

# AIIMS - 2005

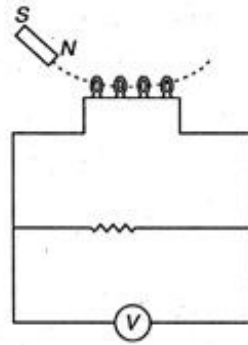
## Full Paper

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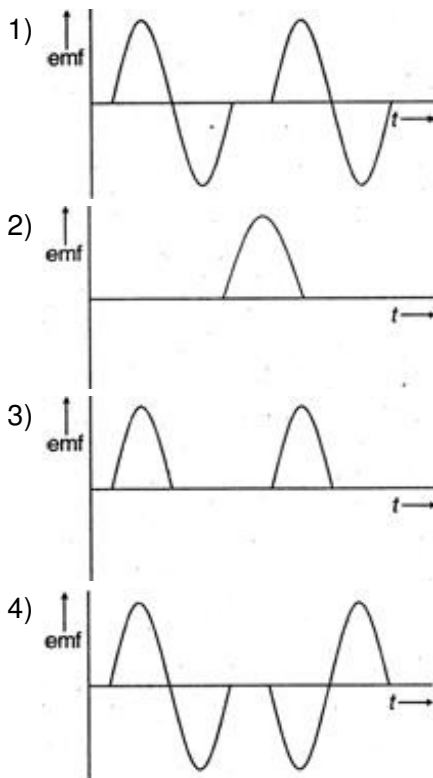
### Physics

1. Consider an  $n-p-n$  transistor amplifier in common-emitter configuration. The, current gain of the transistor is 100. If the collector current changes by 1 mA, what will be the change in emitter current ?
  - 1) 1. 12 mA
  - 2) 1.01 mA
  - 3) 0.001 mA
  - 4) 100 mA
2. For a constant hydraulic stress on an object, the fractional change in the object's volume ( $\Delta V/V$ ) and its bulk modulus (B) are related as :
  - 1)  $(\Delta V/V) \propto B$
  - 2)  $(\Delta V/V) \propto 1/B$
  - 3)  $(\Delta V/V) \propto B^2$
  - 4)  $(\Delta V/V) \propto B^{-2}$
3. In case of linearly polarised light, the magnitude of the electric field vector :
  - 1) does not change with time
  - 2) varies periodically with time
  - 3) increases and decrease linearly with time
  - 4) is parallel to the direction of propagation
4. The magnetic moment ( $\mu$ ) of a revolving electron around the nucleus varies with principal quantum number  $n$  as :
  - 1)  $\mu \propto n$
  - 2)  $\mu \propto 1/n$
  - 3)  $\mu \propto n^3$
  - 4)  $\mu \propto 1/n^3$
5. A particle having charge  $q$  and mass  $m$  is project with velocity  $\vec{v} = 2\hat{i} - 3\hat{j}$  in unifrom electric field  $\vec{E} = E_0 \cdot \hat{j}$ . Change in momentum  $|\Delta \vec{p}|$  during any time interval  $t$  is given by :
  - 1)  $\sqrt{3} M$
  - 2)  $q E_0 t$
  - 3)  $(q E_0 t/m)$
  - 4) zero

6. A magnet is made to oscillate with a particular frequency, passing through a coil as shown



in figure. The time variation of the magnitude of emf generated across the coil during one cycle is :



7. The apparent depth of water in cylindrical water tank of diameter  $2R$  cm is reducing at the rate of  $x$  cm/min when water is being drained out at a constant rate. The amount of water drained in cc per minute is : ( $n_1$  = refractive index of air,  $n_2$  = refractive index of water)

- 1)  $(x\pi R^2 n_1)/n_2$
- 2)  $(x\pi R^2 n_2)/n_1$
- 3)  $(2\pi R n_1)/n_2$
- 4)  $\pi R^2 x$

8. A block of mass  $10$  kg is moving in  $x$ -direction with a constant speed of  $10$  m/s. It is subjected to a retarding force  $F = -0.1 x$  J/m during its travel from  $x = 20$  m to  $x = 30$  m. Its final kinetic energy will be :

- 1)  $475$  J

- 2) 450 J
- 3) 425 J
- 4) 400 J

9. The ground state energy of hydrogen atom is -13.6 eV. What is the potential energy of the electron in this state ?

- 1) Zero
- 2) -27.2 eV
- 3) 35.2 eV
- 4) 40 eV

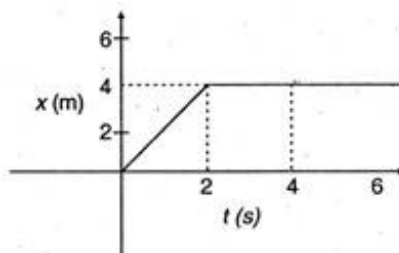
10. For sky wave propagation of 10 MHz signal, what should be the minimum electron density in ionosphere ?

- 1)  $\sim 1.2 \times 10^{12} \text{ m}^{-3}$
- 2)  $\sim 10^5 \text{ m}^{-3}$
- 3)  $\sim 10^4 \text{ m}^{-3}$
- 4)  $\sim 10^{24} \text{ m}^{-3}$

11. In a semiconducting material the mobilities of electrons and holes are  $\mu_e$  and  $\mu_h$  respectively. which of the following is true ?

- 1)  $\mu_e > \mu_h$
- 2)  $\mu_e < \mu_h$
- 3)  $\mu_e = \mu_h$
- 4)  $\mu_e < 0; \mu_h > 0$

12. In the figure given the position-time graph of a particle of mass 0.1 kg is shown. The impulse at  $t = 2\text{s}$  is :



- 1)  $0.2 \text{ kg m s}^{-1}$
- 2)  $-0.4 \text{ kg m s}^{-1}$
- 3)  $0.6 \text{ kg m s}^{-1}$
- 4)  $-0.6 \text{ kg m s}^{-1}$

13. The condition for a uniform spherical mass  $m$  of radius  $r$  to be a black hole is :  
[G = gravitational constant and  $g$  = acceleration due to gravity]

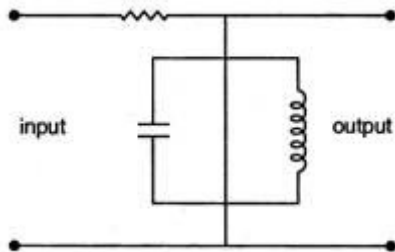
- 1)  $(2Gm/r)^{1/2} \leq c$

2)  $(2Gm/r)^{1/2} = c$

3)  $(2Gm/r)^{1/2} \geq c$

4)  $(gm/r)^{1/2} \geq c$

14. The circuit shown below acts as :

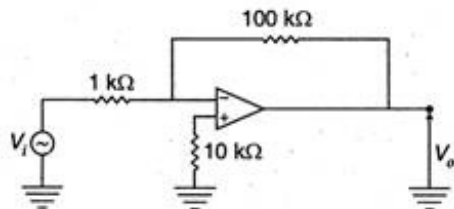


- 1) tuned filter
- 2) low pass filter
- 3) high pass filter
- 4) rectifier

15. Dimensions of electrical resistance are :

- 1)  $[ML^2 T^{-3} A^{-1}]$
- 2)  $[ML^2 T^{-3} A^{-2}]$
- 3)  $[ML^1 T^{-3} A^{-2}]$
- 4)  $[ML^{-1} T^2 A^2]$

16. The voltage gain of the following amplifier is :



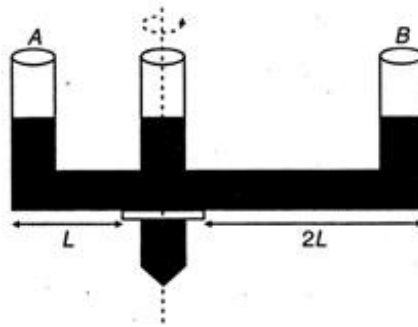
- 1) 50
- 2) 100
- 3) 150
- 4) 200

17. A radioactive material has half-life of 10 days. What fraction of the material would remain after 30 days ?

- 1) 0.05
- 2) 0.025
- 3) 0.125
- 4) 0.175

18. A given shaped glass tube having uniform cross-section is filled with water and is mounted on a rotatable shaft as shown in figure. If the tube is rotated with a constant angular

velocity  $\omega$  then :

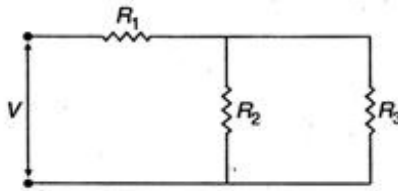


- 1) water levels in both sections A and B go up
- 2) water level in section A goes up and that in B comes down
- 3) water level in section A comes down and that in B it goes up
- 4) water levels remain same in both sections

19. A ladder is leaned against a smooth wall and it is allowed to slip on a frictionless floor. Which figure represents the track of its centre of mass ?

