}$

22. Consider the diagram shown below in which two masses of m and 2m are placed on a fixed triangular wedge.
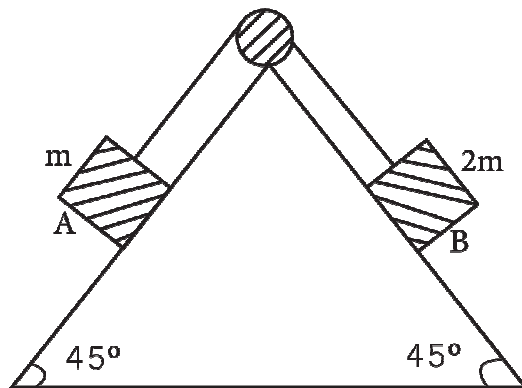
The coefficient of friction between block A and the wedge is 2/3, while that for block B and the wedge is 1/3

(a) zero

(b) $\dfrac{2m^2}{3}g$

(c) $\dfrac{4m^2}{3}g$

(d) $\dfrac{m^2}{\sqrt{2}}g$

23. In the arrangement shown in figure, the current through 5 Ω resistor is
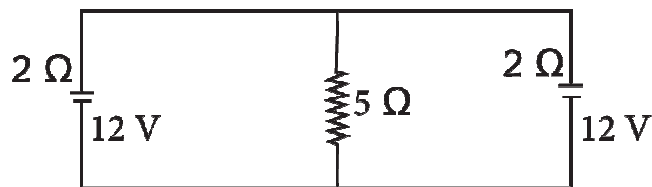

(a) 2A

(b) zero

(c) $\dfrac{12}{7}A$

(d) 1A

24. A hemispherical bowl of radius r is set rotating about its axis of symmetry in vertical. A small block kept in the bowl rotates with bowl without slipping on its surface. If the surface of the bowl is smooth and the angle made by the radius through the block with the vertical is θ, then find the angular speed at which the ball is rotating.

(a) $\omega = \sqrt{rg\sin\theta}$

(b) $\omega = \sqrt{g / r\cos\theta}$

(c) $\omega = \sqrt{\dfrac{gr}{\cos\theta}}$

(d) $\omega = \sqrt{\dfrac{gr}{\tan\theta}}$

25. The phase difference between the flux linked with a coil rotating in a uniform magnetic field and induced emf produce in it is

(a) $\pi/2$

(b) $\pi/3$

(c) $-\pi/6$

(d) π

26. A condenser of 250 μF is connected in parallel to a coil of inductance 0.16 mH, while its effective resistance is 20 Ω. Determine the resonant frequency.

(a) $9 \times 10^4 \, Hz$

(b) $16 \times 10^7 \, Hz$

(c) $8 \times 10^5 \, Hz$

(d) $9 \times 10^3 \, Hz$

27. The variation of magnetic susceptibility with the temperature of a ferromagnetic material can be plotted as

(a)

(b)

(c)

(d)
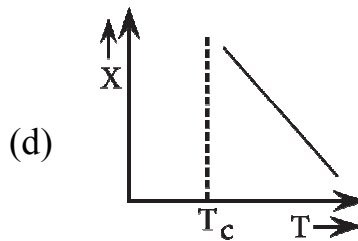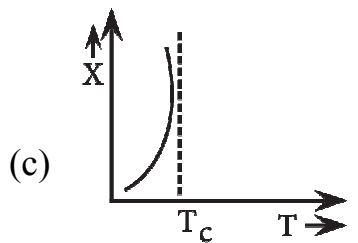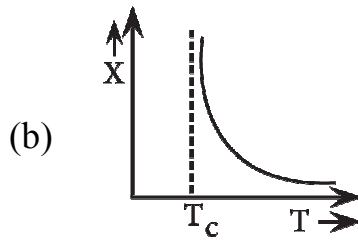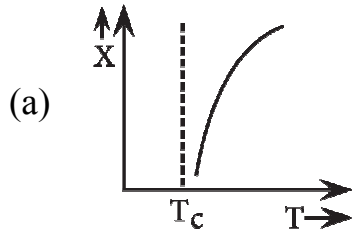
28. For Bragg's diffraction by a crystal to occur, then the X-ray of wavelength λ and interatomic distance d must be
    (a) λ is greater than 2d
    (b) λ equals 2d
    (c) λ is smaller than or equal to 2d
    (d) λ is smaller than 2d

29. A wire having mass m and length l can freely slide on a pair or parallel smooth horizontal rails placed in vertical magnetic field B. The rails are connected by a capacitor of capacitance C. The electric resistance of the rails

and the wire is zero. If a constant force F acts on the wire as shown in the figure. Then, the acceleration of the wire can be given as
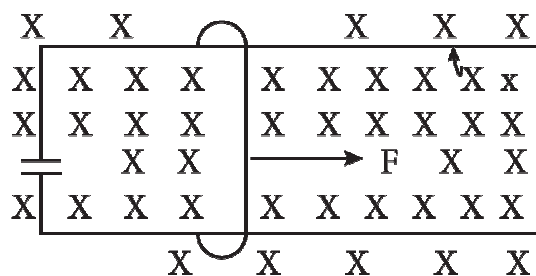
(a) $a = \dfrac{C^2B^2l - F}{m}$

(b) $a = \dfrac{F}{m + CBl}$

(c) $a = \dfrac{FC^2B^2l}{m}$

(d) $a = \dfrac{F}{m + C^2B^2l}$

30. Consider the situation shown in figure, A spring of spring constant 400 N/m is attached at one end to a wedge fixed rigidly with the horizontal part. A 40 g mass is released from rest while situated at a height 5 cm the curved track. The minimum deformation in the spring is nearly equal to (take g = 10 m/s^2)
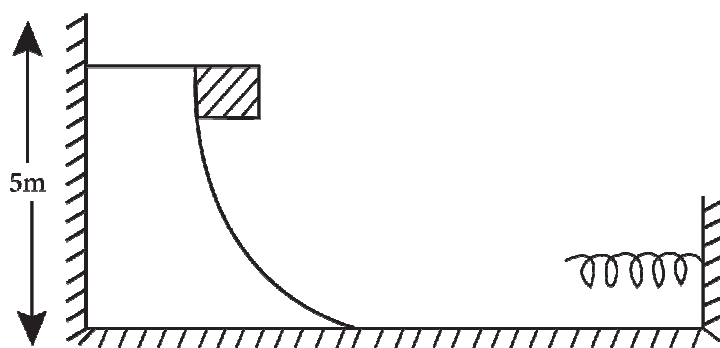
(a) 9.8 m

(b) 9.8 cm

(c) .98 m

(d) .009 km

31. A block having mass m collides with an another stationary block having mass 2 m. The lighter block comes to rest after collision. If the velocity of first block is v, then the value of coefficient of restitution will must be
    (a) 0.5
   (b) 0.4
    (c) 0.6
    (d) 0.8

32. A uniform sphere of mass 500 g rolls without slipping on a p lane surface so that its centre moves at speed of 0.002 m/s.
    The total kinetic energy of rolling sphere would be (in J)
    (a) 1.4×10^{-4} J
    (b) 0.75×10^{-3} J
    (c) 5.75×10^{-3} J
    (d) 4.9×10^{-5} J

33. The force on a particle as the function of displacement x (in x-direction) is given by
    $$F = 10 + 0.5x$$
    The work done corresponding to displacement of particle from x = 0 to x = 2 unit is
    (a) 25 J
    (b) 29 J
    (c) 21 J
    (d) 18 J

34. The reading of a spring balance corresponds to 100 N while situated at the north pole and a body is kept on it. The weight record on the same scale if it is shifted to the equator, is
    (take, g = 10 m/s² and radius of the earth, R = 6.4 × 10³ m)
    (a) 99.66 N
    (b) 110 N
    (c) 97.66 N

(d) 106 N

35. If the intensity is increased by a factor of 20, then how many decibels in the sound level increased?
(a) 18
(b) 13
(c) 9
(d) 7

36. On the same path, the source and observer are moving such ways that the distance between these two increases with the time. The speeds of source and observer are same and equal to 10 ms^{-1} with respect to the ground while no wind is blowing. The apparent frequency received by observer is 1950 Hz, then the original frequency must be (the speed of sound in present medium is 340 m/s)
(a) 2068 Hz
(b) 2100 Hz
(c) 1903 Hz
(d) 602 Hz

37. Consider the ray diagram for the refraction given below. The maximum value of angle θ for which the light suffers total internal reflection at the vertical surface, is

μ=1.0

θ

μ=1.25
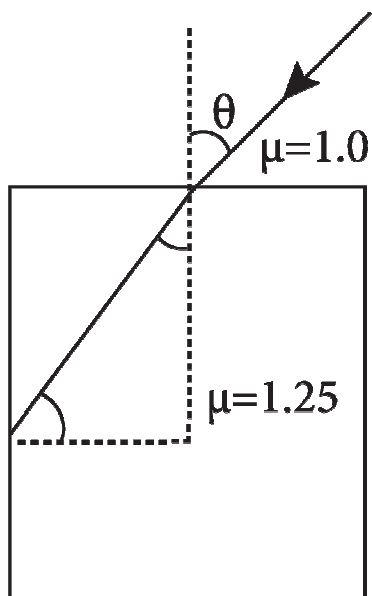
(a) $\cos^{-1}\left(\dfrac{3}{4}\right)$

