

Subject	Topic	Mock Test - 02	Date
C + P + B	Complete Syllabus	NEET - CT	15 th May 2026
		N-20250415	

Max. Marks: 720

Duration: 3 Hours

- This paper consists of 180 questions with 3 parts of Chemistry, Physics and Biology
 - Chemistry: (Q. No. 1 to 45) Multiple Choice Questions with one correct answer. A correct answer carries 4 Marks. A wrong answer carries a penalty of 1 mark.
 - Physics: (Q. No. 46 to 90) Multiple Choice Questions with one correct answer. A correct answer carries 4 Marks. A wrong answer carries a penalty of 1 mark.
 - Biology: (Q. No. 91 to 180) Multiple Choice Questions with one correct answer. A correct answer carries 4 Marks. A wrong answer carries a penalty of 1 mark.
- The OMR sheet NEET-2026-180Q is to be used
- Use of calculators and log tables is prohibited
- Darken the appropriate bubble using a pen in the OMR sheet provided to you. Once entered, the answer cannot be changed. Any corrections or modifications will automatically draw a penalty of 1 mark
- No clarification will be entertained during the examination. Doubts in the paper can be reported to the coordinator after the exam
- If the details in the OMR Sheet are not filled, If the OMR sheet is mutilated, torn, white Ink used, the circles filled and scratched, then the OMR sheet will not be graded

All the best!!

Useful Data

At. Wt.:

$N = 14; O = 16; H = 1; S = 32; Cl = 35.5; Mn = 55; Na = 23; C = 12; Ag = 108; K = 39; Fe = 56; Pb = 207$

Physical Constants:

$h = 6.626 \times 10^{-34} \text{ Js}, N_a = 6.022 \times 10^{23} \text{ mol}^{-1}, c = 2.998 \times 10^8 \text{ ms}^{-1}, m_e = 9.1 \times 10^{-31} \text{ kg}, R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$

Chemistry

Multiple Choice Questions with one correct answer. A correct answer carries 4 marks. A wrong answer carries a penalty of 1 mark. 45 x 4 = 180

1. Under isothermal condition, a gas at 300 K expands from 0.1 L to 0.25 L against a constant external pressure of 2 bar. The work done by the gas is
(Given that 1 L bar = 100 J)

- (a) -30 J (b) 5 kJ (c) 25 J (d) 30 J

Sol: $W_{irr} = -P_{ext} \Delta V$
 $= -2 \text{ bar} \times (0.25 - 0.1) \text{ L}$
 $= -2 \times 0.15 \text{ L-bar}$
 $= -0.30 \text{ L-bar}$
 $= -0.30 \times 100 \text{ J}$
 $= -30 \text{ J}$

Ans: (a)

2. Which of the following nuclear reactions will generate an isotope?
 (a) β^- particle emission (b) Neutron particle emission
 (c) Positron emission (d) α^- particle emission

Sol: The emission of neutron does not change the atomic number of the element and thus generates isotope.

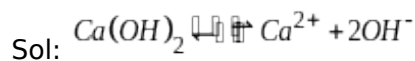
Ans: (b)

3. The first ionisation energies of magnesium and aluminium are respectively given by
 (a) 7.64, 5.98 (b) 7.64, 7.64 (c) 5.98, 7.64 (d) 5.98, 5.98

Sol: IE of Mg is greater than that of Al

Ans: (a)

4. pH of a saturated solution of $Ca(OH)_2$ is 9. The solubility product (K_{sp}) of $Ca(OH)_2$ is:
 (a) 0.5×10^{-15} (b) 0.25×10^{-10} (c) 0.125×10^{-15} (d) 0.5×10^{-10}



$\text{pH} = 9$

Hence $\text{pOH} = 14 - 9 = 5$

$[\text{OH}^-] = 10^{-5} \text{ M}$

Hence $[\text{Ca}^{2+}] = \frac{10^{-5}}{2}$

Thus $K_{sp} = [\text{Ca}^{2+}][\text{OH}^-]^2$

$= \left(\frac{10^{-5}}{2}\right)(10^{-5})^2$

$= 0.5 \times 10^{-15}$

Ans: (a)

5. Which of the following is incorrect statement about OSF_4 ?

- (a) S atom has sp^3d^2 hybridization
- (b) OSF_4 has distorted trigonal-pyramidal shape
- (c) O atom is present at two of the equatorial position
- (d) There is no lone pair on S

Sol: S atom has sp^3d hybridisation

Ans: (a)

6. The increasing order of volatility of hydrides of group 16 elements is

- (a) $\text{H}_2\text{O} < \text{H}_2\text{Te} < \text{H}_2\text{Se} < \text{H}_2\text{S}$
- (b) $\text{H}_2\text{S} < \text{H}_2\text{O} < \text{H}_2\text{Se} < \text{H}_2\text{Te}$
- (c) $\text{H}_2\text{O} < \text{H}_2\text{S} < \text{H}_2\text{Se} < \text{H}_2\text{Te}$
- (d) $\text{H}_2\text{Te} < \text{H}_2\text{Se} < \text{H}_2\text{S} < \text{H}_2\text{O}$

Sol:

Boiling point is inversely proportional to volatility.

Order of bp $= \text{H}_2\text{O} > \text{H}_2\text{Te} > \text{H}_2\text{Se} > \text{H}_2\text{S}$

So order of volatility $= \text{H}_2\text{O} < \text{H}_2\text{Te} < \text{H}_2\text{Se} < \text{H}_2\text{S}$

Ans: (a)

7. For an ideal solution, the correct option is:

(a) $\Delta_{\text{mix}}S = 0$ at constant T and P

(b) $\Delta_{\text{mix}}V \neq 0$ at constant T and P

(c) $\Delta_{\text{mix}}H = 0$ at constant T and P

(d) $\Delta_{\text{mix}}G = 0$ at constant T and P

Sol: For ideal solution,

$$\Delta_{\text{mix}}H = 0$$

$$\Delta_{\text{mix}}S > 0$$

$$\Delta_{\text{mix}}G < 0$$

$$\Delta_{\text{mix}}V = 0$$

Ans: (c)

8. Lanthanide contraction is caused due to

(a) The imperfect shielding on outer electrons by $4f$ - electrons from the nuclear charge

(b) The appreciable shielding on outer electrons by $4f$ - electrons from the nuclear charge

(c) The appreciable shielding on outer electrons by $5d$ - electrons from nuclear charge

(d) The same effective nuclear charge from Ce to Lu

Sol: The imperfect shielding on outer electrons by $4f$ - electrons from the nuclear charge

Ans: (a)

9. How many carbon atoms are present in 0.35 mole of $C_6H_{12}O_6$? (Given : $N_A = 6.023 \times 10^{23}$)

(a) 1.26×10^2 carbon atoms

(b) 1.26×10^{24} carbon atoms

(c) 1.26×10^{44} carbon atoms

(d) 1.26×10^{48} carbon atoms

Sol: 1 mole has $6 \times 6.023 \times 10^{23}$ C atoms

0.35 mole has $0.35 \times 6 \times 6.023 \times 10^{23} = 1.26 \times 10^{24}$ C atoms

Ans: (b)

10. For a cell involving one electron $E^\circ_{\text{cell}} = 0.59 \text{ V}$ at 298 K, the equilibrium constant for the cell reaction is:

[Given that $\frac{2.303RT}{F} = 0.059 \text{ V}$ at $T = 298 \text{ K}$]

- (a) 1.0×10^2 (b) 1.0×10^5 (c) 1.0×10^{10} (d) 1.0×10^{30}

Sol: $E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.059}{n} \log Q$ (i)

(At equilibrium, $Q = K_{\text{eq}}$ and $E_{\text{cell}} = 0$)

$0 = E_{\text{cell}}^{\circ} - \frac{0.059}{1} \log K_{\text{eq}}$ (from equation (i))