- 1)
- 2)
- 3)
- 4)

20. For ensuring dissipation of same energy in all three resistors ( $R_1$ ,  $R_2$ ,  $R_3$ ) connected as shown in figure, their values must be related as :



- 1)  $R_1 = R_2 = R_3$
- 2)  $R_2 = R_3$  and  $R_1 = 4R_2$
- 3)  $R_2 = R_3$  and  $R_1 = (1/4) R_2$
- 4)  $R_1 = R_2 + R_3$

21. A horizontal platform is rotating with uniform angular velocity around the vertical axis passing through its centre. At some instant of time a viscous fluid of mass  $m$  is dropped at the centre and is allowed to spread out and finally fall. The angular velocity during this period :

- 1) decreases continuously
- 2) decreases initially and increases again
- 3) remains unaltered
- 4) increases continuously

22. A conducting ring of radius 1 m is placed in an uniform magnetic field  $B$  of 0.01 T oscillating with frequency 100 Hz with its plane at right angle to  $B$ . What will be the induced electric field?

- 1)  $\pi$  V/m
- 2) 2 V/m
- 3) 15 V/m
- 4) 72 V/m

23. "Parsec" is the unit of :

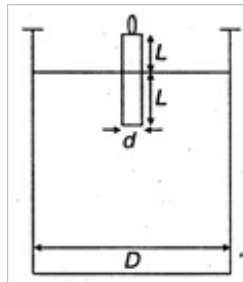
- 1) time
- 2) distance
- 3) Linear velocity
- 4) angular momentum

24. Solid targets of different elements are bombarded by highly energetic electron beams. The frequency ( $f$ ) of the characteristic X-rays emitted from different targets varies with atomic number  $Z$  as :

- 1)  $f \propto \sqrt{Z}$
- 2)  $f \propto Z^2$
- 3)  $f \propto Z^3$
- 4)  $f \propto Z^{3/2}$

25. A candle of diameter  $d$  is floating on a liquid in a cylindrical container of diameter  $D$  ( $D \gg d$ )

as shown in figure. If it is burning at the rate of 2 cm/h then the top of the candle will :

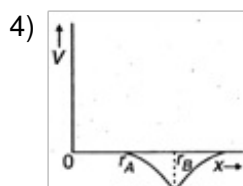
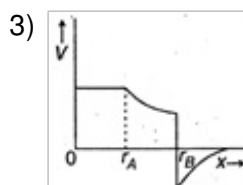
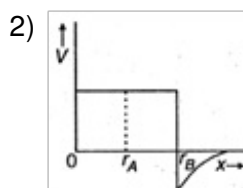
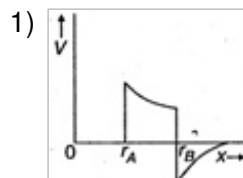


- 1) remain at the same height
- 2) fall at the rate of 1 cm/h
- 3) fall at the rate of 2 cm/h
- 4) go up at the rate of 1 cm/h

26. A telescope has an objective lens of focal length 200 cm and an eye piece with focal length 2 cm. If this telescope is used to see a 50 m tall building at a distance of 2 km, what is the height of the image of the building formed by the objective lens ?

- 1) 5 cm
- 2) 10 cm
- 3) 15 cm
- 4) 20 cm

27. Two concentric conducting thin spherical shells A and B having radii  $r_A$  and  $r_B$  ( $r_B > r_A$ ) are charged to  $Q_A$  and  $-Q_B$  ( $|Q_B| > |Q_A|$ ). The electrical field along a line. (passing through the centre) is :



28. A solid sphere is rolling on a frictionless surface, shown in figure with a translational velocity  $v$  m/s. If it is to climb the inclined surface then  $v$  should be :



- 1)  $\geq \sqrt{(10/7) gh}$
  - 2)  $\geq \sqrt{5 gh}$
  - 3)  $5 gh$
  - 4)  $(10/7) gh$
29. What should be the maximum acceptance angle at the air-core interface of an optical fibre if  $n_1$  and  $n_2$  are the refractive indices of the core and the cladding, respectively ?

- 1)  $\sin^{-1} (n_2/n_1)$
- 2)  $\sin^{-1} \sqrt{(n_1^2 - n_2^2)}$
- 3)  $[\tan^{-1} (n_2/n_1)]$
- 4)  $[\tan^{-1} (n_1/n_2)]$

30. Two infinitely long parallel conducting plates having surface charge densities  $+\sigma$  and  $-\sigma$  respectively, are separated by a small distance. The medium between the plates is vacuum. If  $\epsilon_0$  is the dielectric permittivity of vacuum, then the electric field in the region between the plates is :

- 1) zero
- 2)  $\sigma/2\epsilon_0$  V/m
- 3)  $\sigma/\epsilon_0$  V/m
- 4)  $\sigma/3\epsilon_0$  V/m

31. Which of the following is an amorphous solid ?

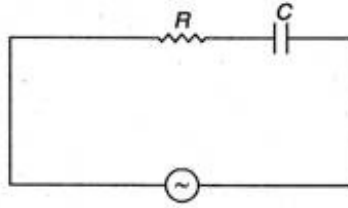
- 1) Glass
- 2) Diamond
- 3) Salt
- 4) Sugar

32. According to Hubble's law, the red-shift ( $Z$ ) of a receding galaxy and its distance  $r$  from earth are related as :

- 1)  $Z \propto r$
- 2)  $Z \propto 1/r$
- 3)  $Z \propto 1/r^3$
- 4)  $Z \propto r^{3/2}$

33. A 50 Hz AC source of 20 V is connected across R and C as shown in figure. The voltage across R is 12 V. The voltage across C is :





- 1) 4 V
  - 2) 8 V
  - 3) 16 V
  - 4) not possible to determine unless values of R and C are given
34. When exposed to sunlight, thin films of oil on water often exhibit brilliant colours due to the phenomenon of :
- 1) interference
  - 2) diffraction
  - 3) dispersion
  - 4) polarisation
35. When a ball is thrown up vertically with velocity  $v_0$ , it reaches a maximum height of  $h$ . If one wishes to triple the maximum height then the ball should be thrown with velocity :
- 1)  $\sqrt{3} v_0$
  - 2)  $3 v_0$
  - 3)  $4 v_0$
  - 4)  $2 v_0$
36. Which of the following functions represents a simple harmonic oscillation ?
- 1)  $\sin \omega t - \cos \omega t$
  - 2)  $\sin^2 \omega t$
  - 3)  $\sin \omega t + \sin 2 \omega t$
  - 4)  $\sin \omega t - \sin 2 \omega t$
37. A person is standing in an elevator. In which situation he finds his weight less ?
- 1) When the elevator moves upward with constant acceleration
  - 2) When the elevator moves downward with constant acceleration
  - 3) When the elevator moves upward with uniform velocity
  - 4) When the elevator moves downward with uniform velocity
38. Which of the following logic gates is an universal gate ?
- 1) OR
  - 2) NOT
  - 3) AND
  - 4) NAND
39. The pressure exerted by an electromagnetic wave of intensity  $I$  ( $\text{W/m}^2$ ) on a non-reflecting surface is :

[c is the velocity of light]

- 1)  $lc/2$
- 2)  $lc^2/2$
- 3)  $l/c$
- 4)  $l/c^2$

40. Energy required to break one bond in DNA is approximately :

- 1)  $\sim 1 \text{ eV}$
- 2)  $\sim 0.01 \text{ eV}$
- 3)  $\sim 0.001 \text{ eV}$
- 4)  $\sim 1.1 \text{ eV}$

**Directions for question 41 to 60 :**

**In each of the following questions, a statement of assertion is given followed by a corresponding statement of reason just below it. Of the statements, mark the correct answer as :**

- (a) If both assertion and reason are true and reason is the 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.