(b) $\sin^{-1}\left(\dfrac{3}{4}\right)$

(c) $\tan^{-1}\left(\dfrac{4}{3}\right)$

(d) $\cos^{-1}\left(\dfrac{4}{3}\right)$

38. The near point and far point of a person are 40 cm and 250 cm respectively. Determine the power of the lens he/she should use while reading a book kept at distance 25 cm from the eye.
    (a) 2.5 D
    (b) 5.0 D
    (c) 1.5 D
    (d) 3.5 D

39. The dimensional formula for electric flux is
    (a) $[ML^3I^{-1}T^{-3}]$
    (b) $[M^2L^2I^{-1}T^{-2}]$

(c) $[ML^3I^1T^{-3}]$

(d) $[ML^{-3}I^{-1}T^{-3}]$

40. An electron of mass M_e, initially at rest moves through a certain distance in a uniform electric field in time t_1. A proton of mass M_p also initially at rest, takes time t_2 to move through an equal distance in this uniform electric field, Neglecting the effect of gravity, the ratio t_2/t_1 is nearly equal to

(a) 1

(b) $\sqrt{\dfrac{M_p}{M_e}}$

(c) $\sqrt{\dfrac{M_e}{M_p}}$

(d) 1836

Directions (Q. Nos. 41-60) *Each of these questions contains two statements. Assertion and Reason.*

Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

41. **Assertion (A)** In an elastic collision between two bides, the relative speed of the bodies after collision is equal to the relative speed before the collision.

    Reason (R) In elastic collision, the linear momentum of the system is conserved.

    (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

    (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

    (c) If Assertion is true but Reason is false.

    (d) If both Assertion and Reason are false.

42. **Assertion (A)** If there is not external torque on a body about its centre of mass, then the velocity of the centre of mass remains constant.

    Reason (R) The linear momentum of an isolated system remains constant.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

43. **Assertion (A)** An astronaut in an orbiting space station above the earth experience weightlessness.

Reason (R) An object moving around the earth under the influence of earth's gravitational force is in a state of 'free fall'.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

44. **Assertion (A)** The stream of water flowing at high speed from a garden hose, pipe tends to spread like a fountain when held vertically up but tends to narrow down when held vertically down.

Reason (R) In any steady flow of an incompressible fluid, the volume flow rate of the fluid remains constant.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

45. **Assertion (A)** Assertion The total translational kinetic energy of all the molecules of a given mass of an ideal gas is 1.5 times the product of its pressure and volume.

Reason (R) The molecules of gas collide with each other and the velocities of the molecules change due to the collision.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

46. **Assertion (A)** The relation among u, v and f for the spherical mirror is valid only for mirrors whose sizes are very small compared to their radii of curvature.

   Reason (R) The laws of reflection are strictly valid for plane surfaces but not for large spherical surfaces.

   (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

   (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

   (c) If Assertion is true but Reason is false.

   (d) If both Assertion and Reason are false.

47. **Assertion (A)** In a meter bridge experiment, null point for an unknown resistance is put inside an enclosure maintained at a higher temperature. The null point can be obtained at the same p as before by decreasing the value of the standard resistance.

   Reason (R) Resistance of metal increases with increase in temperature.

   (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

   (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

   (c) If Assertion is true but Reason is false.

   (d) If both Assertion and Reason are false.

48. **Assertion (A)** Forces acting between proton-protn (f_{pp}), proton-neutron(f_{pn}) and neutron-neutron (f_{nn}) are such that $f_{pp} < f_{pn} = f_{nn}$

   Reason (R) Electrostatic force of repulsion between two protons reduces net nuclear forces between them.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

49. **Assertion (A)** The magnetic moment (μ) of an electron revolving around the nucleus decreases with increasing principle quantum number (n).

Reason (R) Magnetic moment of the revolving electron, $\mu \propto n$.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

50. **Assertion (A)** A particle of mass M at rest decay into two particles of masses m_1 and m_2, having non-zero velocities will have ratio of de-Broglie wavelengths unity.

Reason (R) Here we cannot apply conservation of linear momentum.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

51. **Assertion (A)** To increase resolving power of a telescope, the aperture (a) of the object should be large.

Reason (R) Resolving power of the telescope is given by $\dfrac{2a}{1.22\lambda}$.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

52. **Assertion (A)** If the frequency of the applied AC is doubled, then the power factor of a series R-L circuit decreases.

Reason (R) Power factor of series R-L circuit is given by
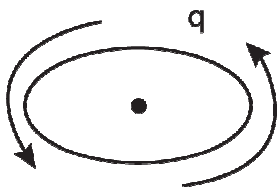
$$\cos\theta = \frac{2R}{\sqrt{R^2 + \omega^2 L^2}}$$

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

53. **Assertion (A)** Above Curie temperature, a ferromagnetic material becomes paramagnetic.

Reason (R) When a magnetic material is heated to very high temperature, it loses its magnetic properties.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

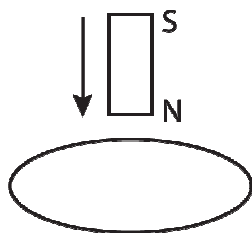(d) If both Assertion and Reason are false.

54. **Assertion (A)** A charge moving in a circular orbit can produce electromagnetic wave.

Reason (R) The source of electromagnetic wave should be in accelerated motion.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.
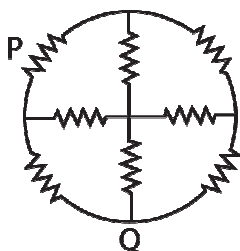
(d) If both Assertion and Reason are false.

55. **Assertion (A)** The bar magnet falling vertically along the axis of the horizontal coil will be having acceleration less than g.

Reason (R) Clockwise current induced in the coil.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

56. **Assertion (A)** The effective resistance of the network between P and Q is $\frac{4}{5}$r.

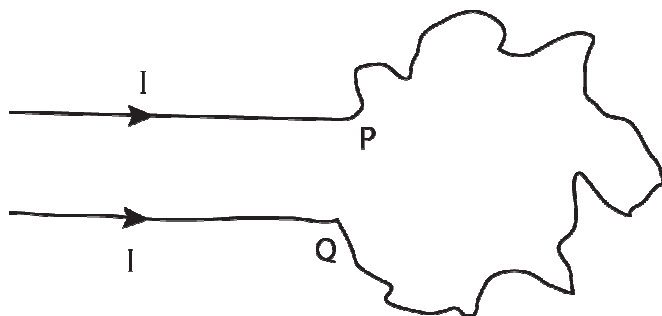**Reason (R)** Symmetry can be applied to be network with respect to centre.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

57. **Assertion (A)** A spherical equipotential surface is not possible for a point charge.

Reason (R) A spherical equipotential surface is possible inside a spherical capacitor.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

58. **Assertion (A)** A wire bent into an irregular shape with the points P and Q fixed. If a current I passed through the wire, then the area enclosed by the irregular portion of the wire increases.

Reason (R) Opposite currents carrying wires repel each other.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

59. **Assertion (A)** A charge q is placed on a height h/4 above the centre of a square of side b. The flux associated with the square is independent of side length.

Reason (R) Gauss's law is independent of size of the Gaussian surface.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

60. **Assertion (A)** Audio signal of frequency 10 kHz cannot be transmitted over long distance without modulation.

Reason (R) Length of the antenna required $\lambda/4$, should have practical value.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

## AIIMS MBBS Entrance Exam 2015
Chemistry (Solved Paper)

61. Following table shows the successive molar ionization energy (kJ mol^{-1}) of five elements A to E.

Element	Ionisation energy (kj mol⁻¹)			
	Ist	2nd	3nd	4th
A	2080	4000	6100	9400
B	500	4600	6900	9500
C	740	1500	7700	10500
D	580	1800	2700	11600
E	420	3100	4400	5900

Which two elements are most likely to be in the same group of the periodic table?