$\log K_{\text{eq}} = \frac{E_{\text{cell}}^{\circ}}{0.059} = \frac{0.59}{0.059} = 10$

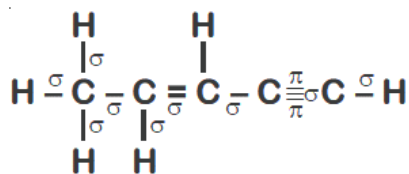
$K_{\text{eq}} = 10^{10} = 1 \times 10^{10}$

Ans: (c)

11. The number of sigma (σ) and pi (π) bonds in pent-2-en-4-yne is

- (a) 10σ bonds and 3π bonds
 (b) 8σ bonds and 5π bonds
 (c) 11σ bonds and 2π bonds
 (d) 13σ bonds and no π bonds

Sol:



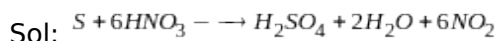
Number of σ bonds = 10

And number of π bonds = 3

Ans: (a)

12. In the estimation of sulphur organic compound on treating with conc. HNO_3 is converted to

- (a) SO_2 (b) H_2S (c) H_2SO_4 (d) SO_3



Ans: (c)

13. The rate of a reaction quadruples when the temperature changes from 300 to 310 K . The activation energy of this reaction is

If observed (mean) molar mass of $HCHO$ and $C_6H_{12}O_6$ are 30 and 150

- (a) 0.50 (b) 0.833 (c) 0.90 (d) 0.96

$$\alpha = \frac{M_{Obs} - M_{th}}{M_{Obs} \left(1 - \frac{1}{6}\right)}$$

Sol:

$$= \frac{150 - 30}{150} \times \frac{6}{5} = 0.96$$

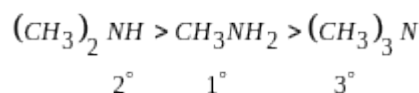
Ans: (d)

17. The correct order of the basic strength of methyl substituted amines in aqueous solution is:

- (a) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$ (b) $(CH_3)_3N > CH_3NH_2 > (CH_3)_2NH$
 (c) $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2$ (d) $CH_3NH_2 > (CH_3)_2NH > (CH_3)_3N$

Sol: In aqueous solution, electron donating inductive effect, solvation effect (H-bonding) and steric hindrance all together affect basic strength of substituted amines.

Basic character:

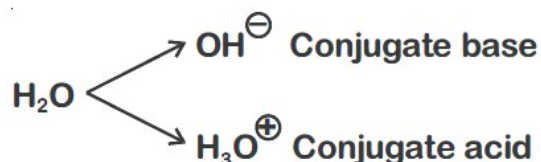


Ans: (a)

18. Conjugate base for Bronsted acids H_2O and HF are:

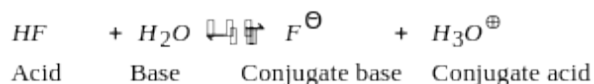
- (a) OH^- and H_2F^+ , respectively (b) H_3O^+ and F^- , respectively
 (c) OH^- and F^- , respectively (d) H_3O^+ and H_2F^+ , respectively

Sol:



HF on loss of H^+ ion becomes F^- is the conjugate base of HF

Example:

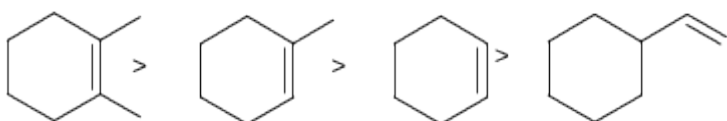


Ans: (c)

19. Which of the following is incorrect order?

(a) $\text{CH}_3^- > \text{CH}_3\text{O}^- > \text{HO}^- > \text{H}_2\text{O}$: (Nucleophilicity in protic solvent)

(b) $\text{Cl}^- > \text{CH}_3\text{COO}^- > \text{CH}_3\text{O}^- > \text{NH}_2^-$: (Leaving group ability)

(c)  : (Stability of alkane)

(d) $\text{CH}_3 - \text{CH}_2 - \text{F} > \text{CH}_3 - \text{CH}_2 - \text{Cl} > \text{CH}_3 - \text{CH}_2 - \text{Br} > \text{CH}_3 - \text{CH}_2 - \text{I}$: (Boiling point)

Sol: Size of the atom is bigger, Van der Waal's force is more and boiling point is more

So b.p. of $\text{CH}_3\text{CH}_2\text{I} > \text{CH}_3\text{CH}_2\text{Br} > \text{CH}_3\text{CH}_2\text{Cl} > \text{CH}_3\text{CH}_2\text{F}$

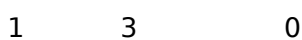
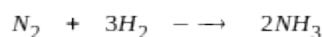
Ans: (d)

20. Consider the following reaction equilibrium $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$

Initially, 1 mole of N_2 and 3 moles of H_2 are taken in a 2L flask. At equilibrium state if, the number of moles of N_2 is 0.6, what is the total number of moles of all gases present in the flask?

- (a) 0.8 (b) 1.6 (c) 3.2 (d) 6.4

Sol:



At eq 0.6 3 - 3 × 0.4 0.8

$$0.6 + 1.8 + 0.8 = 3.2$$

Ans: (c)

21. A compound (C_5H_8) react with ammonical AgNO_3 to give a white precipitate and reacts with excess of KMnO_4 solution to give $(\text{CH}_3)_2\text{CH} - \text{COOH}$. The compound is

- (a) $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH} - \text{CH}_3$ (b) $(\text{CH}_3)_2\text{CHC} \equiv \text{CH}$
 (c) $\text{CH}_3(\text{CH}_2)_2\text{C} \equiv \text{CH}$ (d) $(\text{CH}_3)_2 = \text{C} = \text{CH}_2$

Sol: $(\text{CH}_3)_2\text{CHC} \equiv \text{CH} + \text{KMnO}_4 \rightarrow (\text{CH}_3)_2\text{CHCOOH}$

Ans: (b)

22. Fixed volume of 0.1 M benzoic acid solution is added into 0.2 M sodium benzoate solution and formed a 300 ml , resultant acidic buffer solution. If pH of this buffer solution is 4.5 then find added volume of benzoic acid (Given : pK_a benzoic acid $=4.2$)

- (a) 100 ml (b) 150 ml (c) 200 ml (d) None of these

Sol:
$$pH = pK_a + \log \frac{\text{salt}}{\text{acid}}$$

$$4.5 = 4.2 + \log \frac{0.2(300 - V)}{0.1V}$$

$$1.99V = 600 - 2V$$

$$3.99V = 600 \Rightarrow V = 150\text{ ml}$$

Ans: (b)

23. An electron moving with velocity ' v ' is found to have a certain value of de-Broglie wavelength. The velocity to be possessed by the neutron to have the same de-Broglie wavelength is

- (a) $\frac{1840}{v}$ (b) $1840v$ (c) $\frac{v}{1840}$ (d) v

Sol: Wave length(electron) $= \frac{h}{mv}$

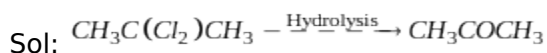
Wave length (neutron) $= \frac{h}{1840mv^1}$

$$v^1 = \frac{h}{1840\text{ m} \times \text{wave length}} = \frac{v}{1840}$$

Ans: (c)

24. $2,2$ - dichloro propane on hydrolysis yields

- (a) Acetone (b) $2,2$ - Propane diol (c) Isopropyl alcohol (d) Acetaldehyde

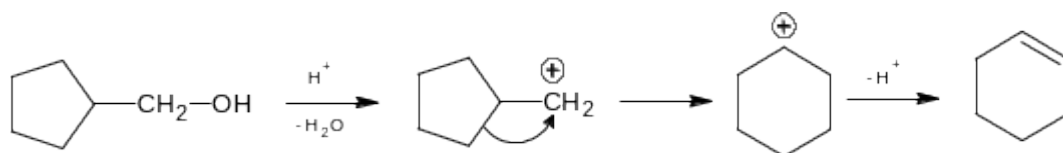


Ans: (a)