41. **Assertion :** Specific gravity of a fluid is a dimensionless quantity.

**Reason :** It is the ratio of density of fluid to the density of water.

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

42. **Assertion :** Frictional forces are conservative forces.

**Reason :** Potential energy can be associated with frictional forces.

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

43. **Assertion :** By roughening the surface of a glass sheet its transparency can be reduced.

**Reason :** Glass sheet with rough surface absorbs more light.

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

44. **Assertion :** Diode lasers are used as optical sources in optical communication.

**Reason :** Diode lasers consume less energy.

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

45. **Assertion :** Diamond glitters brilliantly .

**Reason :** Diamond does not absorb sunlight.

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

46. **Assertion :** The energy (E) and momentum (p) of a photon are related by  $p = E/c$ .

**Reason :** The photon behaves like a particle.

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

47. **Assertion :** The clouds in sky generally appear to be whitish.

**Reason :** Diffraction due to clouds is efficient in equal measure at all wavelengths.

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

48. **Assertion :** Television signals are received through sky-wave propagation.

**Reason :** The ionosphere reflects electromagnetic waves of frequencies greater than a certain critical frequency.

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

49. **Assertion :** The logic gate NOT can be built using diode.

**Reason :** The output voltage and the input voltage of the diode have  $180^\circ$  phase difference.

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

50. **Assertion :** The resolving power of a telescope is more if the diameter of the objective lens is more.

**Reason :** Objective lens of large diameter collects more light.

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

51. **Assertion :** Reversible systems are difficult to find in real world.

**Reason :** Most processes are dissipative in nature.

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

52. **Assertion :** For system of particles under central force field, the total angular momentum is conserved.

**Reason :** The torque acting on such a system is zero.

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

53. **Assertion :** Air quickly leaking out of a balloon becomes cooler.

**Reason :** The leaking air undergoes adiabatic expansion.

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

54. **Assertion :** It is not possible to use  $^{35}\text{Cl}$  as the fuel for fusion energy.

**Reason :** The binding energy of  $^{35}\text{Cl}$  is too small.

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

55. **Assertion :** The number of electrons in a p-type silicon semiconductor is less than the number of electrons in a pure silicon semiconductor at room temperature.

**Reason :** It is due to law of mass action.

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

56. **Assertion** : In a common-emitter transistor amplifier the input current is much less than the output current.

**Reason** : The common-emitter transistor amplifier has very high input impedance.

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

57. **Assertion** : A body that is a good radiator is also a good absorber of radiation at a given wavelength.

**Reason** : According to Kirchoff's law the absorptivity of a body is equal to its emissivity at a given wavelength.

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

58. **Assertion** : In pressure-temperature (P-T) phase diagram of water, the slope of the melting curve is found to be negative.

**Reason** : Ice contracts on melting to water.

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

59. **Assertion** : For higher temperatures the peak emission wavelength of a black body shifts to lower wavelengths.

**Reason** : Peak emission wavelengths of a black body is proportional to the fourth-power of temperature.

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

60. **Assertion** : For Reynold's number  $R_e > 2000$ , the flow of fluid is turbulent.

**Reason** : Inertial forces are dominant compared to the viscous forces at such high Reynold's numbers.

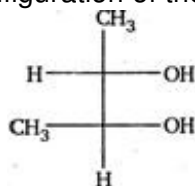
- 1) (a)                      2) (b)                      3) (c)                      4) (d)

### Chemistry

61. Among the following the most stable compound is :

- 1) cis-2, 3-cyclohexanediol
- 2) trans-2, 3-cyclohexanediol
- 3) cis-, 3-cyclohexenediol
- 4) trans-1, 3-cyclohexanediol

62. Correct configuration of the following is :



- 1) 2R, 3S
- 2) 1S, 2R
- 3) 1R, 2S

4) 1R, 2R

63. For reaction,  $2\text{NOCl}(\text{g}) \rightleftharpoons 2\text{NO}(\text{g}) + \text{Cl}_2(\text{g})$ ;  $K_c$  at  $427^\circ\text{C}$  is  $3 \times 10^{-6} \text{ L mol}^{-1}$ . The value of  $K_p$  is nearly :

1)  $4.50 \times 10^{-5}$

2)  $6.50 \times 10^{-5}$

3)  $8.50 \times 10^{-4}$

4)  $1.72 \times 10^{-4}$

64. Which one of the following statements is true for protein synthesis (translation) ?

1) Amino acids are directly recognised by m-RNA

2) The third base of the codon is less specific

3) Only one codon codes for an amino acid

4) Every t-RNA molecule has more than one amino acid attachment

65. If Z is the number of atoms in the unit cell that represents the closest packing sequence ...ABC ABC ..., the number of tetrahedral voids in the unit cell is equal to :

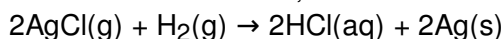
1) Z

2) 2Z

3) Z/2

4) Z/4

66. The chemical reaction,



taking place in a galvanic cell is represented by the notation :

1)  $\text{Pt}(\text{s}) | \text{H}_2(\text{g}), 1 \text{ bar} | 1 \text{ M KCl}(\text{aq}) | \text{AgCl}(\text{s}) | \text{Ag}(\text{s})$

2)  $\text{Pt}(\text{s}) | \text{H}_2(\text{g}), 1 \text{ bar} | 1 \text{ M HCl}(\text{aq}) | 1 \text{ M Ag}^+(\text{aq}) | \text{Ag}(\text{s})$

3)  $\text{Pt}(\text{s}) | \text{H}_2(\text{g}), 1 \text{ bar} | 1 \text{ M HCl}(\text{aq}) | \text{AgCl}(\text{s}) | \text{Ag}(\text{s})$

4)  $\text{Pt}(\text{s}) | \text{H}_2(\text{g}), 1 \text{ bar} | 1 \text{ M HCl}(\text{aq}) | \text{Ag}(\text{s}) | \text{AgCl}(\text{s})$

67.  $\Delta H_f^0$  (298 K) of methanol is given by the chemical equation :

1)  $\text{CH}_4(\text{g}) + (1/2) \text{O}_2(\text{g}) \rightarrow \text{CH}_3\text{OH}(\text{g})$

2)  $\text{C}(\text{graphite}) + (1/2) \text{O}_2(\text{g}) + 2\text{H}_2(\text{g}) \rightarrow \text{CH}_3\text{OH}(\text{l})$

3)  $\text{C}(\text{diamond}) + (1/2) \text{O}_2(\text{g}) + 2\text{H}_2(\text{g}) \rightarrow \text{CH}_3\text{OH}(\text{l})$

4)  $\text{CO}(\text{g}) + 2\text{H}_2(\text{g}) \rightarrow \text{CH}_3\text{OH}(\text{l})$

68. 3-phenylpropene on reaction with HBr gives (as a major product) :

1)  $\text{C}_6\text{H}_5\text{CH}_2\text{CH}(\text{Br})\text{CH}_3$

2)  $\text{C}_6\text{H}_5\text{CH}(\text{Br})\text{CH}_2\text{CH}_3$

3)  $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$

4)  $\text{C}_6\text{H}_5\text{CH}(\text{Br})\text{CH}=\text{CH}_2$

69. In which of the following pairs both the complexes show optical isomerism ?

- 1) cis -  $[\text{Cr}(\text{C}_2\text{O}_4)_2\text{Cl}_2]^{3-}$  cis -  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]$
- 2)  $[\text{Co}(\text{en})_3] \text{Cl}_3$ , cis -  $[\text{Co}(\text{en})_2\text{Cl}_2]\text{Cl}$
- 3)  $[\text{PtCl}(\text{dien})] \text{Cl}$ ,  $[\text{NiCl}_2\text{Br}_2]^{2-}$
- 4)  $[\text{Co}(\text{NO}_3)_3(\text{NH}_3)_3]$ , cis -  $[\text{Pt}(\text{en})_2\text{Cl}_2]$