(a) C and D
(b) D and E
(c) B and D
(d) B and E

62. Consider the following arrangements of the octahedral complex ion $[Co(NH_3)_4Cl_2]^+$.

I

II

III

IV
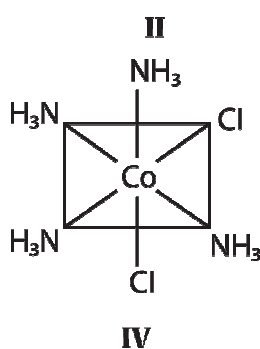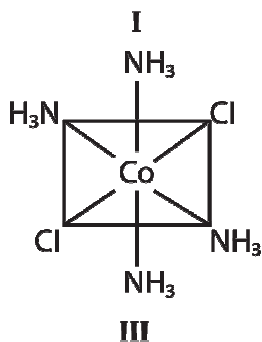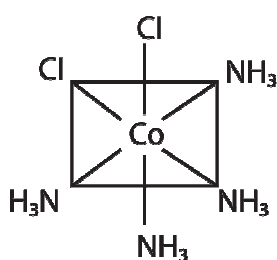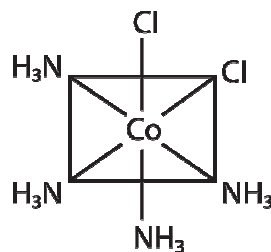
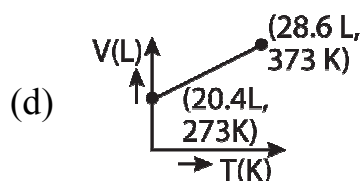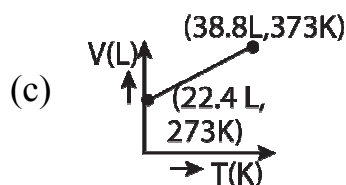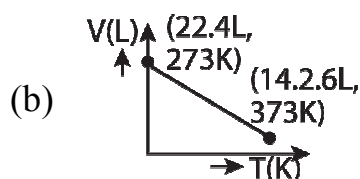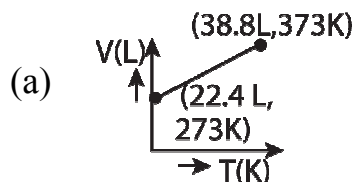Which of the following statements is false?
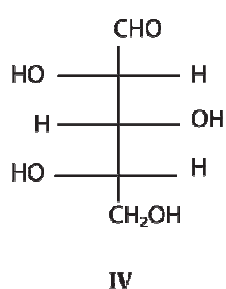(a) II and III are cis and trans-isomers respectively

(b) III and IV are trans and cis-isomers respectively

(c) I and II are enantiomers

(d) All are identical

63. Which of the following volume (V) – temperature (T) plots represents the behaviour of one mole of an ideal gas at one atmospheric pressure?

(a)
```
V(L)           (38.8L,373K)
  ↑         •
   ↑•(22.4 L,
     273K)
   └───────→ T(K)
```

(b)
```
V(L) (22.4L,
  ↑ • 273K)
       •(14.2.6L,
        373K)
   └──────→ T(K)
```

(c)
```
V(L)          (38.8L,373K)
  ↑        •
   ↑•(22.4 L,
     273K)
   └──────→ T(K)
```

(d)
```
           (28.6 L,
V(L)     • 373 K)
  ↑   •
   ↑•(20.4L,
     273K)
   └──────→ T(K)
```

64. Two aldopentoses A and B give the same osazone derivative. A is oxidized to an optically active aldoric acid by dilute nitric acid. Ruff degradation of B gave a tetrose which was similarly oxidized to an optically active aldaric acid. Assign the structure of A and B from the following list.

CHO
H —— OH
H —— OH
H —— OH
CH₂OH

I

CHO
H —— OH
HO —— H
H —— OH
CH₂OH

II

CHO
HO —— H
HO —— H
H —— OH
CH₂OH

III

CHO
HO —— H
H —— OH
HO —— H
CH₂OH

IV
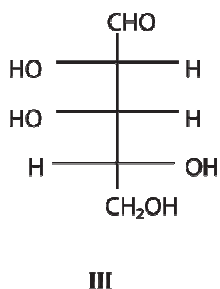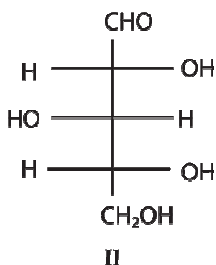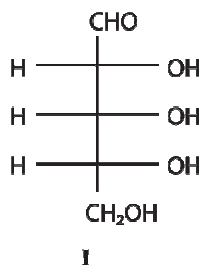
(a) A = I, B=IV

(b) A=IV, B=I

(c) A=III, B=II

(d) A=II, B=III

65. $[Fe(H_2O)_5NO]^{2+}$ is a complex formed during the brown ring test for NO_3^- ion. In this complex.

(a) there are three unpaired electrons so that its magnetic moment is 3.87 BM

(b) NO transfer its electron to Fe^{2+} so that iron as Fe(I) and NO as NO^+

(c) the colour is because of charge transfer

(d) All of the above statements are correct

66. An organic compound X having molecular mass 60 is found to contain C = 20%, H = 6.67% and N = 46.67%, while rest is oxygen. On heating it gives ammonia along with a solid residue. The solid residue gives violet colour with alkaline copper sulphate solution. The compound X is

(a) $CH_3CH_2CONH_2$

(b) CH_3NCO

(c) CH_3CONH_2

(d) $(NH_2)_2CO$

67. Point out incorrect sawhorse drawing(s) for the following compound.
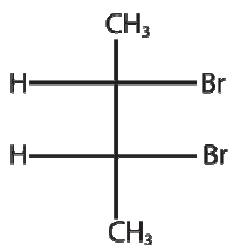
(a)

(b)

(c)

(d)

68. KO_2(potassium superoxide) is used in oxygen cylinder in space and submarines because of it
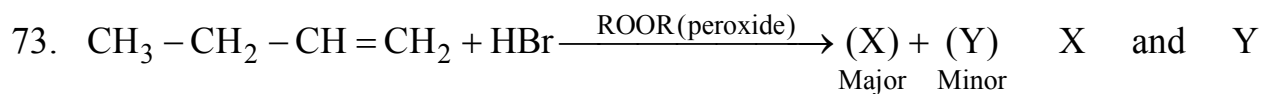   (a) absorbs CO_2
   (b) produces ozone
   (c) eliminates moisture
   (d) absorbs CO_2 and increases O_2 content

69. The order of reactivity of halides towards S_N1 mechanism is
    (a) benzyl > allyl > 1° > 2° > 3° > Me
    (b) Me > 1° > 2° > 3° > allyl > benzyl
    (c) 3° > 2° > 1° > Me > allyl > benzyl
    (d) benzyl > allyl > 3° > 2° > 1° > Me

70. Arrange the given set of compounds in order of increasing boiling points.
    I. 1-chloropropane
    II. Iso-propyl chloride
    III. 1-chlorobutane
    (a) II < III < I
    (b) I < II < III
    (c) II < I < III
    (d) III < I < II

71. The factor of ΔG values is important in metallurgy. The ΔG values for the following reactions at 800°C are given as
    $S_2(g) + 2O_2(g) \rightarrow 2SO_2(g)$; ΔG = −544 kJ
    $2Zn(s) + S_2(g) \rightarrow 2ZnS(s)$; ΔG = −293 kJ
    $2Zn(s) + O_2(g) \rightarrow 2ZnO(s)$; ΔG = −480 kJ
    The ΔG for the reaction,
    $2ZnS(g) + 3O_2(g) \rightarrow 2ZnO(g) + 2SO_2(g)$ will be
    (a) −731 kJ
    (b) −787 kJ
    (c) −534 kJ
    (d) −554 kJ

72. The shapes of SF_4 and XeF_2 respectively are
    (a) trigonal bipyramidal and trigonal bipyramidal
    (b) see-saw and linear
    (c) T-shape and linear
    (d) square planar and trigonal bipyramidal

73. $CH_3 - CH_2 - CH = CH_2 + HBr \xrightarrow{\text{ROOR(peroxide)}} \underset{\text{Major \quad Minor}}{(X) + (Y)}$ X   and   Y

    respectively are

    (a) $BrCH_2 - CH_2 - CH = CH_2$ and $C_2H_5 - CHBr - CH_3$

    (b) $C_2H_5 - CH_2 - CH_2Br$ and $Br - CH_2 - CH_2 - CH = CH_2$

    (c) $C_2H_5 - CH_2 - CH_2Br$ and $C_2H_5 - CHBr - CH_3$

    (d) $C_2H_5CHBr - CH_3$ and $C_2H_5 - CH_2 - CH_2Br$

74. 'a' moles of PCl_5 are heated in a closed container to equilibriate $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ at pressure of p atm. If x moles of PCl_5 dissociate at equilibrium, then

    (a) $\dfrac{x}{a} = \left(\dfrac{K_p}{p} \right)^{1/2}$

    (b) $\dfrac{x}{a} = \dfrac{K_p}{K_p + p}$

    (c) $\dfrac{x}{a} = \left(\dfrac{K_p}{K_p + p} \right)^{1/2}$

    (d) $\dfrac{x}{a} = \left(\dfrac{K_p + p}{K_p} \right)^{1/2}$

75. Among the metals Fe, Zn, Pb, Ag and Pt, which do not give a metal nitrate on treatment with concentrated HNO_3?

    (a) Fe and Pt

    (b) Fe and Zn

    (c) Fe, Ag and Pt

    (d) Pb, Ag and Pt

76. $\Delta G°$ versus T plot the Ellingham's diagram slopes downward for the reaction
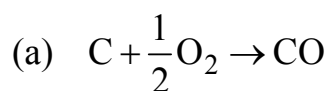
    (a) $C + \dfrac{1}{2}O_2 \rightarrow CO$

(b) $\quad CO + \dfrac{1}{2}O_2 \to CO_2$

(c) $\quad 2Ag + \dfrac{1}{2}O_2 \to Ag_2O$

(d) $\quad Mg + \dfrac{1}{2}O_2 \to MgO$

77. When a substance 'A' reacts with water, it produces a combustible gas 'B' and a solution of substance 'C' in water. while another substance 'D' reacts with solution of 'C' to produce the same gas B on warming while 'D' can produce gas 'B' on reaction with dilute H_2SO_4 at room temperature. 'A' imparts a deep golden yellow colour to a smokeless flame on Bunsen burner. Identify 'A', 'B', 'C' and 'D' respectively are