25. Dehydration of cyclopentyl carbinol with conc. H_2SO_4 forms

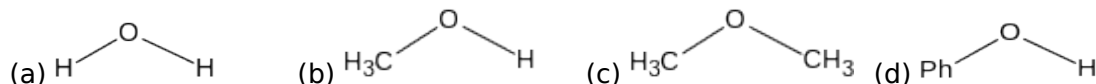
- (a) Cyclopentene (b) Cyclohexene (c) Cyclohexane (d) None of these

Sol:



Ans: (b)

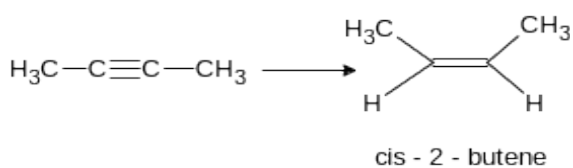
26. The compound that is most difficult to protonate is:



Sol: Due to involvement of lone pair of electrons in resonance in phenol, it will have positive charge (partial), hence incoming proton will not be able to attack easily.

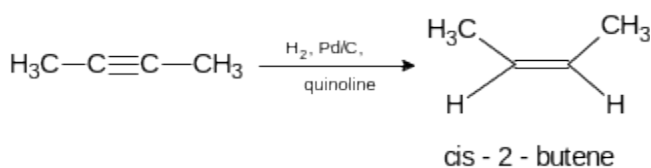
Ans: (d)

27. The most suitable reagent for the following conversion, is:



- (a) $\text{Na} / \text{liquid } \text{NH}_3$ (b) $\text{H}_2, \text{Pd/C}, \text{quinoline}$
(c) Zn / HCl (d) $\text{Hg}^{2+} / \text{H}^+, \text{H}_2\text{O}$

Sol:



Ans: (b)

28. A tetrapeptide has $-\text{COOH}$ group on alanine. This produces glycine (Gly), valine (Val), phenyl alanine (Phe) and alanine (Ala), on complete hydrolysis. For this tetrapeptide, the number of possible sequences (primary structure) with $-\text{NH}_2$ group attached to a chiral center is

- (a) 2 (b) 3 (c) 4 (d) 5

Sol: Since $-\text{COOH}$ group is attached to alanine, one terminal of the tetrapeptide contains alanine. Thus its position is fixed

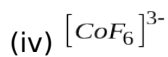
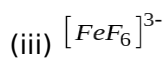
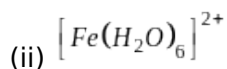
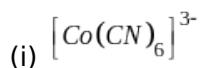
Glycine is achiral whereas valine and phenyl alanine are chiral

Four combinations are possible

Phe-val-gly-ala, Phe-gly-val-ala, Val-phe-gly-ala, Val-gly-phe-ala

Ans: (c)

29. Among the complex ions given below which is/are outer orbital's complex



(a) ii, iii, iv

(b) ii, iii only

(c) i, iv only

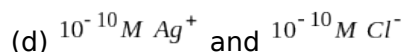
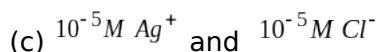
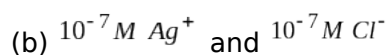
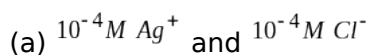
(d) ii only

Sol: (i) is inner orbital complex.

(ii), (iii), (iv) are outer orbital complex

Ans: (a)

30. The solubility product of $AgCl$ is 1.8×10^{-10} . Precipitation of $AgCl$ will occur when equal volumes of which of the following solutions are mixed?



Sol: (a) Ionic product $= 0.25 \times 10^{-8}$

(b) Ionic product $= 0.25 \times 10^{-14}$

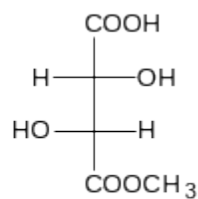
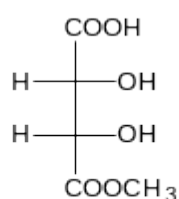
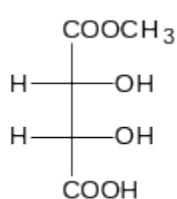
(c) Ionic product $= 0.25 \times 10^{-10}$

(d) Ionic product $= 0.25 \times 10^{-20}$

For precipitation ionic product should be $>$ solubility product

Ans: (a)

31. The correct statements about the compounds a, b and c is/are



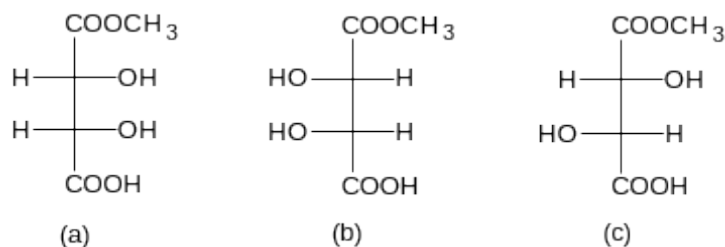
(a) a and b are identical

(b) a and b are diastereomers

(c) a and c are enantiomers

(d) a and b are enantiomers

Sol:



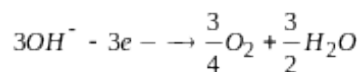
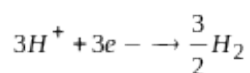
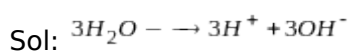
a and b are enantiomer

a and c are diastereomers

Ans: (d)

32. The total volume of dry gaseous products at STP, when 3 moles of electrons are transferred from anode to cathode in the electrolysis of water is: (volume of gas at STP 22.4 L)

- (a) 67.2 L (b) 50.4 L (c) 44.8 L (d) 56.0 L



$$\text{Total gaseous mole} = \frac{3}{4} + \frac{3}{2} = 2.25$$

$$\text{Volume at STP} = 2.25 \times 22.4 = 50.4$$

Ans: (b)

33. Spin only magnetic moment in B.M. of the compound $\text{Hg(II)}[\text{Co(SCN)}_4]$ is -

- (a) $\sqrt{3}$ (b) $\sqrt{15}$ (c) $\sqrt{24}$ (d) $\sqrt{8}$

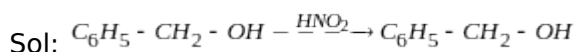
Sol: Co carries +2 charge and has 3 unpaired electrons

$$\text{Spin only magnetic moment} = [3(3+2)]^{1/2} = 15^{1/2}$$

Ans: (b)

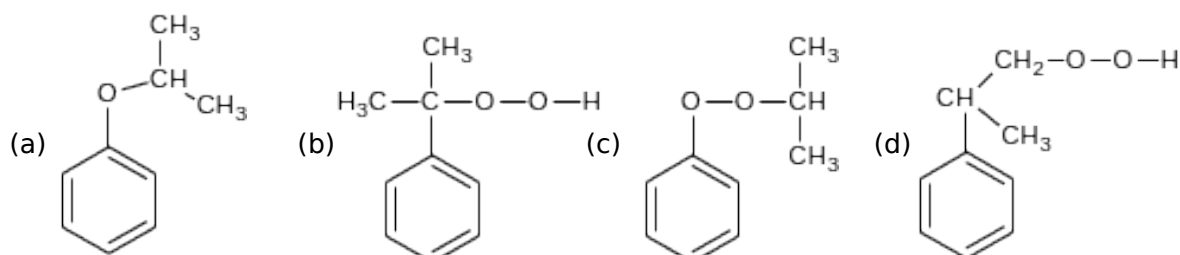
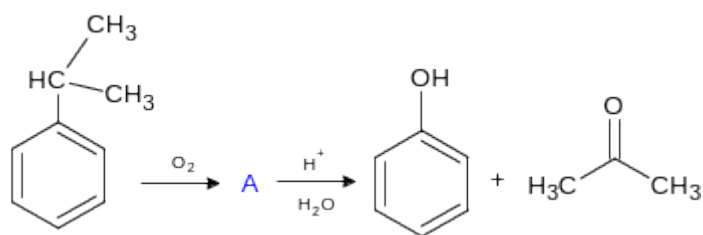
34. What is the product when $\text{C}_6\text{H}_5 - \text{CH}_2 - \text{NH}_2$ reacts with nitrous acid?