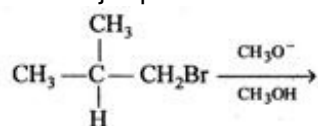
70. For the reaction of one mole of zinc dust with one mole of sulphuric acid in a bomb calorimeter,  $\Delta U$  and  $w$  corresponds to :

- 1)  $\Delta U < 0$ ,  $w = 0$
- 2)  $\Delta U < 0$ ,  $w < 0$
- 3)  $\Delta U > 0$ ,  $w = 0$
- 4)  $\Delta U > 0$ ,  $w > 0$

71. Which of the following is a carbonate ore ?

- 1) Pyrolusite
- 2) Malachite
- 3) Diaspore
- 4) Cassiterite

72. The major product formed in the following reaction is :



- 1)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_2\text{OCH}_3 \\ | \\ \text{H} \end{array}$
- 2)  $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2\text{CH}_3 \\ | \\ \text{OCH}_3 \end{array}$
- 3)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} = \text{CH}_2 \end{array}$
- 4)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ | \\ \text{OCH}_3 \end{array}$

73. Which one of the following biomolecules is insoluble in water ?

- 1)  $\alpha$ -keratin
- 2) Haemoglobin
- 3) Ribonuclease
- 4) Adenine

74.  $^{238}\text{U}_{92}$  emits 8  $\alpha$ -particles and 6  $\beta$ -particles. The neutron/proton ratio in the product

nucleus is :

- 1) 58/41
- 2) 59/40
- 3) 62/41
- 4) 61/40

75. When 10 mL of 0.1 M acetic acid ( $pK_a = 5.0$ ) is titrated against 10 mL of 0.1 M ammonia solution ( $pK_b = 5.0$ ), the equivalence point occurs at pH :

- 1) 3.0
- 2) 4.0
- 3) 7.0
- 4) 8.0

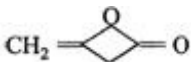
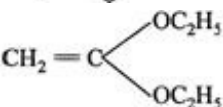
76. An aqueous solution of  $CoCl_2$  on addition of excess of concentrated HCl turns blue due to formation of :

- 1)  $[Co(H_2O)_4Cl_2]$
- 2)  $[Co(H_2O)_2Cl_4]^{2-}$
- 3)  $[CoCl_4]^{2-}$
- 4)  $[Co(H_2O)_2Cl_2]$

77. Among the following pairs of ions, the lower oxidation state in aqueous solution is more stable than the other, in :

- 1)  $Ti^+$  ,  $Ti^{3+}$
- 2)  $Cu^+$  ,  $Cu^{2+}$
- 3)  $Cr^{2+}$  ,  $Cr^{3+}$
- 4)  $V^{2+}$  ,  $VO^{2+}$

78.  $CH_3CO_2C_2H_5$  on reaction with sodium ethoxide in ethanol gives A, which on heating in the presence of acid gives B. Compound B is :

- 1)  $CH_3COCH_2COOH$
- 2)  $CH_3COCH_3$
- 3) 
- 4) 

79. Among the following which one does not act as an intermediate in Hofmann rearrangement ?

- 1)  $RNCO$
- 2)  $RCON$
- 3)  $RCO\ddot{N}HBr$
- 4)  $RNC$

80.  $\alpha$ -particles can be detected using :

- 1) thin aluminium sheet
- 2) barium sulphate
- 3) zinc sulphide screen
- 4) gold foil

81. The most probable radius (in pm) for finding the electron in  $\text{He}^+$  is :

- 1) 0.0
- 2) 22.9
- 3) 26.5
- 4) 102.8

82. The diamagnetic species is :

- 1)  $[\text{Ni}(\text{CN})_4]^{2-}$
- 2)  $[\text{NiCl}_4]^{2-}$
- 3)  $[\text{CoCl}_4]^{2-}$
- 4)  $[\text{CoF}_6]^{2-}$

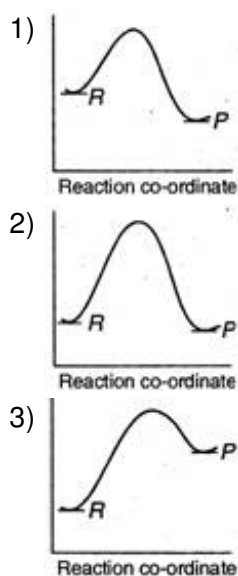
83. The number of P—O—P bridges in the structure of phosphorus pentoxide and phosphorus trioxide are respectively :

- 1) 6, 6
- 2) 5, 5
- 3) 5, 6
- 4) 6, 5

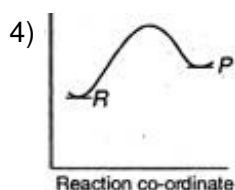
84. In diborane, the two H—B—H angles are nearly :

- 1)  $75^\circ$ ,  $120^\circ$
- 2)  $95^\circ$ ,  $120^\circ$
- 3)  $95^\circ$ ,  $120^\circ$
- 4)  $135^\circ$ ,  $180^\circ$

85. An endothermic reaction with high activation energy for the forward reaction is given by the diagram :







86. Among the following the strongest nucleophile is :

- 1)  $\text{C}_2\text{H}_5\text{SH}$
- 2)  $\text{CH}_3\text{COO}^-$
- 3)  $\text{CH}_3\text{NH}_2$
- 4)  $\text{NCCH}_2^-$

87. The correct order for the wavelength of absorption in the visible region is :

- 1)  $[\text{Ni}(\text{NO}_2)_6]^{4-} < [\text{Ni}(\text{NH}_3)_6]^{2+} < [\text{Ni}(\text{H}_2\text{O})_6]^{2+}$
- 2)  $[\text{Ni}(\text{NO}_2)_6]^{4-} < [\text{Ni}(\text{H}_2\text{O})_6]^{2+} < [\text{Ni}(\text{NH}_3)_6]^{2+}$
- 3)  $[\text{Ni}(\text{H}_2\text{O})_6]^{2+} < [\text{Ni}(\text{NH}_3)_6]^{2+} < [\text{Ni}(\text{NO}_2)_6]^{4-}$
- 4)  $[\text{Ni}(\text{NH}_3)_6]^{2+} < [\text{Ni}(\text{H}_2\text{O})_6]^{2+} < [\text{Ni}(\text{NO}_2)_6]^{4-}$

88. Among the following molecules

(i)  $\ddot{\text{Xe}}\text{O}_3$  (ii)  $\ddot{\text{Xe}}\text{OF}_4$  (iii)  $\ddot{\text{Xe}}\text{F}_6$

Those having same number of lone pairs on Xe are :

- 1) (i) and (ii) only
- 2) (i) and (iii) only
- 3) (ii) and (iii) only
- 4) (i), (ii) and (iii)

89. The isoelectronic pair is :

- 1)  $\text{Cl}_2\text{O}_3, \text{ICl}_2^-$
- 2)  $\text{ICl}_2^-, \text{ClO}_2$
- 3)  $\text{IF}_2^+, \text{I}_3^-$
- 4)  $\text{ClO}_2^-, \text{ClF}_2^+$

90. Which of the following gives propyne on hydrolysis ?

- 1)  $\text{Al}_4\text{C}_3$
- 2)  $\text{Mg}_2\text{C}_3$
- 3)  $\text{B}_4\text{C}$
- 4)  $\text{La}_4\text{C}_3$

91. For reaction  $a\text{A} \rightarrow x\text{P}$ , when  $[\text{A}] = 2.2 \text{ mM}$ , the rate was found to be  $2.4 \text{ mM s}^{-1}$ . On

reducing concentration of A to half, the rate changes to  $0.6 \text{ mM s}^{-1}$ . The order of reaction with respect to A is :