(a) $\quad K, H_2, KOH, Al$

(b) $\quad Na, H_2, NaOH, Zn$

(c) $\quad CaC_2, C_2H_2, Ca(OH)_2, Fe$

(d) $\quad Ca, H_2, Ca(OH)_2, Sn$

78. The volume of a colloidal particle, V_c as compared to volume of solute particle V_s in a true solution could be

(a) $\quad \dfrac{V_c}{V_s} = 10^{-3}$

(b) $\quad \dfrac{V_c}{V_s} = 10^{3}$

(c) $\quad \dfrac{V_c}{V_s} \approx 10$

(d) $\quad \dfrac{V_c}{V_s} \approx 10^{22}$

79. Point out the correct decreasing order of pK_b values of following amines
$C_2H_5NH_2$, $C_6H_5NHCH_3$, $(C_2H_5)_2NH$ and $C_6H_5NH_2$

(a) $\quad (C_2H_5)_2NH > C_2H_5NH_2 > C_6H_5NHCH_3 > C_6H_5NH_2$

(b) $\quad (C_2H_5)_2NH > C_6H_5NHCH_3 > C_6H_5NH_2 > C_2H_5NH_2$

(c) $C_6H_5NH_2 > C_6H_5NHCH_3 > (C_2H_5)_2NH > C_2H_5NH_2$

(d) $C_2H_5NH_2 > (C_2H_5)_2NH > C_6H_5NHCH_3 > C_6H_5NH_2$

80. If the rate of decomposition of N_2O_5 during a certain time internal is 2.4×10^{-4} mol L^{-1} min^{-1}.

$$N_2O_5 \rightarrow 2NO_2 + \frac{1}{2}O_2$$
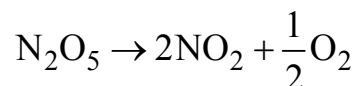
What is the rate of formation of NO_2 and O_2 mol L^{-1} min^{-1}?

(a) 2.3×10^{-5} and 1.2×10^{-5} respectively

(b) 3.8×10^{-4} and 0.6×10^{-4} respectively

(c) 2.4×10^{-4} and 1.5×10^{-4} respectively

(d) 4.8×10^{-4} and 1.2×10^{-4} respectively
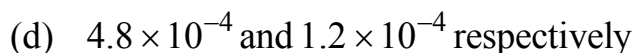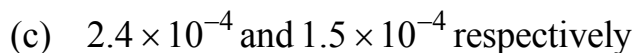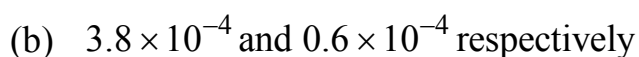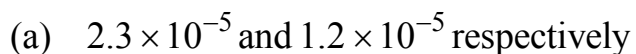
81. Consider the reaction equilibrium

$$\underset{\substack{\text{(Greater}\\\text{volume)}}}{\text{Ice}} \rightleftharpoons \underset{\substack{\text{(Lesser}\\\text{volume)}}}{\text{Water}} - x\,\text{kcal}$$
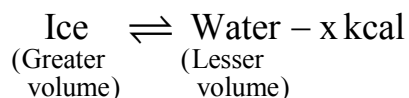
The favourable conditions for forward reaction are

(a) low temperature, high pressure and excess of ice

(b) low temperature, low pressure and excess of ice

(c) high temperature, low pressure and excess of ice

(d) high temperature, high pressure and excess of ice
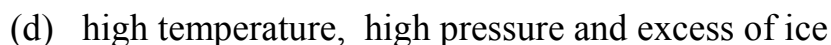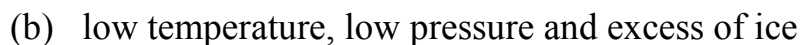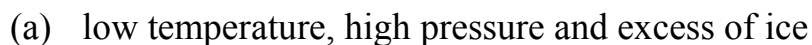
82. Calculate the emf of the cell in which of the following reaction takes place

$Ni(s) + 2Ag^+(0.002M) \rightarrow Ni^{2+}(0.160M) + 2Ag(s)$
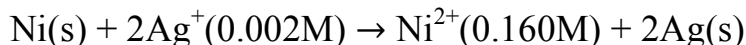
(Give that $E°_{cell} = 1.05V$]

(a) 0.73 V

(b) 0.91 V

(c) 0.62 V

(d) 0.34 V
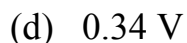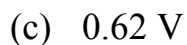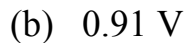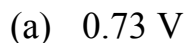
83. Point out of the true statement.

(a) photochemical smog occurs in a day time while the classical smog occur in the morning hours

(b) Classical smog has an oxidizing character whereas the photochemical smog is reducing in character

(c) During formation of smog, the level of ozone in the atmosphere goes down

(d) Classical smog is good for health but not photochemical smog

84. One mole of magnesium in the vapour state absorbed 1200 kJ mol^{-1} energy. If the first and second ionisation energies of Mg are 750 and 1450 kJ mol^{-1} respectively, the final composition of the mixture is

(a) 86% Mg$^+$ + 14% Mg^{2+}

(b) 69% Mg$^+$ + 31% Mg^{2+}

(c) 14% Mg$^+$ + 86% Mg^{2+}

(d) 31% Mg$^+$ + 69% Mg^{2+}

85. In the following reaction $CH_3CHO + NH_2 \cdot NH_2 \to A \xrightarrow{B} CH_3CH_3 + N_2$
Identify A and B.

(a) $CH_3CH = NNH_2$ and C_2H_5ONa

(b) $CH_3CH_2 - NH_2$ and C_2H_5ONa

(c) $CH_3 - NH - NH - CH_3$ and C_2H_5OH

(d) $CH_3CH_2NH_2$ and C_2H_5OH

86. If the distance between Na$^+$ and Cl$^-$ ions in sodium chloride crystal is y pm, the length of the edge of the c unit cell is

(a) 4y pm

(b) y/4 pm

(c) y/2 pm

(d) 2y pm

87.

$$CH_3CH_2 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - \underset{\underset{OH}{|}}{CH} - CH_3 \xrightarrow[\text{heat}]{H_2SO_4} \underset{\text{Major}}{P}$$
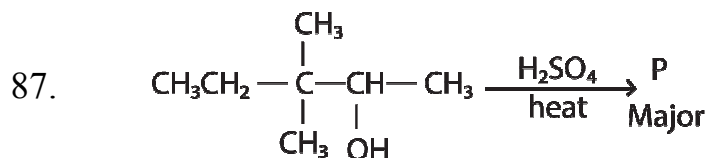
What is the major product P in the above reaction?

(a) $\underset{\underset{CH_3}{|}}{CH_2} - CH_2 \ - CH_3 - \overset{\overset{CH_3}{|}}{CH} = CH_2$

(b) $CH_3 - \overset{\overset{CH_3}{|}}{CH} - \overset{\overset{CH_3}{|}}{CH} - CH = CH_2$

(c) $CH_3CH_2 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH = CH_2$

(d) $CH_3CH_2 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} = C - CH_3$
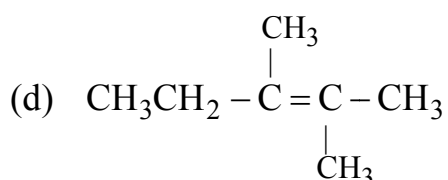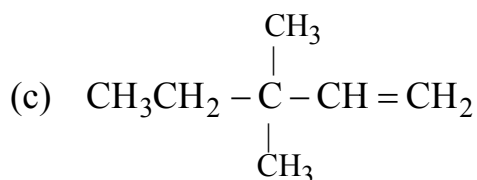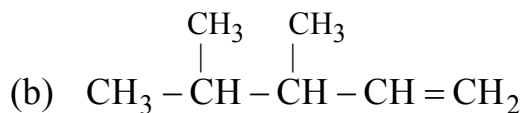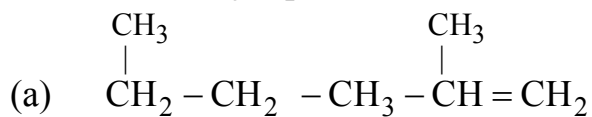
88. Carbon and oxygen forms two compound. Carbon content in one of them is 42.9% while in the other is 27.3%. The give data is in support with
(a) law of definite proportions
(b) law of reciprocal proportions
(c) law of multiple proportions
(d) law of conservation of mass

89.

$$\text{(structure)} \xrightarrow[-H_2O]{+H^+} [X] \xrightarrow{Br_2, CCl_4} C_4H_8Br_2$$

five such products are possible
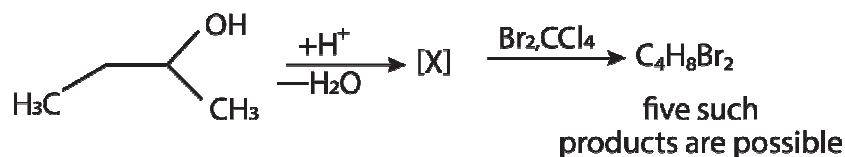
How many structures of X is possible?
(a) 4
(b) 5
(c) 6

(d) 3

90. 100 mL of liquid A was mixed with 25 mL of liquid B, to give non-ideal solution of A-B. The volume of this mixture will be
(a) 75 mL
(b) 125 mL exact
(c) fluctuating between 75 mL to 125 mL
(d) close to 125 mL but not exceed that 125 mL

91.