- (a) $\text{C}_6\text{H}_5 - \text{N} \equiv \text{N}$ (b) $\text{C}_6\text{H}_5 - \text{CH}_2 - \overset{\oplus}{\text{N}} \equiv \text{N}$ (c) $\text{C}_6\text{H}_5 - \text{CH}_2 - \text{OH}$ (d) $\text{C}_6\text{H}_5 - \text{NH}_2$

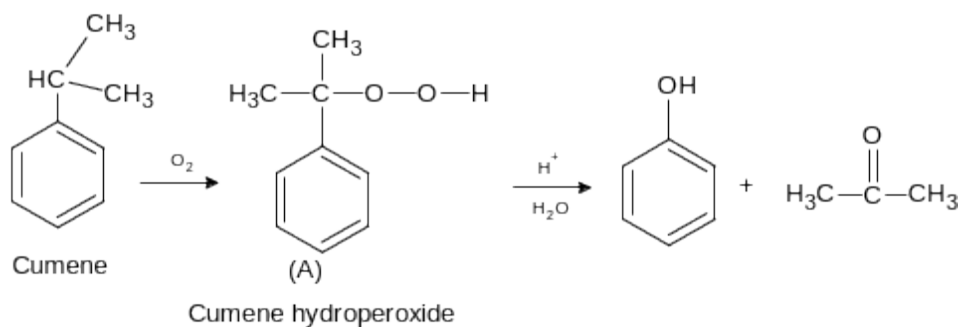


Ans: (c)

35. The structure of intermediate A in the following reaction, is

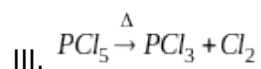
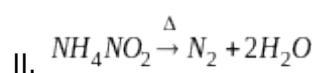
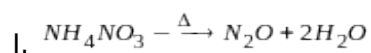


Sol:



Ans: (b)

36. Out of the following redox reactions



Disproportionation is not shown in

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

Sol: I and II are comproportionation reactions. III is redox reaction.

Ans: (d)

37. If the rate constant for a first order reaction is k , the time (t) required for the completion of 99% of the reaction is given by:

- (a) $t = 0.693 / k$ (b) $t = 6.909 / k$ (c) $t = 4.606 / k$ (d) $t = 2.303 / k$

Sol: First order rate constant is given as,

$$k = \frac{2.303}{t} \log \frac{[A]_0}{[A]_t}$$

99% completed reaction,

$$k = \frac{2.303}{t} \log \frac{100}{1}$$

$$= \frac{2.303}{t} \log 10^2$$

$$k = \frac{2.303}{t} \times 2 \log 10$$

$$t = \frac{2.303}{k} \times 2 = \frac{4.606}{k} \quad t = \frac{4.606}{k}$$

Ans: (c)

38. The structure and hybridisation of $\text{Si}(\text{CH}_3)_4$ are

- (a) bent, sp (b) trigonal sp^2 (c) octahedral, sp^3d^2 (d) tetrahedral sp^3

Sol: The central silicon atom is sp^3 hybridised, has no lone pair of electrons and hence, the structure should be tetrahedral.

Ans: (d)

39. Carbon monoxide is

- (a) acidic (b) basic (c) neutral (d) amphoteric

Sol: CO is neutral due to low O.N of carbon

Ans: (c)

40. 0.15 g of hydrocarbon on complete combustion gives 0.44g of carbon dioxide. The percentages of carbon and hydrogen respectively are

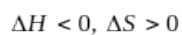
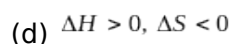
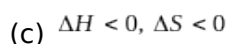
- (a) 80 and 20 (b) 60 and 40 (c) 90 and 10 (d) 70 and 30

Sol: % of carbon $= \frac{12 \times 0.44 \times 100}{44 \times 0.15} = 80$; % of hydrogen $= (100 - 80) = 20$

Ans: (a)

41. Which of the following conditions regarding a chemical process ensure its spontaneity at all temperature?

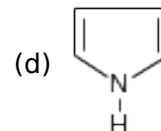
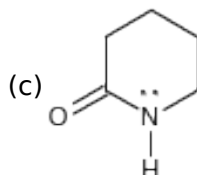
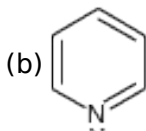
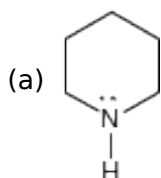
- (a) $\Delta H > 0, \Delta S > 0$ (b) $\Delta H < 0, \Delta S > 0$



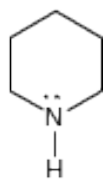
Sol:

Ans: (b)

42. The strongest base in the given compounds is



Sol:



is most basic as lone pair of electron is most easily available for protonation.

Ans: (a)

43. How many cyclic isomers of C_5H_{10} are possible? (excluding stereoisomer)

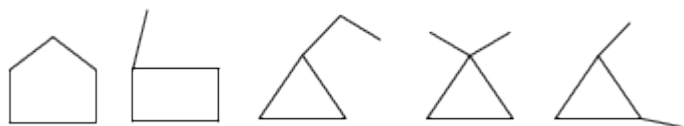
(a) 4

(b) 3

(c) 2

(d) 5

Sol: Du is 1



Ans: (d)

44. The major product obtain in reaction of t^- butyl bromide with sodium methoxide is

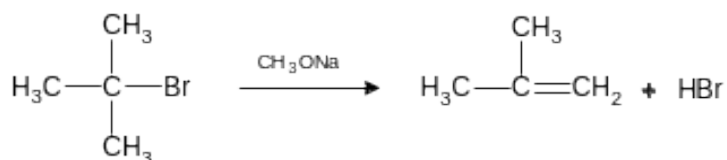
(a) t^- butyl methyl ether

(b) Isobutylene

(c) Sodium t^- butoxide

(d) Isobutane

Sol:



Ans: (b)

45. Which is the strongest acid in the following?

- (a) $HClO_3$ (b) $HClO_4$ (c) H_2SO_3 (d) H_2SO_4

Sol: $HClO_4$

Ans: (b)

Physics

Multiple Choice Questions with one correct answer. A correct answer carries 4 marks. A wrong answer carries a penalty of 1 mark.

45 x 4 = 180

46. The mechanical quantity, which has dimensions of reciprocal of mass (M^{-1}) is:
- (a) angular momentum (b) coefficient of thermal conductivity
(c) torque (d) gravitational constant

Sol: Angular momentum $= [ML^2T^{-1}]$

Coeff of thermal conductivity $= [MLT^{-3}K^{-1}]$

Torque $= [ML^2T^{-2}]$

Gravitational constant $= [M^{-1}L^3T^{-2}]$

So, gravitational constant has power of (-1) of M

Ans: (d)

47. The position of a particle is given by $r(t) = 4t\hat{i} + 2t^2\hat{j} + 5\hat{k}$

Where t is in seconds and r in metre. Find the magnitude of velocity at $t = 1s$

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

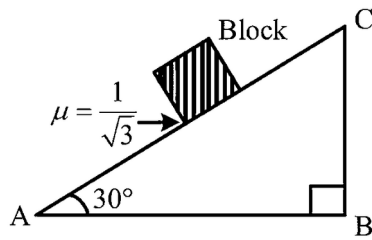
Sol: $\dot{V} = \frac{dr}{dt} = 4\hat{i} + 4t\hat{j} + 0\hat{k}$ at $t = 1sec$

$V = 4\hat{i} + 4(1)\hat{j}$

$|V| = \sqrt{4^2 + 4^2} = 4\sqrt{2}$

Ans: (a)

48. A block of mass 2 kg is placed on inclined surface AC (as shown in figure) of coefficient of friction μ . If $g = 10\text{ m s}^{-2}$, the net force (in N) on the block will be:



- (a) $10\sqrt{3}$ (b) zero (c) 10 (d) 20

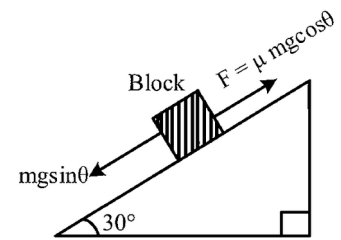
Sol: $\mu = \frac{1}{\sqrt{3}}$

$\tan 30^\circ = \frac{1}{\sqrt{3}}$

As $\mu = \tan \theta$

The block is at rest net force on it must be zero.