- 1) 1.2
- 2) 2.0
- 3) 2.4
- 4) 3.2

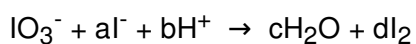
92. The major product obtained on treatment of  $\text{CH}_3\text{CH}_2\text{CH}(\text{F})\text{CH}_3$  with  $\text{CH}_3\text{O}^- / \text{CH}_3\text{OH}$  is :

- 1)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}(\text{OCH}_3)\text{CH}_3$
- 2)  $\text{CH}_3\text{CH} = \text{CHCH}_3$
- 3)  $\text{CH}_3\text{CH}_2\text{CH} = \text{CH}_2$
- 4)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OCH}_3$

93. The pair of amphoteric hydroxides is :

- 1)  $\text{Al}(\text{OH})_3, \text{LiOH}$
- 2)  $\text{Be}(\text{OH})_2, \text{Mg}(\text{OH})_2$
- 3)  $\text{B}(\text{OH})_3, \text{Be}(\text{OH})_2$
- 4)  $\text{Be}(\text{OH})_2, \text{Zn}(\text{OH})_2$

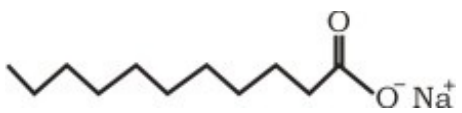
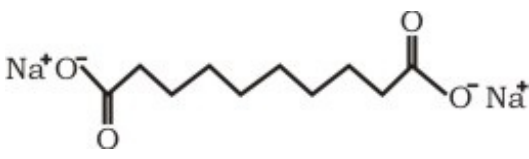
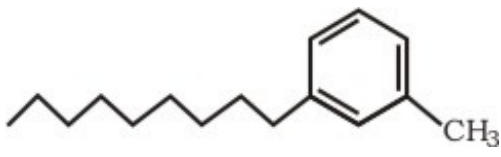
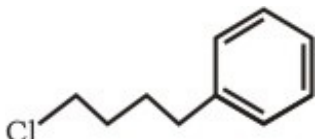
94. In the balanced chemical reaction,



$a, b, c$  and  $d$  respectively corresponds to :

- 1) 5, 6, 3, 3
- 2) 5, 3, 3, 3
- 3) 5, 6, 6, 6
- 4) 5, 5, 5, 5

95. Which of the following molecules is most suitable to disperse benzene in water ?

- 1) 
- 2) 
- 3) 
- 4) 

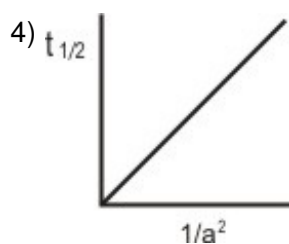
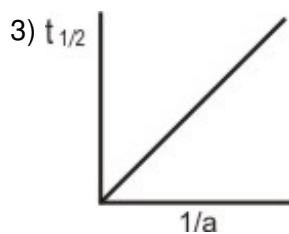
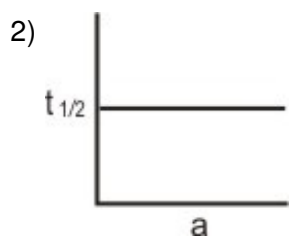
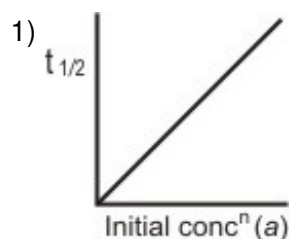
96.  $C_6H_5CONHCH_3$  can be converted into  $C_6H_5CH_2NHCH_3$  by :

- 1)  $NaBH_4$
- 2)  $H_2 - Pd / C$
- 3)  $LiAlH_4$
- 4)  $Zn - Hg / HCl$

97. Which of the following chemicals are used to manufacture methyl isocyanate that caused "Bhopal Tragedy"?

- (i) Methylamine
  - (ii) Phosgene
  - (iii) Phosphine
  - (iv) Dimethylamine
- 1) (i) and (iii)
  - 2) (iii) and (iv)
  - 3) (i) and (ii)
  - 4) (ii) and (iv)

98. Which of the following graphs represent relation between initial concentration of reactants and half-life for third order reaction?



99. Pyridine is less basic than triethylamine because :

- 1) pyridine has aromatic character
- 2) nitrogen in pyridine is  $sp^2$ -hybridised
- 3) pyridine is a cyclic system
- 4) in pyridine, lone pair of nitrogen is delocalised

100.  $F_2$  formed by reacting  $K_2MnF_6$  with :

- 1)  $SbF_5$
- 2)  $MnF_3$
- 3)  $KSbF_6$
- 4)  $MnF_4$

**Directions for question 101 to 120 :**

**In each of the following question, a statement of Assertion (A) is given followed by a corresponding statement of Reason (R) just below it. Of the statements, mark the correct answer as :**

- (a) If both Assertion and Reason are true and Reason is the 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.

101. **Assertion :** Reaction of  $SO_2$  and  $H_2S$  in the presence of  $Fe_2O_3$  catalyst gives elemental sulphur.

**Reason :**  $SO_2$  is a reducing agent.

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

102. **Assertion :**  $SiF_6^{2-}$  is known but  $SiCl_6^{2-}$  is not.

**Reason :** Size of fluorine is small and its lone pair of electrons interacts with d-orbitals of Si strongly.

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

103. **Assertion :** Borax bead test is not suitable for Al (III).

**Reason :**  $Al_2O_3$  is insoluble in water.

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

104. **Assertion :** Ozone is powerful oxidising agent in comparison to  $O_2$ .

**Reason :** Ozone is diamagnetic but  $O_2$  is paramagnetic.

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

105. **Assertion :** Potassium ferrocyanide is diamagnetic, whereas potassium ferricyanide is paramagnetic.

**Reason :** Crystal field splitting in ferrocyanide ion is greater than that of ferricyanide ion.

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

106. **Assertion :** Addition of  $\text{NH}_4\text{OH}$  to an aqueous solution of  $\text{BaCl}_2$  in the presence of  $\text{NH}_4\text{Cl}$  (excess) precipitates  $\text{Ba}(\text{OH})_2$ .

**Reason :**  $\text{Ba}(\text{OH})_2$  is insoluble in water.

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

107. **Assertion :**  $\text{SeCl}_4$  does not have a tetrahedral structure.

**Reason :** Se in  $\text{SeCl}_4$  has two lone pairs.

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

108. **Assertion :** The molecular weight of acetic acid determined by depression in freezing point method in benzene and water was found to be different.

**Reason :** Water is polar and benzene is non-polar.

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

109. **Assertion :** Compressibility factor for hydrogen varies with pressure with positive slope at all pressures.

**Reason :** Even at low pressure, repulsive forces dominate hydrogen gas.

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

110. **Assertion :** First ionisation energy for nitrogen is lower than oxygen.

**Reason :** Across a period effective nuclear charge decreases.

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

111. **Assertion :**  $\text{B}_2$  molecule is diamagnetic.

**Reason :** The highest occupied molecular orbital is of  $\sigma$  type.

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

112. **Assertion :** Rate of hydrolysis of methyl chloride to methanol is higher in DMF than in water.

**Reason :** Hydrolysis of methyl chloride follows second order kinetics.

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

113. **Assertion :** Galvanised iron does not rust.

**Reason :** Zinc has a more negative electrode potential than iron.

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

114. **Assertion :** Extraction of iron metal from iron oxide ore is carried out by heating with coke.

**Reason :** The reaction,  $\text{Fe}_2\text{O}_3(\text{s}) \rightarrow \text{Fe}(\text{s}) + (3/2)\text{O}_2(\text{g})$  is a spontaneous process.