Major Product 'X' is

(a)

(b)

(c)

(d)
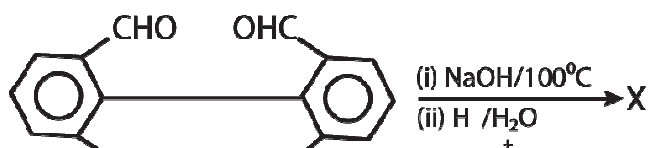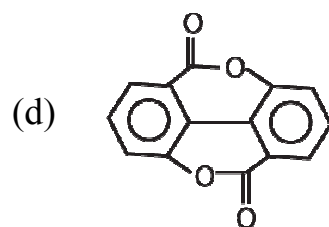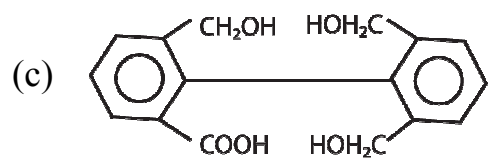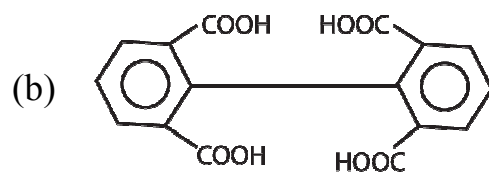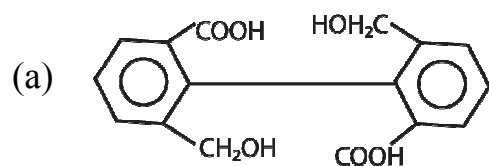
92. Salts of metals X, Y and Z are electrolysed under identical condition using same quantity of electricity. It was observed that 4.2 g of X, 5.4 g of Y and 19.2 g of Z were deposited at respective cathode. If the atomic weights of X, Y, Z are 7, 27 and 64 respectively, then their ratio of valencies is
(a) $1:2:3$
(b) $1:3:2$
(c) $2:3:1$
(d) $3:2:2$

93. Aniline is reacted with bromine water and the resulting product is treated with an aqueous solution of sodium nitrite in the presence of dilute HCl. The compound so formed is converted into tetrafluoroborate which is subsequently heated dry. The final product is
(a) 2, 4, 6-tribromofluorobenzene
(b) 1, 3, 5-tribromobenzene
(c) p-bromoaniline
(d) o-bromofluorobenzene

94. Three spheres of the first layer and three of the second layer enclose a site at the centre in a closest packing arrangement, this site is called
(a) interstitial void
(b) tetrahedral void
(c) octahedral void
(d) cubic void

95. Which of the following is the best method for synthesis of 1-bromo-3-chlorobenzene?

(a)

(b)

Br—(benzene) $\xrightarrow[\text{H}_2\text{SO}_4]{\text{SO}_3}$ $\xrightarrow[\text{AlCl}_3]{\text{Cl}_2}$ $\xrightarrow[60^\circ\text{C}]{\text{H}_2\text{SO}_4}$

(c)

NO_2—(benzene) $\xrightarrow[\text{AlCl}_3]{\text{Cl}_2}$ $\xrightarrow[\text{HCl}]{\text{Zn}}$ $\xrightarrow[\text{Cold}]{\text{HNO}_2}$ $\xrightarrow{\text{Cu}_2\text{Br}_2}$

(d)

Cl—(benzene) $\xrightarrow[\text{H}_2\text{SO}_4]{\text{HNO}_3}$ $\xrightarrow[\text{HCl}]{\text{Zn}}$ $\xrightarrow[\text{Cold}]{\text{HNO}_2}$ $\xrightarrow{\text{Cu}_2\text{Br}_2}$
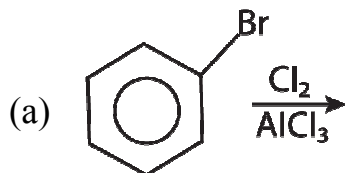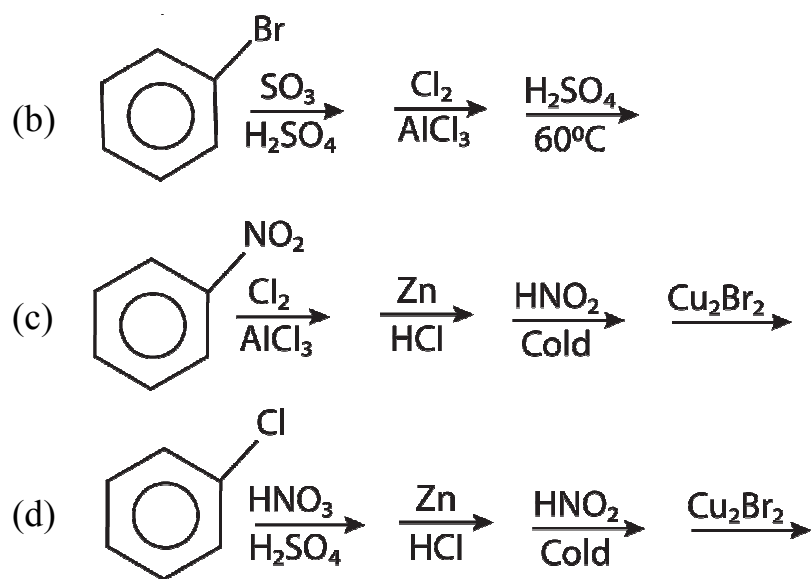
96. Formation of polyethylene from calcium carbide takes place is follows:

$CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$

$C_2H_2 + H_2 \rightarrow C_2H_4$

$nC_2H_4 \rightarrow \left(CH_2 - CH_2\right)_n$
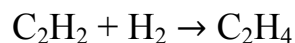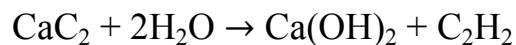
The amount of polyethylene obtained from 64.0 kg of CaC_2 is

(a) 27 kg
(b) 24 kg
(c) 22 kg
(d) 28 kg

97. Identify the product A in the given reaction,

$\xrightarrow{\text{MeI/NaOH(excess)}}$ A

(a)

(b)

(c)

(d)
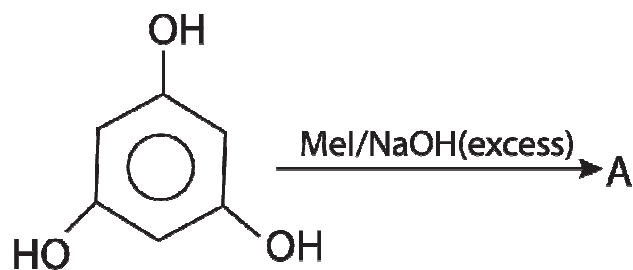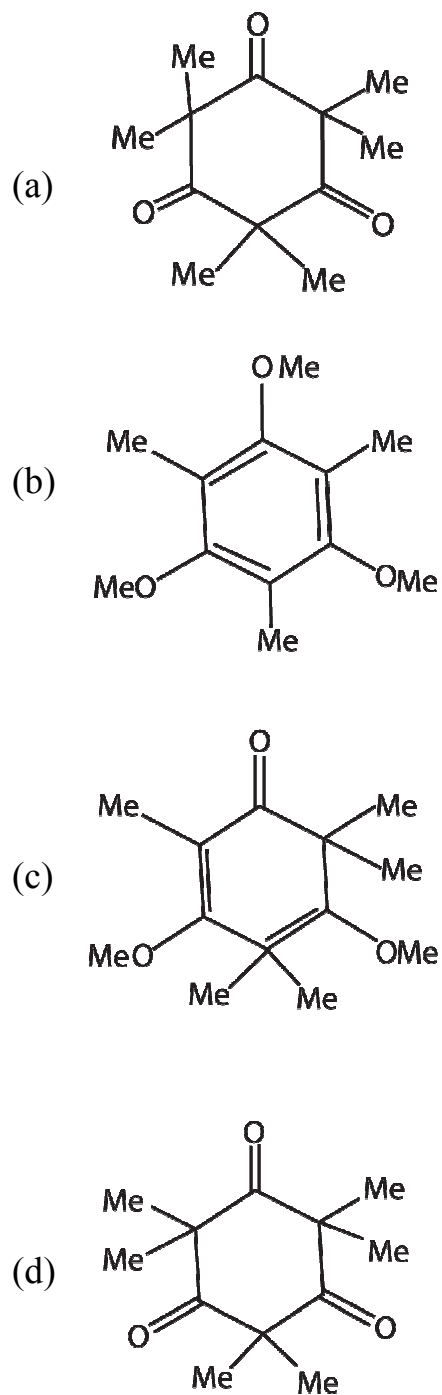
98. The degeneracy of hydrogen atom that has energy equal to $\dfrac{-R_H}{9}$