Ans: (b)



49. A hospital uses an ultrasonic scanner to locate tumours in a tissue. The operating frequency of the scanner is 4.2 MHz . The speed of sound in a tissue is 1.7 km s^{-1} . The wavelength of sound in tissue is close to

- (a) $4 \times 10^{-4}\text{ m}$ (b) $8 \times 10^{-4}\text{ m}$ (c) $4 \times 10^{-3}\text{ m}$ (d) $8 \times 10^{-3}\text{ m}$

Sol: Frequency (n) = $4.2\text{ MHz} = 4.2 \times 10^6\text{ Hz}$ and speed of sound (v) = $1.7\text{ km s}^{-1} = 1.7 \times 10^3\text{ m s}^{-1}$.

Wavelength of sound in tissue

$(\lambda) = \frac{v}{n} = \frac{1.7 \times 10^3}{4.2 \times 10^6} = 4 \times 10^{-4}\text{ m}$

Ans: (a)

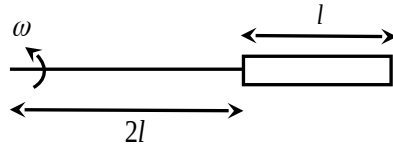
50. An ideal gas A and a real gas B have their volumes increased from V to $2V$ under isothermal conditions. The increase in internal energy

- (a) will be same in both A and B (b) will be zero in both the cases
 (c) of B will be more than that of A (d) of A will be more than that of B

Sol: Under isothermal conditions, there is no change in internal energy. $nC_V \Delta T = 0$ as $\Delta T = 0$.

Ans: (b)

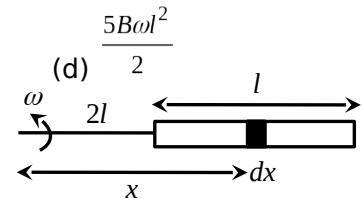
51. A metallic rod of length l is tied to a string of length $2l$ and made to rotate with angular speed ω , in a horizontal plane on a smooth table, with free end of the string fixed on the table. If there is a magnetic field B acting in the vertical direction. The emf induced across the ends of the rod is



(a) $\frac{2B\omega l^2}{2}$

(b) $\frac{3B\omega l^2}{2}$

(c) $\frac{4B\omega l^2}{2}$



Sol: Here, induced emf, $\int_{2l}^{3l} (\mathbf{v} \times \mathbf{B}) \cdot d\mathbf{l}$

$$\int_{2l}^{3l} (\omega x) B dx = B\omega \left[\frac{(3l)^2}{2} - \frac{(2l)^2}{2} \right] = \frac{5B\omega l^2}{2}$$

Ans: (d)

52. 10^3 cm is a wavelength of light corresponding to the spectrum of
 (a) infrared rays (b) ultraviolet rays (c) microwaves (d) γ -rays

Sol: Microwave region wavelength = 1 mm to 30 cm.

Ans: (c)

53. A block of mass 10 kg, moving in x direction with a constant speed of 10 ms⁻¹, is subjected to a retarding force $F = 0.1x$ J/m during its travel force $x = 20$ m to 30 m. Its final KE will be
 (a) 275 J (b) 250 J (c) 475 J (d) 450 J

Sol: Here, $m = 10$ kg, $v_i = 10$ ms⁻¹
 Initial kinetic energy of the block is

$$K_i = \frac{1}{2}mv_i^2 = \frac{1}{2} \times (10 \text{ kg}) \times (10 \text{ ms}^{-1})^2 = 500 \text{ J}$$

Work done by retarding force

$$W = \int_{x_1}^{x_2} F_r dx = \int_{20}^{30} -0.1x dx = -0.1 \left[\frac{x^2}{2} \right]_{20}^{30}$$

$$= -0.1 \left[\frac{900 - 400}{2} \right] = -25 \text{ J}$$

According to work-energy theorem,

$$W = K_f - K_i$$

$$K_f = W + K_i = -25 J + 500 J = 475 J$$

Ans: (c)

54. A body of mass 5 kg under the action of a constant force $F = F_x \hat{i} + F_y \hat{j}$ has velocity at $t = 0 \text{ s}$ as $u = (6\hat{i} - 2\hat{j}) \text{ ms}^{-1}$ and at $t = 10 \text{ s}$ as $v = +6\hat{j} \text{ ms}^{-1}$. The force F is

- (a) $(-3\hat{i} + 4\hat{j}) \text{ N}$ (b) $\left(-\frac{3}{5}\hat{i} + \frac{4}{5}\hat{j}\right) \text{ N}$ (c) $(3\hat{i} - 4\hat{j}) \text{ N}$ (d) $\left(\frac{3}{5}\hat{i} - \frac{4}{5}\hat{j}\right) \text{ N}$

Sol: Acceleration,
$$\vec{a} = \frac{\vec{v} - \vec{u}}{t} = \frac{6\hat{j} - (6\hat{i} - 2\hat{j})}{10} = \frac{-3\hat{i} + 4\hat{j}}{5} \text{ ms}^{-2}$$

Force,
$$\vec{F} = m\vec{a} = 5 \times \frac{(-3\hat{i} + 4\hat{j})}{5} = (-3\hat{i} + 4\hat{j}) \text{ N}$$

Ans: (a)

55. When sound waves travel from air to water, which one of the following remains constant?

- (a) Amplitude (b) Frequency (c) Velocity (d) Wavelength

Sol: When sound travels from one medium to another, its speed and wavelength change. Its frequency remains constant. Amplitude changes due to absorption.

Ans: (b)

56. The electrostatic potential inside a charged spherical ball is given by $V = ar^2 + b$ where r is the distance from the centre and a, b are constants. Then the charge density inside the ball is

- (a) $-6a\epsilon_0 r$ (b) $-24\pi a\epsilon_0$ (c) $-6a\epsilon_0$ (d) $-24\pi a\epsilon_0 r$

Sol: Electric field,

$$E = -\frac{dV}{dr} = -2ar \quad \dots \text{ (i)}$$

By Gauss's theorem,

$$E = \frac{1}{4\pi\epsilon_0} \frac{q}{r^2} \quad \dots \text{ (ii)}$$

From (i) and (ii),

$$q = -8\pi\epsilon_0 ar^3$$

$$\Rightarrow dq = -24\pi\epsilon_0 ar^2 dr$$

Charge density, $\rho = \frac{dq}{4\pi r^2 dr} = -6\epsilon_0 a$

Ans: (c)

57. A particle of mass m_1 is moving with a velocity v_1 and another particle of mass m_2 is moving with a velocity v_2 . Both of them have the same momentum but different kinetic energies E_1 and E_2 respectively. If $m_1 > m_2$, then

- (a) $E_1 = E_2$ (b) $E_1 < E_2$ (c) $\frac{E_1}{E_2} = \frac{m_1}{m_2}$ (d) $E_1 > E_2$