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

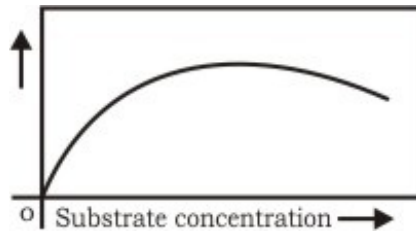
115. **Assertion** : Rates of nitration of benzene and hexadeuterobenzene are different.  
**Reason** : C—H bond is stronger than C—D bond.  
1) (a)                      2) (b)                      3) (c)                      4) (d)
116. **Assertion** : t-butyl methyl ether is not prepared by the reaction of t-butyl bromide with sodium methoxide.  
**Reason** : Sodium methoxide is a strong nucleophile.  
1) (a)                      2) (b)                      3) (c)                      4) (d)
117. **Assertion** : Maltose is a reducing sugar which gives two moles of D-glucose on hydrolysis.  
**Reason** : Maltose has a 1, 4- $\beta$ -glycosidic linkage.  
1) (a)                      2) (b)                      3) (c)                      4) (d)
118. **Assertion** :  $p\text{-O}_2\text{N}-\text{C}_6\text{H}_5\text{COCH}_3$  is prepared by Friedel-Craft's acylation of nitrobenzene.  
**Reason** : Nitrobenzene easily undergoes electrophilic substitution reaction.  
1) (a)                      2) (b)                      3) (c)                      4) (d)
119. **Assertion** : Alkyl isocyanides in acidified water give alkyl formamides.  
**Reason** : In isocyanides, carbon first acts as a nucleophile and then as an electrophile.  
1) (a)                      2) (b)                      3) (c)                      4) (d)
120. **Assertion** : Cyclopentadienyl anion is much more stable than allyl anion.  
**Reason** : Cyclopentadienyl anion is aromatic in character.  
1) (a)                      2) (b)                      3) (c)                      4) (d)

### Biology

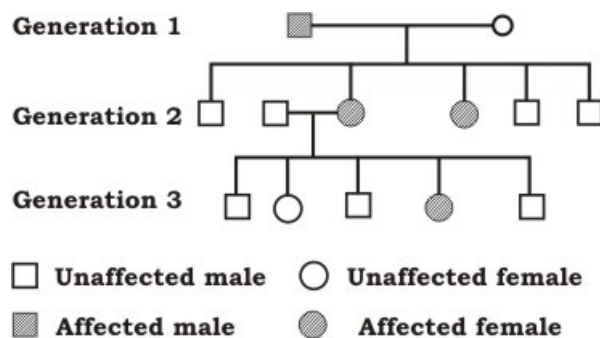
121. One of the *ex situ* conservation methods for endangered species is :
- 1) wildlife sanctuaries
  - 2) biosphere reserves
  - 3) cryopreservation
  - 4) national parks
122. An insect bite may result in inflammation of that spot. This is triggered by the alarm chemicals such as :
- 1) histamine and dopamine
  - 2) histamine and kinins
  - 3) interferons and opsonin
  - 4) interferons and histones

123. The family containing mustard and its main characters are :
- 1) Brassicaceae — Tetramerous flowers, six stamens, bicarpellary gynoecium, siliqua type fruit
  - 2) Brassicaceae — Pentamerous flowers, many stamens, pentacarpellary gynoecium, capsule type fruit
  - 3) Solanaceae — Pentamerous flowers, five stamens, bicarpellary gynoecium berry type fruit
  - 4) Poaceae — Trimerous flowers, three stamens, monocarpellary gynoecium, caryopsis type of fruit
124. Somaclonal variation appears in :
- 1) organisms produced through somatic hybridization
  - 2) plants growing in highly polluted conditions
  - 3) apomictic plants
  - 4) tissue culture raised plants
125. Which one of the following four secretions(Se) is correctly matched with its source(So), target(T) and nature of action(A) ?
- 1) Se => Gastrin, So => Stomach lining, T => Oxyntic cell, A => Production of HCl
  - 2) Se => Inhibin, So => Sertolin cell, T => Hypothalamus, A => Inhibition of secretion of gonadotropin releasing hormone
  - 3) Se => Enterokinase, So => Duodenum, T => Gall bladder, A => Release of bile juice
  - 4) Se => Atrial Natriuretic Factor(ANF), So => Sinu Atrial Node (SAN) M-cells Atria, T => Juxtaglomerular apparatus (JGA), A => Inhibition of release of renin
126. Autopolyploids (numeric or quantitative polyploids or intra specific polyploids) like ferns, garden plants, gram, maize, rice, banana, grapes, apple etc., show :
- 1) increased gene dosage
  - 2) gigas effect and seedless fruits
  - 3) more yields and better adaptation
  - 4) all of the above
127. Three of the following statements regarding cell organelles are correct while one is wrong. Which one is wrong ?
- 1) Lysosomes are double membraned vesicles budded off from Golgi apparatus and contain digestive enzymes
  - 2) Endoplasmic reticulum consists of a network of membranous tubules and helps in transport, synthesis and secretion
  - 3) Leucoplasts are bound by two membranes, lack pigment but contain their own DNA and protein synthesizing machinery
  - 4) Sphaerosomes are single membrane bound and are associated with synthesis and storage of lipids
128. The given graph shows the effect of substrate concentration on the rate of reaction of the

enzyme green gram-phosphatase. What does the graph indicate ?



- 1) The rate of enzyme reaction is directly proportional to the substrate concentration
  - 2) Presence of an enzyme inhibitor in the reaction mixture
  - 3) Formation of an enzyme-substrate complex
  - 4) At higher substrate concentration the pH increases
129. Which one of the following groups of structures/organs have similar function ?
- 1) Typhlosole in earthworm, intestinal villi in rat and contractile vacuole in *Amoeba*
  - 2) Nephridia in earthworm, Malpighian tubules in cockroach and urinary tubules in rat
  - 3) Antennae of cockroach, tympanum of frog and clitellum of earthworm
  - 4) Incisors of rat, gizzard (proventriculus) of cockroach and tube feet of starfish
130. Genetic diversity in agricultural crops is threatened by :
- 1) introduction of high yielding varieties
  - 2) intensive use of fertilizers
  - 3) extensive intercropping
  - 4) intensive use of biopesticides
131. Primary source of allelic variation is :
- 1) independent assortment
  - 2) recombination
  - 3) mutation
  - 4) polyploidy
132. Given below is a pedigree chart showing the inheritance of a certain sex-linked trait in humans.



The trait traced in the above pedigree chart is :

- 1) dominant X-linked
- 2) recessive X-linked



- 3) dominant Y-linked
- 4) recessive Y-linked

133. Antigen binding site in an antibody is found between :

- 1) two light chains
- 2) two heavy chains
- 3) one heavy and one light chains
- 4) either between two light chains or between one heavy and one light chain depending upon the nature of antigen

134. Formation of non-functional methaemoglobin causes blue-baby syndrome. This is due to :

- 1) excess of arsenic concentration in drinking water
- 2) excess of nitrates in drinking water
- 3) deficiency of iron in food
- 4) increased methane content in the atmosphere

135. Grain colour in wheat is determined by three pairs of polygene. Following the cross AABBCC (dark colour) x aabbcc (light colour), in F<sub>2</sub> generation what proportion of the progeny is likely to resemble either parent ?

- 1) Half
- 2) Less than 5 per cent
- 3) One third
- 4) None of these

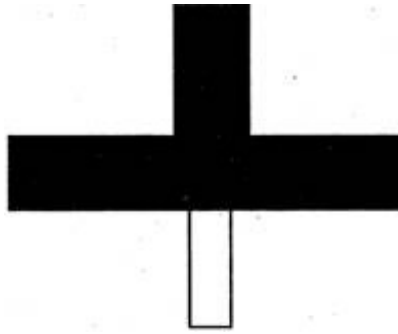
136. Which one of the following is a correct statement ?