(where R_H = Rydberg constant)
   (a) 6
   (b) 8
   (c) 5
   (d) 9

99. Consider the statement
    I. Bond length in N_2^+ is 0.02Å greater than in N_2.
    II. Bond length of NO^+ is 0.09 Å less than in NO.
    III. O_2^{2-} has shorter bond length than O_2.
    Which of the following statements are true?
    (a) I and II
    (b) II and III
    (c) I, II and III
    (d) I and III

100. In the following reaction, B is

$$A \xrightarrow{\text{Bromination}} B \xrightarrow{\text{NaNO}_2/\text{HCl}} C \xrightarrow[\text{C}_2\text{H}_5\text{OH}]{\text{Boiling}} \text{sym-tribromobenzene}$$
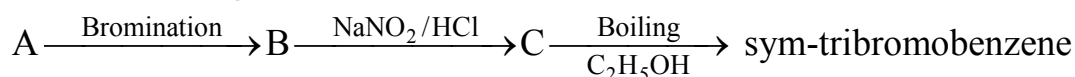
    (a) salicylic acid
    (b) benzoic acid
    (c) phenol
    (d) 2, 4, 6-tribromoaniline

Direction (Q. Nos. 101-120) *Each of these questions contains two statements. Assertion (A) and Reason (R).*
Each of these questions also has four alternative choice, only one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

101. **Assertion (A)** Both Frenkel and Schottky defects are stoichiometric defects.
    Reason (R) Both defects change the density of the crystalline solid.
    (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.
    (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
    (c) If Assertion is true but Reason is false.
    (d) If both Assertion and Reason and false.

102. **Assertion (A)** In any transition series, the magnetic moment of M^{2+} ion first increases and then decreases.

Reason (R) In any transition series, the number of unpaired electrons first increases, afterward decrease.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

103. **Assertion (A)** Benzaldehyde is less reactive in comparison to ethanol towards nucleophilic attack.

Reason (R) All the carbon atoms of benzaldehyde are sp^2-hybridised.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

104. **Assertion (A)** Osmotic pressure of 0.1 N urea solution is less than that of 0.1 M NaCl solution.

Reason (R) Osmotic pressure is not a colligative property.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

105. **Assertion (A)** Gabriel phthalimide reaction can be used to prepare aryl and alkyl amines.

Reason (R) Aryl halides have same reactivity as alkyl halides towards nucleophilic substitution reactions.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

106. **Assertion (A)** Iron is protected from corrosion by connecting magnesium metal with it.

Reason (R) Iron acts as cathode and magnesium as anode which gradually disappears.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

107. **Assertion (A)** Elementary phosphorus exists in three principal allotropic forms, i.e. white (or yellow), red (or violet) and black.

Reason (R) Of the three forms, white phosphorus is the most important and most reactive.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

108. **Assertion (A)** Chlorine reacts more rapidly with H_2 in comparison to D_2.

Reason (R) D—CL bond is stronger in comparison to H—Cl bond.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

109. **Assertion (A)** A solution of sucrose in water is dextrorotatory while on hydrolysis inn presence of little hydrochloric acid, it becomes laevorotatory.

    Reason (R) Sucrose on hydrolysis gives unequal amounts of glucose and fructose as a result of which change in sign of rotation is observed.

    (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

    (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

    (c) If Assertion is true but Reason is false.

    (d) If both Assertion and Reason and false.

110. **Assertion (A)** tert-butyl methyl ether on treatment with HI at 100℃ gives a mixture of methyl iodide and tert-butyl alcohol.

    Reason (R) This reaction occur via S_N2 mechanism

    (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

    (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

    (c) If Assertion is true but Reason is false.

    (d) If both Assertion and Reason and false.

111. **Assertion (A)** In comparison to ethyl chloride, it is not easy to carry out nucleophilic substitution on vinyl chloride.

    Reason (R) Vinyl group is an electron donating.

    (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

    (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

    (c) If Assertion is true but Reason is false.

    (d) If both Assertion and Reason and false.

112. **Assertion (A)** Ranitidine is used to treat hyperacidity and brompheniramine is used to treat hypersensitivity.

    Reason (R) Both of these drugs are antihistamines.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

113. **Assertion (A)** Graphite is a good conductor of heat and electricity.

Reason (R) Graphite has all the electrons firmly held together in C—C σ-bonds.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

114. **Assertion (A)** Sodium reacts with oxygen to form Na_2O_2 but potassium reacts with oxygen to form KO_2.

Reason (R) Potassium is more reactive metal than sodium.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

115. **Assertion (A)** A mixture of o-nitrophenol and p-nitrophenol can be separated by steam distillation.

Reason (R) p-nitrophenol is steam volatile whereas o-nitrophenol is not steam volatile.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

116. **Assertion (A)** Friedel-Crafts reaction benzene with n-propyl chloride on heating produce isopropyl benzene

Reason (R) Benzene undergoes electrophilic substitution easily.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

117. **Assertion (A)** Presence of green plant is essential for greenhouse effect.

Reason (R) Chlorophyll of green plants causes greenhouse effect.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

118. **Assertion (A)** Neoprene can be further hardened by heating with the sulphur.

Reason (R) It contains allylic double bond which help in introducing sulphur bridges between different polymer chains.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

119. **Assertion (A)** H_2O is the only hydride of group-16 which is liquid at ordinary temperature.

Reason (R) In ice, each oxygen atom is surrounded by two covalent bonds and two hydrogen bonding.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

120. **Assertion (A)** Carbonate and hydroxide ores are concentrated by froth floatation process.

Reason (R) In froth floatation process, mineral oil is used due to it preferentially wets the gangue particles.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

AIIMS MBBS Entrance Exam 2015
Biology (Solved Paper)

121. The antibiotics have no effect on viruses because
    (a) viruses show metabolism of their own
    (b) viruses are too small in size for antibiotics to act upon them
    (c) viruses show no metabolism of their own
    (d) viruses produce a thick covering and encyst themselves as endospores

122. Schizocoelomates and enterocoelomates are
    (a) acoelomates
    (b) invertebrates
    (c) true coelomates
    (d) echinoderms only

123. Cestoda are distinguished from other flatworms by the absence by
    (a) digestive system
    (b) nervous system
    (c) excretory system
    (d) reproductive system

124. Which one of the following is referred as 'living fossils'?
    (a) *Sarcoptes*
    (b) *Daphnia*
    (c) *Limulus*
    (d) *Balanus*

125. Match the following columns.

Column I	Column II
A. Sea lemon	1. Doris
B. Sea mussel	2. Mytilus
C. Garden snail	3. Helix
D. Grey slug	4. Limax

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

126. The small projections present on the surface of pineapple fruit represent
    (a) persistent styles
    (b) persistent stamens
    (c) persistent calyx
    (d) persistent bracts

127. Pith cavity occurs in the stem of
    (a) *Helianthus*
    (b) *Zea mays*

(c) *Cucurbita*

(d) *Dracaena*

128. Pollination in *Rafflesia is occurred by*
    (a) Carion flies
    (b) elephant
    (c) bat
    (d) crow

129. Which of the following statement is true?
    (a) Vessels are unicellular and with narrow lumen
    (b) Vessels are multicellular and with side lumen
    (c) Tracheids are unicellular and with wise lumen
    (d) Tracheids are multicellular and with narrow lumen

130. Haversian canal in the bone of mammals are connected by small blood vessel canal called
    (a) Schlemm's canal
    (b) Volkmann's canal
    (c) Portal capillaries
    (d) Sinuses

131. If a biochemical analysis of mitochondria has to done, the best procedure would be
    (a) select cells which have a larger number of mitochondria
    (b) plasmolyse the cell and filter out the mixture an take the debris
    (c) grind the cells and filter out the mixture and take the debris
    (d) subject the cell to cell fractionation (centrifuge) and obtain mitochondria

132. Choose the statement.
    (a) All proteins have 20 amino acids
    (b) Both ends of a protein are similar
    (c) All proteins are soluble
    (d) Proteins are formed by peptide bonds

133. Match the following column I with column II.

Column I	Column II
A. Agrostology	1. Earth
B. Smallest flowering plant	2. Genetic engineering
C. Tectonic	3. Migration
D. Ecesis	4. Wolffia
E. Euphanix	5. Grass

   (a)   A-5, B-4, C-1, D-3, E-2
   (b)   A-1, B-2, C-3, D-4, E-5
   (c)   A-2, B-3, C-1, D-5, E-4
   (d)   A-4, B-2, C-2, D-1, E-3

134. What is true of urea biosynthesis?
   (a)   Uric acid is starting point
   (b)   Urea is synthesized in lysosomes
   (c)   Urea cycle enzymes are located inside mitochondria
   (d)   Urea is synthesized in kidney

135. In old age, stiffness of joints is due to the
   (a)   hardening of bones
   (b)   inefficiency of muscles
   (c)   decrease in synvial fluid
   (d)   enlargement of bones

136. Node of Ranvier occurs where
   (a)   nerve is covered with myelin sheath
   (b)   neurilemma is discontinuous
   (c)   neurilemma and myelin sheath are discontinuous
   (d)   myelin sheath is discontinuous