Sol: $E = \frac{p^2}{2m} \propto \frac{1}{m}$ (if momentum is same)

Since, $m_1 > m_2$, therefore, $E_1 < E_2$

Ans: (b)

58. The moment of inertia of a disc about a tangent axis in its plane is (Here, M is mass of the disc and R is radius of disc)

- (a) $\frac{MR^2}{4}$ (b) $\frac{3MR^2}{2}$ (c) $\frac{5MR^2}{4}$ (d) $\frac{7MR^2}{4}$

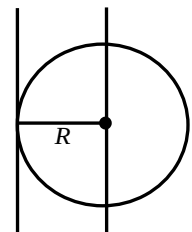
Sol: Moment of inertia of a disc about a diameter

$$= \frac{1}{2} \times \frac{1}{2} MR^2 = \frac{1}{4} MR^2 \left[\because I_x + I_y = I_z = \frac{1}{2} MR^2 \right]$$

Applying theorem of parallel axis,

$$I_{\text{tangent}} = \frac{1}{4} MR^2 + MR^2 = \frac{5MR^2}{4}$$

Ans: (c)

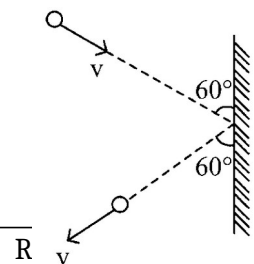


59. A 1kg object strikes a wall with velocity 1ms^{-1} at an angle of 60° with the wall and reflects at the same angle. If it is in contact with wall for 0.1s , then the force exerted on the wall is:

- (a) $30\sqrt{3}\text{ N}$ (b) zero (c) $10\sqrt{3}\text{ N}$ (d) $20\sqrt{3}\text{ N}$

Sol:

$$F = \left| \frac{\Delta p}{\Delta t} \right| = \frac{2mv \sin \theta}{t} = \frac{2(1)(1)\sin 60^\circ}{0.1} = 10\sqrt{3}\text{ N}$$



Ans: (c)

60. Monochromatic light of frequency 6.0×10^{14} Hz is produced by a laser. The power emitted is 2×10^{-3} W. The number of photons emitted, on the average, by the source per second is

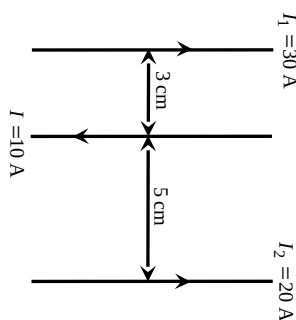
- (a) 5×10^{16} (b) 5×10^{17} (c) 5×10^{14} (d) 5×10^{15}

Sol: Since $P = nh\nu$

$$\Rightarrow n = \frac{P}{h\nu} = \frac{2 \times 10^{-3}}{6.6 \times 10^{-34} \times 6 \times 10^{14}} = 5 \times 10^{15}$$

Ans: (d)

61. Three straight, parallel current-carrying conductors are shown in the figure. The net force experienced by the middle conductor of length 25 cm is



- (a) 3×10^{-4} N towards right (b) 6×10^{-4} N towards right
 (c) 9×10^{-4} N towards right (d) zero

Sol: Middle conductor is repelled by left conductor and also by right conductor.

Force due to left conductor,

$$F_1 = \frac{\mu_0 I_1 I l}{2\pi r} = \frac{(4\pi \times 10^{-7}) \times (30) \times (10) \times (25 \times 10^{-2})}{2\pi \times (3 \times 10^{-2})} = 5 \times 10^{-4} \text{ N} \quad (\text{towards right})$$

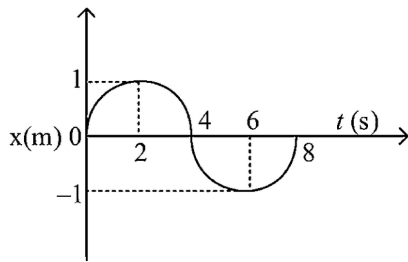
Force due to right conductor,

$$F_2 = \frac{\mu_0 I_2 I l}{2\pi r} = \frac{(4\pi \times 10^{-7}) \times (20) \times (10) \times (25 \times 10^{-2})}{2\pi \times (5 \times 10^{-2})} = 2 \times 10^{-4} \text{ N} \quad (\text{towards left})$$

Net force on the middle conductor, $F = F_1 - F_2 = 5 \times 10^{-4} \text{ N} - 2 \times 10^{-4} \text{ N} = 3 \times 10^{-4} \text{ N}$ (towards right).

Ans: (a)

62. The $x-t$ graph of a particle performing simple harmonic motion is shown in the figure. The acceleration of the particle at $t = 2s$ is:



- (a) $-\frac{\pi^2}{8}ms^{-2}$ (b) $\frac{\pi^2}{16}ms^{-2}$ (c) $-\frac{\pi^2}{16}ms^{-2}$ (d) $\frac{\pi^2}{8}ms^{-2}$

Sol: $x = A\sin(\omega t)$

$$\frac{dx}{dt} = v = A\omega \cos(\omega t)$$

$$\frac{dv}{dt} = a = -\omega^2 A\sin(\omega t)$$

$$a = -\left(\frac{2\pi}{8}\right)^2 \times 1 \sin\left(\frac{2\pi}{8} \times 2\right) \Rightarrow a = -\frac{\pi^2}{16} \times \sin\left(\frac{\pi}{2}\right)$$

$$\therefore a = -\frac{\pi^2}{16}m/s^2$$

Ans: (c)

63. The pressure P of an ideal gas and its mean translational kinetic energy per unit volume E are related as

- (a) $P = \frac{E}{2}$ (b) $P = E$ (c) $P = \frac{3E}{2}$ (d) $P = \frac{2E}{3}$

Sol:
$$P = \frac{1}{3}\rho v^2 = \frac{2}{3} \times \left(\frac{1}{2}\rho v^2\right) = \frac{2}{3}E$$

Ans: (d)

64. A metal sample carrying a current along X -axis with current density $J_x \text{ A m}^{-2}$ is subjected to a magnetic field $B_z \text{ T}$ (along Z -axis). The electric field $E_y \text{ NC}^{-1}$ developed along Y -axis is directly proportional to J_x as well as B_z . The constant of proportionality has SI unit

- (a) m^2A^{-1} (b) $m^3A^{-1}s^{-1}$ (c) $m^2A^{-1}s^{-1}$ (d) Asm^{-3}

Sol: According to question

$$E_y \propto J_x B_z$$

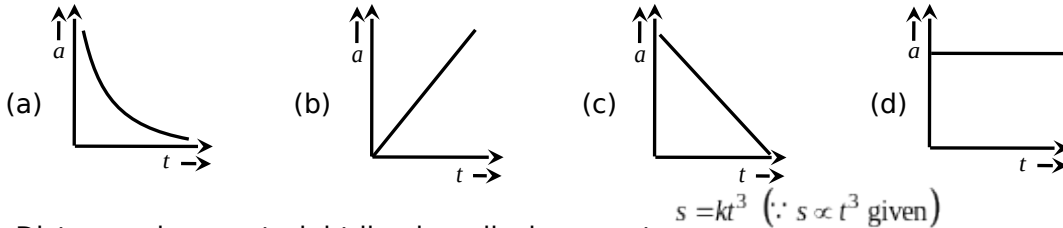
∴ Constant of proportionality

$$K = \frac{E_y}{B_z J_x} = \frac{c}{J_x} = \text{m}^3 \text{A}^{-1} \text{s}^{-1} \left[\text{As } \frac{E}{B} = c \text{ (speed of light) and } J = \frac{I}{\text{Area}} \right]$$

Ans: (b)

65. The distance travelled by a body moving along a straight line in time t is proportional to t^3 .

The acceleration-time ($a-t$) graph for the motion of the body will be



Sol: Distance along a straight line i.e., displacement,

By double differentiation of displacement, we get acceleration.

$$v = \frac{ds}{dt} = \frac{dkt^3}{dt} = 3kt^2 \quad \text{and}$$

$$a = \frac{dv}{dt} = k \frac{d(3t^2)}{dt} = 6kt$$

$$a = 6kt \quad \text{or} \quad a \propto t$$

Hence graph (b) is correct.