- 1) "Bt" in "Bt-cotton" indicates that it is a genetically modified organism produced through biotechnology
- 2) Somatic hybridization involves fusion of two complete plant cells carrying desired genes
- 3) The anticoagulant hirudin is being produced from transgenic *Brassica napus* seeds
- 4) "Flavr Savr" variety of tomato has enhanced the production of ethylene which improves its taste

137. In which one of the following would you expect to find glyoxysomes ?

- 1) Endosperm of wheat
- 2) Endosperm of castor
- 3) Palisade cells in leaf
- 4) Root hairs

138. Given below is one of the types of ecological pyramids. This type represents :



- 1) pyramid of numbers in a grassland
- 2) pyramid of biomass in a fallow land
- 3) pyramid of biomass in a lake
- 4) energy pyramid in a spring

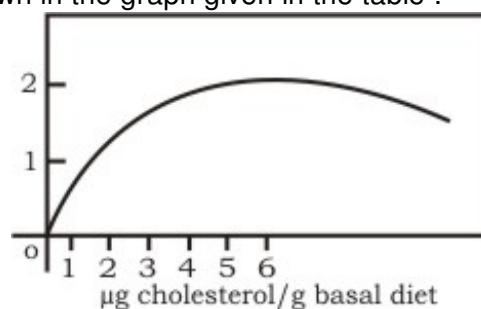
139. Many cells function properly and divide mitotically even though they do not have :

- 1) plasma membrane
- 2) cytoskeleton
- 3) mitochondria
- 4) plastids

140. Which one of the following statement pertaining to pollutants is correct ?

- 1) DDT is a non-biodegradable pollutant
- 2) Excess fluoride in drinking water causes osteoporosis
- 3) Excess cadmium in drinking water causes black foot disease
- 4) Methylmercury in water may cause "Itai Itai" disease

141. In an experiment freshly hatched larvae of an insect (khopra beetle) were reared on a basal diet (complete diet without cholesterol) with increasing amounts of cholesterol. Results obtained are shown in the graph given in the table :



The graph indicates :

- 1) cholesterol is an essential dietary requirement of khopra beetle
- 2) growth of khopra beetle is directly proportional to cholesterol concentration
- 3) cholesterol concentration of 2 µg diet is the optimum level
- 4) growth of khopra beetle is inhibited when cholesterol concentration exceeds 5 µg diet

142. A tumour inducing plasmid widely used in the production of transgenic plant is that of :

- 1) *Escherichia coli*
  - 2) *Bacillus thuringiensis*
  - 3) *Staphylococcus aureus*
  - 4) *Agrobacterium tumefaciens*
143. Gibberellins can promote seed germination because of their influence on :
- 1) rate of cell division
  - 2) production of hydrolyzing enzymes
  - 3) synthesis of abscisic acid
  - 4) absorption of water through hard seed coat
144. Which one of the following events is correctly matched with the time period in a normal menstrual cycle ?
- 1) Release of egg — 5th day
  - 2) Endometrium regenerates — 5-10 days
  - 3) Endometrium secretes nutrients for implantation — 11-18 days
  - 4) Rise in progesterone level — 1-15 days
145. Which one of the following correctly represents an organism and its ecological niche ?
- 1) *Vallisneria* and pond
  - 2) Desert locust (*Scistocerca*) and desert
  - 3) Plant lice (aphids) and leaf
  - 4) Vultures and dense forest
146. Two of the body parts which do not appear in MRI may be :
- 1) molar teeth and eye lens
  - 2) scapula and canines
  - 3) ligaments and ribs
  - 4) tendons and premolars
147. Which one of the following features is common in silverfish, scorpion, dragonfly and prawn ?
- 1) Three pairs of legs and segmented body
  - 2) Chitinous cuticle and two pairs of antennae
  - 3) Jointed appendages and chitinous exoskeleton
  - 4) Cephalothorax and tracheae
148. Based on cellular mechanisms there are two major types of regeneration found in the animals. Which one of the following is the correct example of the type mentioned ?
- 1) Morphallaxis — Regeneration of two transversely cut equal pieces of a *Hydra* into two small *Hydra*
  - 2) Epimorphosis — Replacement of old and dead erythrocytes by the new ones

- 3) Morphollaxis — Healing up of a wound in the skin
  - 4) Epimorphosis — Regneration of crushed and filtered out pieces of a *Planaria* into as many new *Planarian*
149. C-DNA probes are copied from the messenger RNA molecules with the help of :
- 1) restriction enzymes
  - 2) reverse transcriptase
  - 3) DNA polymerase
  - 4) adenosine deaminase
150. The "Cri-du-Chat" syndrome is caused by change in chromosome structure involving :
- 1) deletion
  - 2) duplication
  - 3) inversion
  - 4) translocation
151. A young drug addict used to show symptoms of depressed brain activity, feeling of calmness, relaxation and drowsiness. Possibly he was taking :
- 1) amphetamine
  - 2) marijuna
  - 3) pethidine
  - 4) valium
152. Double fertilization involves :
- 1) fertilization of the egg by two male gametes
  - 2) fertilization of two eggs in the same embryo sac by two sperms brought by one pollen tube
  - 3) fertilization of the egg and the central cell by two sperms brought by different pollen tubes
  - 4) fertilization of the egg and the central cell by two sperms brought by the same pollen tube
153. Which one of the following statements pertaining to plant structure is correct ?
- 1) Cork lacks stomata but lenticels carry out transpiration
  - 2) Passage cells help in transfer of food from cortex to phloem
  - 3) Sieve tube elements possess cytoplasm but no nuclei
  - 4) The shoot apical meristem has a quiescent centre
154. Which one of the following statements is correct with respect to salt water balance inside the body of living organisms ?
- 1) When water is not available camels do not produce urine but store urea in tissues
  - 2) Salmon fish excretes lot of stored salt through gill membrane when in fresh water
  - 3) Paramecium discharges concentrated salt solution by contractile vacuoles

- 4) The body fluids of freshwater animals are generally hypotonic to surrounding water
155. Electroporation procedure involves :
- 1) fast passage of food through sieve pores in phloem elements with the help of electric stimulation
  - 2) opening of stomatal pores during night by artificial light
  - 3) making transient pores in the cell membrane to introduce gene constructs
  - 4) purification of saline water with the help of a membrane system
156. When synapsis is complete all along the chromosome, the cell is said to have entered a stage called :
- 1) zygotene
  - 2) pachytene
  - 3) diplotene
  - 4) diakinesis
157. Which one of the following four glands is correctly matched with the accompanying description ?
- 1) Thyroid — hyperactivity in young children causes cretinism
  - 2) Thymus — starts undergoing atrophy after puberty
  - 3) Parathyroid — secretes parathormone which promotes movement of calcium ions from blood into bones during calcification
  - 4) Pancreas — delta cells of the islets of Langerhans secrete a hormone which stimulates glycolysis in liver
158. Which one of the following pairs of geographical areas show maximum bio-diversity in our country ?
- 1) Sunderbans and Rann of Kutch
  - 2) Eastern Ghats and West Bengal
  - 3) Eastern Himalaya and Western Ghats
  - 4) Kerala and Punjab
159. A cross section at the midpoint of the middle piece of a human sperm will show :
- 1) centriole, mitochondria and 9+2 arrangement of microtubules
  - 2) centriole and mitochondria
  - 3) mitochondria. and 9+2 arrangement of microtubules
  - 4) 9+2 arrangement of microtubules only
160. Which one of the following is correct matching of a plant, its habit and the forest type where it normally occurs ?
- 1) Prosopis, tree, scrub
  - 2) Saccharum officinarum, grass, forest
  - 3) Shorea robusta, herb, tropical rain forest

4) Acacia catechu, tree, coniferous forest

**Directions for question 161 to 180 :**

**In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Select the most appropriate response as —**

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

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

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

(d) If both Assertion Reason are false statements.

161. **Assertion :** Senescence is the time when age associated defects are manifested.

**Reason :** Certain genes may be undergoing sequential switching on and off during one's life.

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

162. **Assertion :** In recombinant DNA technology, human genes are often transferred into bacteria (prokaryotes) or yeast (eukaryotes).

**Reason :** Both bacteria and yeast multiply very fast to form huge population which express the desired gene.

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

163. **Assertion :** Methane component of green house gases contributing to global warming is about 20 per cent.

**Reason :** Introduction of multi-point fuel injection engines in automobiles has decreased methane content in the exhausts.