137. Correct hormonal sequence in the case of menstruation as
   (a)   oestrogen, FSH, progesterone

(b) oestrogen, progesterone, FSH

(c) FSH, progesterone, oestrogen

(d) FSH, oestrogen, progesterone

138. In blue-green algae, photosystem-II contains important pigment concerned with photolysis of water. It is a
(a) phycocyanin
(b) cytochrome-c
(c) chlorophyll-b
(d) β-carotene

139. Identify the process taking place in this experiment.
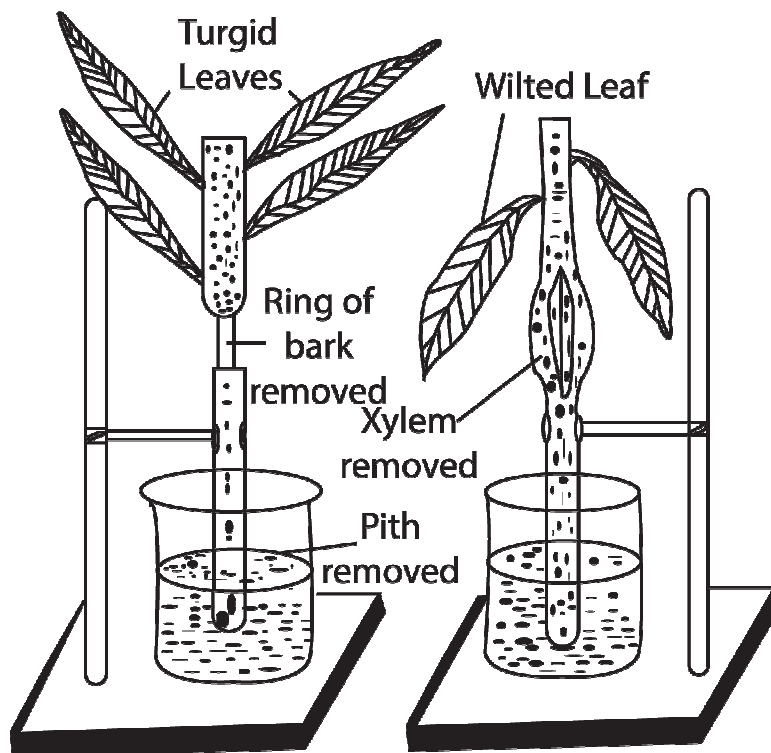
(a) Ringing experiment for translocation of sap
(b) Demonstration of root pressure
(c) Eosin test to demonstrate ascent of sap
(d) Demonstration of transpiration

140. Which of the following statement is incorrect regarding the band region of polytene chromosome?
    (a) Feulgen negative area
    (b) Absorb ultraviolet light at 2600 Å
    (c) Chromonemata is tightly packed
    (d) Stain intensity with basic stain

141. Refrigerated fruits maintain flavor and taste for longer period due to
    (a) non-availability of O_2
    (b) presence of excess of CO_2
    (c) presence of excess humidity
    (d) slower rate of respiration

142. The biological clock measures the length at each night by the
    (a) relative amount of red absorbing and far-red absorbing phytochrome present at dawn
    (b) amount of far-red absorbing phytochrome at dusk
    (c) relative amount of red absorbing and far-red absorbing phytochrome at mid day
    (d) rate at which are kind of phytochrome is converted to the other

143. In the homeostatic control of blood sugar level, which organs function as modulator and effector respectively?
    (a) Liver and islet of Langerhans
    (b) Hypothalamus and liver
    (c) Hypothalamus and islet of Langerhans
    (d) Islet of Langerhans and hypothalamus

144. A colour blind man marry with a daughter of colour blind father, the generation will be
    (a) there will be no daughter colour blind
    (b) all sons will be colour blind
    (c) all daughter will be colour blind
    (d) half sons will be colour blind

145. Which one of the following organisms is correctly matched with its three characteristics?
    (a) Pea $- C_3 -$ pathway, endospermic seed, veaxillary aestivation
    (b) Tomato-twisted aestivation, axile placentation, berry
    (c) Onion-Bulb, imbricate aestivation, axile placentation
    (d) Maize $- C_3 -$ pathway, closed vascular bundle scutellum

146. The domestic sewage in large cities
    (a) has high BOD as it contains both aerobic and bacteria
    (b) is processed by aerobic and then anaerobic bacteria in the secondary treatment in Sewage Treatment Plants (STPs)
    (c) when treated in STPs does not really require the aeration step as the sewage contains adequate oxygen
    (d) has very high amounts of suspended solids and dissolved salts

147. The first clinical gene therapy was given for treating
    (a) diabetes mellitus
    (b) chickenpox
    (c) rheumatoid arthritis
    (d) adenosine deaminase deficiency

148. Which one of the following human organs is called the 'graveyard of RBCs?
    (a) Gall b ladder
    (b) Kidney
    (c) Spleen
    (d) Liver

149. Biolistic (gene gun) is suitable for
    (a) disarming pathogen vectors
    (b) transformation of plant cell
    (c) constructing recombinant DNA by joining with vectors
    (d) DNA fingerprinting

150. Which one of the following generally act as an antagonists to gibberellins?
    (a) Zeatin
    (b) Ethylene
    (c) ABA
    (d) IAA

151. Select the correct statement about biodiversity.
    (a) The desert area of Rajasthan and Gujarat have very high level of desert animals.
    (b) Large scale planting of Bt cotton has no adverse effect on biodiversity.
    (c) Western Ghats have a very high degree of species richness and endemism.
    (d) Conservation of biodiversity is just a fad pursued by the developed countries.

152. Which one of the following structure is an organelle within an organelle?
    (a) Ribosome
    (b) Peroxysome
    (c) ER
    (d) Mesosome

153. Which of the following is the relatively most accurate method for dating fossils?
    (a) Potassium-argon method
    (b) Uranium-lead method
    (c) Electron spin resonance method
    (d) Radio carbon method

154. The 24-hour (diurnal) rhythm of our body such as the sleep-wake cycle is regulated by the hormone
    (a) cacitonin
    (b) prolactin
    (c) adrenaline
    (d) melatonin

155. In Krnaz anatomy, the bundle sheath cell have
    (a) thin walls many intercellular space and large
    (b) thick walls, no intercellular spaces and large number of chloroplasts
    (c) thin walls, no intercellular spaces and several chloroplasts
    (d) thick walls, many intercellular space and few chloroplasts

156. Which of the following is essential for photolysis of water
    (a) Manganese
    (b) Zinc
    (c) Copper
    (d) Boron

157. In a plant, red fruit (R) dominant over yellow fruit (r) and tallness (T) is dominant over shortness (t). If a plant with RRTT genotype is crossed with a plant that is rrtt. Then
    (a) 25% will be tall with red fruit
    (b) 50% will be tall with red fruit
    (c) 75% will be tall with red fruit
    (d) All of the offspring will be tall with red fruits

158. Which one of the following pairs is not correctly matched?
    (a) Vitamin $- B_{12} -$ Pernicious anaemia
    (b) Vitamin $- B_6 -$ Loss of appetite
    (c) Vitamin $- B_1 -$ Beri $-$ beri
    (d) Vitamiin $- B_2 -$ Pellagra

159. What would happen, if in a gene encoding a polypeptide of 50 amino acids, 25th codon (UAU) is mutated to UAA?
    (a) A polypeptide of 49 amino acids will be formed
    (b) A polypeptide of 25 amino acids will be formed
    (c) A polypeptide of 24 amino acids will be formed
    (d) Two polypeptides of 24 and 25 amino acids will be formed

160. Short-lived immunity acquired from mother to foetus placenta or through mother's milk to the infant is categorized as
(a) cellular immunity
(b) innate non-specific immunity
(c) active immunity
(d) passive immunity

Direction (Q. Nos. 161-180) *Each of these questions contains two statements. Assertion (A) and Reason (R).*
Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

161. **Assertion (A)** Coacervates are believed to be the precursors of life.
Reason (R) Coacervates were self-duplicating aggregates of proteins surrounded by lipid molecules.
(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.
(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) If Assertion is true but Reason is false.
(d) If both Assertion and Reason and false.

162. **Assertion (A)** Genecology is the study of genetic compositions and changes is relation to the origin of ecades, ecotypes, new sps., etc.
Reason (R) Auteology deals with the study of a group of organisms.
(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.
(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) If Assertion is true but Reason is false.
(d) If both Assertion and Reason and false.

163. **Assertion (A)** UV-radiation causes photodissociation of enzyme into O_2 and O. Thus causing damage to the stratospheric ozone layer.
Reason (R) Ozone hole is resulting in global warming and climate change.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

164. **Assertion (A)** A morphology based approach to taxonomy is called alpha taxonomy and it is old fashioned.

Reason (R) A multidisciplinary approach to taxonomy called omega taxonomy is favoured in recent years. As, it excludes morphological features.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

165. **Assertion (A)** A network of food chains existing together in an ecosystem is known as food web.

Reason (R) An animal like kite cannot be apart of food web.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

166. **Assertion (A)** Smaller the organism, higher is the rate of metabolism per gram weight.

Reason (R) The heart rate of six months old baby is much higher than that of an old person.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

167. **Assertion (A)** Female gametophyte in angiosperm is eight nucleate.
   Reason (R) Double fertilization occurs in angiosperms.
   (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.
   (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   (c) If Assertion is true but Reason is false.
   (d) If both Assertion and Reason and false.