Ans: (b)

66. Which one of the following statements is false?

- (a) A vector has only magnitude, whereas a scalar has both magnitude and direction
- (b) Distance is a scalar quantity but displacement is a vector quantity
- (c) Momentum, force and torque are vector quantities
- (d) Mass, speed and energy are scalar quantities

Sol: Vector has both magnitude and direction, scalar has only magnitude. So, statement (a) is wrong.

Ans: (a)

67. A motor car is travelling at 30 ms^{-1} on a circular road of radius 500 m . It is increasing its speed at the rate of 2 ms^{-2} . Then the acceleration of the car at that instant will be

- (a) 4.7 ms^{-2}
- (b) 3.7 ms^{-2}
- (c) 2.7 ms^{-2}
- (d) 8.7 ms^{-2}

Sol: Radial acceleration = centripetal acceleration

$$\frac{v^2}{r} = \frac{30 \times 30}{500} = \frac{9}{5} \text{ m s}^{-2}$$

Tangential acceleration, $(a_t) = 2 \text{ m s}^{-2}$

$$\begin{aligned} \text{Total acceleration, } &= \sqrt{a_t^2 + a_r^2} \\ &= \sqrt{2^2 + \frac{81}{25}} = \sqrt{4 + \frac{81}{25}} = \sqrt{\frac{181}{25}} = 2.7 \text{ m s}^{-2} \end{aligned}$$

Ans: (c)

68. How many electrons make up a charge of magnitude $20 \mu\text{C}$?

- (a) 1.25×10^{14} (b) 2.23×10^{14} (c) 3.25×10^{14} (d) 5.25×10^{14}

Sol: Charge on an electron $= 1.6 \times 10^{-19}$ coulomb

$$\begin{aligned} \text{Number of electrons required } &= \frac{q}{e} = \frac{20 \times 10^{-6}}{1.6 \times 10^{-19}} \\ &= \frac{20}{1.6} \times 10^{13} = 1.25 \times 10^{14} \end{aligned}$$

Ans: (a)

69. If $M(A; Z)$, M_p and M_n denote the masses of the nucleus ${}^A_Z X$, proton and neutron

respectively in units of u ($1u = 931.5 \text{ MeV}/c^2$) and BE represents its bonding energy in MeV , then

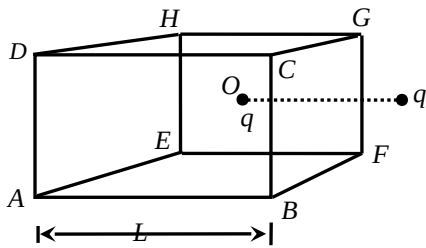
- (a) $M(A, Z) = ZM_p + (A - Z)M_n - BE$ (b) $M(A, Z) = ZM_p + (A - Z)M_n + BE/c^2$
 (c) $M(A, Z) = ZM_p + (A - Z)M_n + BE$ (d) None of these

Sol: Mass defect $= ZM_p + (A - Z)M_n - M(A, Z)$

$$\Rightarrow \frac{BE}{c^2} = ZM_p + (A - Z)M_n - M(A, Z)$$

Ans: (d)

70. A charged particle q is placed at the centre O of a cube of length L (ABCDEFGH). Another (same) charge q is placed at a distance L from O along a line parallel to AB as shown in the figure. Then the electric flux through the face $BCFG$ is



- (a) $q/4\pi\epsilon_0L$ (b) zero (c) $q/2\pi\epsilon_0L$ (d) $q/3\pi\epsilon_0L$

Sol: Electric flux through the face $BCFG$ due to charge q kept at $O = \frac{q}{6\epsilon_0}$ (towards right).

Electric flux through the face $BCFG$ due to the other charge $q = \frac{q}{6\epsilon_0}$ (towards left).

Therefore, total electric flux through $BCFG = 0$.

Ans: (b)

71. A body is projected from ground at an angle of 30° to the horizontal with a speed of 30 ms^{-1} . What is the angle of its velocity vector with the horizontal after 1.5 seconds? (Take $g = 10 \text{ ms}^{-2}$)

- (a) 0° (b) 30° (c) 60° (d) 90°

Sol: $v_x = u_x = 30 \cos 30^\circ = 30\sqrt{3}/2$, $u_y = 30 \sin 30^\circ$; $v_y = u_y - gt = 30 \sin 30^\circ - 10 \times 1.5 = 0$

Angle with horizontal α is given by, $\tan \alpha = \frac{v_y}{v_x} = 0^\circ$

Particle is at the highest point of its path at this instant.

Ans: (a)

72. A fully charged capacitor C with initial charge Q_0 is connected to a coil of self inductance L at $t = 0$. The time at which the energy is stored equally between the electric and the magnetic field is

- (a) $\frac{\pi}{4}\sqrt{LC}$ (b) $2\pi\sqrt{LC}$ (c) \sqrt{LC} (d) $\pi\sqrt{LC}$

Sol: Energy stored in the capacitor is equal to one-half of the initial energy stored in it.

$$U = \frac{Q^2}{2C} = \frac{1}{2} \frac{Q_0^2}{2C} \Rightarrow Q = \frac{Q_0}{\sqrt{2}} \quad \text{Now, } Q = Q_0 \cos \omega t \Rightarrow \frac{Q_0}{\sqrt{2}} = Q_0 \cos \omega t$$

$$\Rightarrow \cos \omega t = \frac{1}{\sqrt{2}} \Rightarrow \omega t = \frac{2\pi}{T} t = \frac{\pi}{4} \Rightarrow t = \frac{T}{8} \quad \text{But } T = 2\pi\sqrt{LC} \Rightarrow t = \frac{2\pi\sqrt{LC}}{8} = \frac{\pi\sqrt{LC}}{4}$$

Ans: (a)

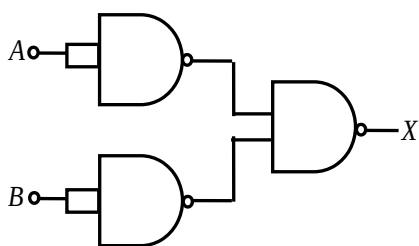
73. Of the various series of the hydrogen spectrum, the one which lies wholly in the ultraviolet region is

- (a) Lyman series (b) Balmer series (c) Paschen series (d) Brackett series

Sol: The wavelengths of the lines of Lyman series vary from 912 \AA to 1216 \AA .

Ans: (a)

74. The combination of gates shown below yields



- (a) OR gate (b) NOT gate (c) AND gate (d) NAND gate

Sol: The final Boolean expression is,

$$X = \overline{(\overline{A} \cap \overline{B})} = \overline{\overline{A}} + \overline{\overline{B}} = A + B \Rightarrow \text{OR gate}$$

Ans: (a)

75. An artificial satellite moving in a circular orbit around the earth has a total (kinetic + potential) energy E_0 . Its potential energy is

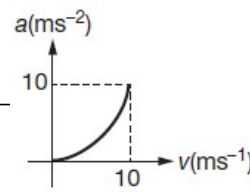
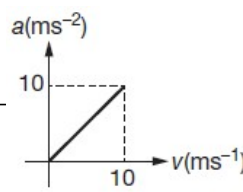
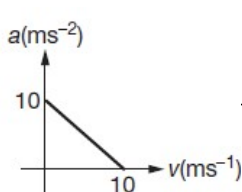
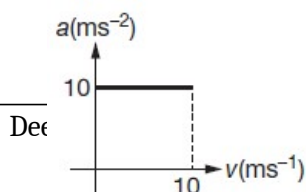
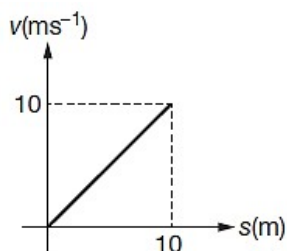
- (a) $-E_0$ (b) $1.5E_0$ (c) $2E_0$ (d) E_0

Sol: $PE = 2 \times KE \Rightarrow PE = 2E_0$

In case of circular motion of satellite around the earth, or planets revolving around the Sun or electrons revolving in a circular orbit around nucleus, $PE = 2 \times KE = -2 \times KE$.