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

164. **Assertion :** A suspended particulate matter (SPM) is an important pollutant released by diesel vehicles.

**Reason :** Catalytic converters greatly reduce pollution caused by automobiles.

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

165. **Assertion :** Interferons are a type of antibodies produced by body cells infected by bacteria.

**Reason :** Interferons stimulate inflammation at the site of injury.

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

166. **Assertion :** Organ transplantation patients are given immunosuppressive drugs.

**Reason :** Transplanted tissue has antigens which stimulate the specific immune response of the recipient.

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

167. **Assertion :** Persons suffering from haemophilia fail to produce blood clotting factor VIII.

**Reason :** Prothrombin producing platelets in such persons are found in very low



**Reason :** Genetic code is universal.

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

176. **Assertion :** Darwin's finches show a variety of beaks suited for eating large seeds, flying insects and cactus seeds.

**Reason :** Ancestral seed-eating stock of Darwin's finches radiated out from South American mainland to different geographical areas of the Galapagos Islands, where they found competitor-free new habitates.

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

177. **Assertion :** The atmospheric concentration of CO<sub>2</sub> at which photosynthesis just compensates for respiration is referred to as CO<sub>2</sub> compensation point.

**Reason :** The CO<sub>2</sub> compensation point is reached when the amount of CO<sub>2</sub> uptake is less than that generated through respiration because the level of CO<sub>2</sub> in the atmosphere is more than that required for achieving CO<sub>2</sub> compensation point.

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

178. **Assertion :** The sex ratio of Kerala is highest in India.

**Reason :** In countries like India the population is increasing at a rapid rate.

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

179. **Assertion :** The duck-billed platypus and the spiny ant-eater, both are egg-laying animals yet they are grouped under mammals.

**Reason :** Both the them have seven cervical vertebrae and 12 pairs of cranial nerves.

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

180. **Assertion :** *Agrobacterium tumefaciens* is popular in genetic engineering because this bacterium is associated with the roots of all cereal and pulse crops.

**Reason :** A gene incorporated in the bacterial chromosomal genome gets automatically transferred to the crop with which the bacterium is associated.

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

### General Knowledge

181. 'Maoris' are :

- 1) inhabitants of New Zealand
- 2) inhabitants of Hungary
- 3) inhabitants of North America
- 4) inhabitants of North-West Asia

182. World Trade Organisation established in :

- 1) 1954                      2) 1988                      3) 1994                      4) 1995

183. Who is the Author of 'An Area of Darkness' ?



- 1) Nirad C. Choudhari
- 2) Vikram Seth
- 3) V.S. Naipaul
- 4) B.C. Chatterjee

184. Which river is called 'Bengal's Sorrow' ?

- 1) Hughli
- 2) Ganga
- 3) Damodar
- 4) Koshi

185. Who was the first woman ruler of India ?

- 1) Raziya Sultan
- 2) Noor Jahan
- 3) Chand Biwi
- 4) Durga Devi

186. Who was the first Indian to win Nobel Prize ?

- 1) Mother Teresa
- 2) C.V. Raman
- 3) Ravindra Nath Tagore
- 4) Amartya Sen

187. Ascorbic acid is the chemical name of :

- 1) vitamin A
- 2) vitamin B
- 3) vitamin C
- 4) vitamin D

188. 'Chittaranjan' is famous for the :

- 1) railway coaches
- 2) locomotives
- 3) iron and steel
- 4) heavy machinery

189. In which space Shuttle Kalpana Chawla killed ?

- 1) Discovery
- 2) Columbia
- 3) Sputnik
- 4) None of the above

190. The Planning Commission was set up in :

- 1) January, 1950
- 2) March, 1950
- 3) January, 1952
- 4) March, 1952

191. Who is the inventor of 'Insulin' ?

- 1) Lord Lister
- 2) Jonos Salk
- 3) Ronald Ross
- 4) Banting and Best

192. 'Brahmo Samaj' was founded by :

- 1) Devendra Nath Tagore
- 2) Keshav Chandra Sen
- 3) Raja Ram Mohan Roy
- 4) Annie Besant

193. The chemical formulae of Plaster of Paris' is :

- 1)  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
- 2)  $\text{Ca}(\text{OH})_2$
- 3)  $\text{CaSO}_4 \cdot 1/2\text{H}_2\text{O}$
- 4)  $\text{C}_2\text{H}_5\text{OH}$

194. The Tenure of first planning holiday was :

- 1) 1964 - 1967
- 2) 1965 - 1968
- 3) 1966 - 1969
- 4) 1978 - 1981

195. How many spokes are in Indian National Flag ?

- 1) 22                                      2) 24                                      3) 26                                      4) 28

196. Where is 'National Defence Academy' situated ?

- 1) New Delhi
- 2) Khadakvasla
- 3) Dehradun
- 4) Pune

197. Oldest religious text in the world is :

- 1) Rig Veda
- 2) Sama Veda

- 3) Yajur Veda
- 4) Atharva Veda

198. Who was elected as the permanent President of constituent assembly ?

- 1) Dr. Sachchidanand Sinha
- 2) Dr. Rajendra Prasad
- 3) Dr. B.R. Ambedkar
- 4) C. Rajgopalachari

199. Who were the first to issue gold coins in India ?

- 1) The Kushan's
- 2) The Gupta's
- 3) The Mauryan's
- 4) The Indo Greeks

200. How many articles and schedule are there in originally constitution ?

- 1) 391 articles and 7 schedules
- 2) 395 articles and 8 schedules
- 3) 400 articles and 10 schedules
- 4) 444 articles and 12 schedules

### Answer Key

1) 2	2) 2	3) 2	4) 1	5) 2	6) 1	7) 2	8) 1	9) 2	10) 1
11) 1	12) 1	13) 3	14) 1	15) 2	16) 2	17) 3	18) 1	19) 3	20) 3
21) 2	22) 2	23) 2	24) 2	25) 2	26) 1	27) 3	28) 1	29) 2	30) 3
31) 1	32) 1	33) 3	34) 1	35) 1	36) 1	37) 2	38) 4	39) 3	40) 1
41) 1	42) 4	43) 3	44) 2	45) 2	46) 1	47) 3	48) 4	49) 4	50) 1
51) 1	52) 1	53) 1	54) 3	55) 1	56) 3	57) 1	58) 1	59) 3	60) 1
61) 4	62) 1	63) 4	64) 2	65) 2	66) 2	67) 2	68) 1	69) 2	70) 1
71) 2	72) 4	73) 1	74) 3	75) 3	76) 3	77) 1	78) 1	79) 4	80) 3
81) 3	82) 1	83) 1	84) 2	85) 3	86) 1	87) 1	88) 4	89) 4	90) 2
91) 2	92) 2	93) 4	94) 1	95) 3	96) 4	97) 3	98) 4	99) 1	100) 1
101) 3	102) 1	103) 2	104) 2	105) 3	106) 4	107) 3	108) 1	109) 1	110) 4
111) 4	112) 1	113) 1	114) 3	115) 4	116) 2	117) 3	118) 4	119) 1	120) 1
121) 3	122) 2	123) 1	124) 4	125) 4	126) 3	127) 1	128) 2	129) 2	130) 1
131) 2	132) 1	133) 3	134) 2	135) 2	136) 3	137) 2	138) 3	139) 4	140) 1
141) 1	142) 4	143) 2	144) 2	145) 3	146) 2	147) 3	148) 1	149) 2	150) 1
151) 4	152) 4	153) 3	154) 1	155) 3	156) 2	157) 2	158) 3	159) 1	160) 1
161) 1	162) 1	163) 2	164) 2	165) 4	166) 1	167) 3	168) 3	169) 3	170) 1
171) 3	172) 1	173) 2	174) 4	175) 2	176) 1	177) 3	178) 2	179) 1	180) 4
181) 1	182) 4	183) 3	184) 3	185) 1	186) 3	187) 3	188) 2	189) 2	190) 2
191) 2	192) 3	193) 3	194) 3	195) 2	196) 2	197) 1	198) 2	199) 4	200) 2