168. **Assertion (A)** Photomodulation of flowering is a phytochrome regulated process.
   Reason (R) Active form of phytochrome directly induces floral induction in shoot bud.
   (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.
   (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   (c) If Assertion is true but Reason is false.
   (d) If both Assertion and Reason and false.

169. **Assertion (A)** Cyclic pathway of photosynthesis first appeared in some eubacterial sps.
   Reason (R) O_2 started accumulating in the atmosphere after the non-cyclic pathway of photosynthesis evolve.
   (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.
   (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   (c) If Assertion is true but Reason is false.
   (d) If both Assertion and Reason and false.

170. **Assertion (A)** Under condition of high light intensity and limited CO_2 supply, photorespiration has a useful role in protecting the plants from photooxidative damage.

   Reason (R) If enough CO_2 is not available to utilize light energy for carboxylation to proceed, the excess energy may not cause damage to plants.

   (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

   (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

   (c) If Assertion is true but Reason is false.

   (d) If both Assertion and Reason and false.

171. **Assertion (A)** A cell membrane shows fluid behavior.

   Reason (R) A membrane is a mosaic or composite of diverse lipids and proteins.

   (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

   (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

   (c) If Assertion is true but Reason is false.

   (d) If both Assertion and Reason and false.

172. **Assertion (A)** A co-enzyme or metal ion that is very tightly bound to enzyme protein called prosthetic group.

   Reason (R) A complete, catalytically active enzyme together with its bound prosthetic group is called apoenzyeme.

   (a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

   (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

   (c) If Assertion is true but Reason is false.

   (d) If both Assertion and Reason and false.

173. **Assertion (A)** G$_1$-phase is also called anaphase, as during this phase the cell stores ATP for cell division.

Reason (R) Cell produces structural and functional proteins. Cell's metabolic rate is high and is controlled by the enzymes.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

174. **Assertion (A)** Secondary growth in dicot roots occur with the help of vascular cambium and phellogen.

Reason (R) Vascular cambium is formed from conjuctive parenchyma and part of pericycle.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

175. **Assertion (A)** Most mineral must enter the root by the active absorption into the cytoplasm of epidermal cells.

Reason (R) This transportation needs energy in the form of ATP. Some ions also move into the epidermal cells passively.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

176. **Assertion (A)** The chemical potential of pure water at normal temperature and pressure is zero.

Reason (R) In solution, value of water potential is always positive.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

177. **Assertion (A)** Chlorine is absorbed as Cl^- ions. Its precise role is not well known. However with Na^+ and K^+, it help in determining solute concentration and anion-cation balance is cells.

Reason (R) Chlorine plays an important role in photosynthesis and takes part in the water splitting reaction, thus releasing O_2.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

178. **Assertion (A)** In alcoholic drink, the alcohol is converted into glucose in liver.

Reason (R) Liver cells are able to produce glucose from alcohol by back fermentation.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

179. **Assertion (A)** Liver is the largest gland of the body. The hepatic lobules are the structural and functional units of liver containing hepatic cells arranged in the form of cords.

Reason (R) Each lobule of the liver is covered by a thin connective tissue sheath called the Glisson's capsule. The bile is secreted by hepatic cells.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

180. **Assertion (A)** Tidal volume is the volume of air inspired or expired with the normal breath.

Reason (R) Adult person contains 500 mL expired or inspired volumes of air with each normal breath.

(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason and false.

AIIMS MBBS Entrance Exam 2015
General Knowledge & Aptitude

1. National Sample Survey Office (NSSO) survey released literacy rate report in July, 2015. What was the percent in rural areas and in urban areas?
   (a) 71% and 86%
   (b) 86% and 71%
   (c) 78% and 61%
   (d) 76% and 81%

2. Which State government launched a voluntary scheme 'Mhara Gaon-Jagmag Gaon' in July, 2015?
   (a) Punjab
   (b) Gujarat
   (c) Haryana

(d) Maharashtra

3. The students of which State entered Guinness book for washing hands on Global Hand washing Day?
(a) Chhattisgarh
(b) Madhya Pradesh
(c) Jharkhand
(d) Bihar

4. The United Nations Educational, Scientific and Cultural Organization (UNESCO) has granted world heritage status to more than 20 old industrial sites in Japan including Jeiji-era site? What is Keiji-era site's location in Japan?
(a) South-East
(b) South-West
(c) North-West
(d) North-East

5. In July, 2015, which countries were accepted as full members of the Shanghai Cooperation Organization (SCO)?
(a) India and Bangladesh
(b) India and Pakistan
(c) India and Myanmar
(d) India and Sri Lanka

6. Which two antibodies showed n ability recently to neutralize the virus of the epidemic of Middle-East respiratory Syndrome (MERS)?
(a) REGN3051
(b) REGN3048
(c) Both (a) and (b)
(d) None of these

7. Who become Britain's youngest 'cyborg' (part-human, part machine) boy
(a) Kevin Warwick
(b) Byron Wake

(c) Martock

(d) None of the above

8. Which country in July, 2015 launched its heaviest commercial space mission ever with its polar rocket successfully putting five British satellites in the Sun synchronous orbit?
   (a) Russia
   (b) The USA
   (c) India
   (d) China

9. Which Grandmaster and former world junior champion won the Commonwealth Chess Championship in July, 2015?
   (a) Arghyadip Das
   (b) Abhijeet Gupte
   (c) MR Lalith Babu
   (d) None of these

10. Chile won Copa America Cup 2015 by defeating which South American country?
    (a) Argentina
    (b) Brazil
    (c) Ecuador
    (d) Venezuela

11. China declared whom to head the $ 100 billion Beijing-backed Asian Infrastructure Investment Bank (AIIB)
    (a) Xi Jinping
    (b) Chanda Kochhar
    (c) Jim Kim
    (d) Jin Liqun

12. Basharat Nawaz Khan popularly known as Bashar Nawaz, a renowned Urdu poet, critic and orator has been died in July, 2015. He penned which popular song?

(a) Karoge Yaad

(b) Dekhio Aaj Humko

(c) Dikhayi Diye Youn

(d) Phir Chhidi

13. Rakesh Sahni, Former Chief Secretary of which State government has appointed as the Chairman of Narmada Valley Development Authority (NVDA)?

(a) Maharashtra

(b) Andhra Pradesh

(c) Chhattisgarh

(d) Madhya Pradesh

14. Krishnapatnam Port has received the Golden Peacock Environment Management Award for its initiatives and achievements in the field of environment at the 17th World Congress on Environment Management held in New Delhi, Where is it is located?

(a) Andhra Pradesh

(b) Tamil Nadu

(c) Telangana

(d) Odisha

15. In an examination, Raju got more marks than Mukesh but not as many as Priya. Priya got more marks than Gaurav and Kavita. Gaurav got less marks than Kukesh but his marks are not the lowest in the group. Who is second in the descending order of marks?

(a) Priya

(b) Kavita

(c) Raju

(d) Gaurav

Directions (Q Nos. 16 and 17) Select the misting number from the given responses.
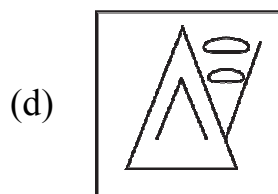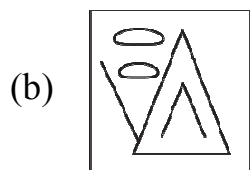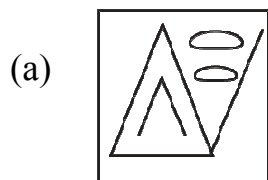
16.
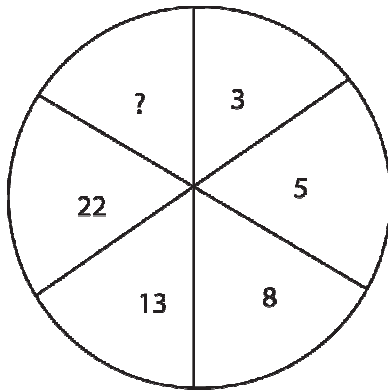
(a) 1
(b) 26
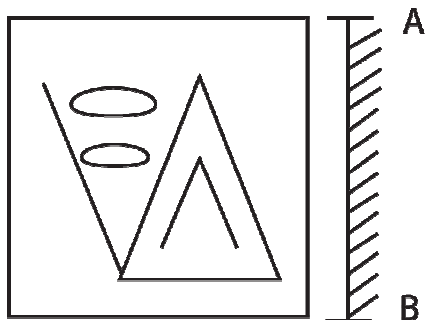(c) 39
(d) 45

17.

64	36	2
81	25	4
144	16	?

(a) 6
(b) 8
(c) 3
(d) 16

18. Ashish walked 50 m towards East and took a right turn and walked 40 m. He again took a right turn and walked 50 m, How for is he from the starting point?
    (a) 10 m
    (b) 25 m
    (c) 30 m
    (d) 40 m

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

(a)

(b)

(c)

(d)

20. The least number which when divided by 5, 6, 7 and 8 leaves a remainder 3 but when divided by 9 leaves no remainder, is
(a) 1677
(b) 1683

(c) 2523

(d) 3363