Ans: (c)

76. Velocity versus displacement graph of a particle moving in a straight line is shown in figure. Corresponding acceleration versus velocity graph will be



Dec

- (a) (b) (c) (d)

Sol: The graph shows the following v-s relation i.e.,

$$v = s$$

$$\Rightarrow \frac{dv}{ds} = 1$$

Since $a = \frac{v dv}{ds}$

$$\Rightarrow a = v(1)$$

$$a = v$$

So, a - v graph is again a straight line passing through the origin and inclined to the x -axis at an angle of 45°

Hence, the correct answer is (c).

Ans: (c)

77. A primary cell has an emf of 1.5 volt. When short-circuited, it gives a current of 3 ampere. The internal resistance of the cell is

- (a) 4.5 ohm (b) 2 ohm (c) 0.5 ohm (d) 1.5 ohm

Sol: $r = E / I = 1.5 / 3 = 0.5 \text{ ohm}$

Ans: (c)

78. The magnetic lines of force inside a bar magnet

- (a) are from North pole to South pole of magnet
 (b) do not exist
 (c) depends upon the area of cross-section of bar magnet
 (d) are from South pole to North pole of magnet

Sol: Magnetic lines of force form closed loops. Inside a bar magnet, they go from south pole to north pole of the magnet. Outside the bar magnet, they go from north pole to south pole.

Ans: (d)

79. A straight rod of length L extends from $x = a$ to $x = a + L$. Find the gravitational force it exerts on a point mass m kept at $x = 0$ if the linear density of rod $\mu = A + Bx^2$.

- (a) $Gm \left[\frac{A}{a} + BL \right]$ (b) $Gm \left[A \left(\frac{1}{a} - \frac{1}{a+L} \right) + BL \right]$

(c) $Gm \left[BL + \frac{A}{a+L} \right]$

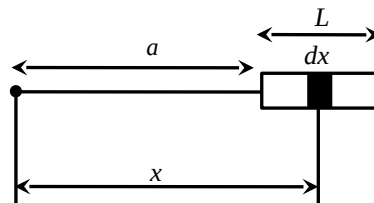
(d) $Gm \left[BL - \frac{A}{a} \right]$

Sol: $\therefore dF = \frac{Gm(\mu dx)}{x^2}$

$F = Gm \int_a^{a+L} (A + Bx^2) \frac{dx}{x^2}$

$F = Gm \left[A \left(\frac{1}{a} - \frac{1}{a+L} \right) + BL \right]$

Ans: (b)



80. If Q , E and W denote respectively the heat added, change in internal energy and the work done in a closed cyclic process, then

- (a) $W = 0$ (b) $Q = W = 0$ (c) $E = 0$ (d) $Q = 0$

Sol: In a cyclic process, the initial state coincides with the final state. Hence, the change in internal energy is zero, as it depends only on the initial and final states. But Q and W are non-zero during a cyclic process.

Ans: (c)

81. A shunt of resistance 1Ω is connected across a galvanometer of 120Ω resistance. A current of 5.5 ampere gives full scale deflection in the galvanometer. The current that will give full scale deflection in the absence of the shunt is nearly

- (a) 5.5 ampere (b) 0.5 ampere (c) 0.004 ampere
(d) 0.045 ampere

Sol: The current that will give full scale deflection in the absence of the shunt is nearly equal to the current through the galvanometer when shunt is connected i.e. I_g

As $I_g = \frac{IS}{G+S} = \frac{5.5 \times 1}{120+1} = 0.045$ ampere

Ans: (d)

82. A steel wire of length 20 cm and uniform cross-section 1 mm^2 is tied rigidly at both the ends. The temperature of the wire is altered from 40°C to 20°C . Thermal coefficient of linear expansion for steel $\alpha = 1.1 \times 10^{-5} \text{ }^\circ \text{C}^{-1}$ and Y for steel is $2.0 \times 10^{11} \text{ Nm}^{-2}$. The change in tension of the wire is

- (a) 2.2×10^6 newton (b) 16 newton (c) 88 newton (d) 44 newton

Sol: $F = YA\alpha t = (2.0 \times 10^{11})(10^{-6})(1.1 \times 10^{-5})(20) = 44$ newton

Ans: (d)

83. To produce an instantaneous displacement current of 2 mA in the space between the parallel plates of a capacitor of capacitance $4\text{ }\mu\text{F}$, the rate of change of applied variable

potential difference $\left(\frac{dV}{dt}\right)$ must be:-

- (a) 800 V/s (b) 500 V/s (c) 200 V/s (d) 400 V/s

Sol: $Q = CV$

$$\frac{dQ}{dt} = C \cdot \frac{dV}{dt} \Rightarrow \frac{dV}{dt} = \frac{I}{C} = \frac{2 \times 10^{-3}}{4 \times 10^{-6}} = \frac{10^3}{2} = 500 \frac{\text{V}}{\text{s}}$$

Ans: (b)

84. A boat is sent across a river with a velocity of 8 km h^{-1} . If the resultant velocity of boat is 10 km h^{-1} , then the velocity of the river is

- (a) 2 km h^{-1} (b) 6 km h^{-1} (c) $\sqrt{3}\text{ km h}^{-1}$ (d) $2\sqrt{2}\text{ km h}^{-1}$

Sol: $v_r = \sqrt{v_{B,g}^2 - v_{B,r}^2} = \sqrt{10^2 - 8^2} = 6\text{ km h}^{-1}$

Ans: (b)

85. In a plane electromagnetic wave travelling in free space, the electric field component oscillates sinusoidally at a frequency of $2.0 \times 10^{10}\text{ Hz}$ and amplitude 48 Vm^{-1} . Then the amplitudes of oscillating magnetic field is: (Speed of light in free space $= 3 \times 10^8\text{ ms}^{-1}$)

- (a) $1.6 \times 10^{-8}\text{ T}$ (b) $1.6 \times 10^{-7}\text{ T}$ (c) $1.6 \times 10^{-6}\text{ T}$ (d) $1.6 \times 10^{-9}\text{ T}$

Sol: $C = \frac{E_0}{B_0}$

$$B_0 = \frac{E_0}{C} = \frac{48}{3 \times 10^8} = 1.6 \times 10^{-7}\text{ T}$$

Ans: (b)

86. Yellow light is used in a single slit diffraction experiment with slit width of 0.6 mm . If yellow light is replaced by X-rays, then the observed pattern will reveal,

- (a) that the central maximum is narrower (b) more number of fringes
(c) less number of fringes (d) no diffraction pattern

Sol: For diffraction pattern to be observed, the dimension of slit should be comparable to the wavelength of light. X-rays have very small wavelength than 0.6 mm . So, they will not show diffraction effects.

Ans: (d)

87. When a ray of light enters glass from air,

- (a) its wavelength decreases
- (b) Its wavelength increases
- (c) its frequency decreases
- (d) neither its wavelength nor its frequency changes

Sol: When the ray enters a glass slab from air, its frequency remains unchanged. Since glass slab is an optically denser medium, the velocity of light decreases and therefore we can conclude that the wavelength decreases ($\because v = \nu\lambda$).

Ans: (a)

88. An ideal fluid flows (laminar flow) through a pipe of non-uniform diameter. The maximum and minimum diameters of the pipe are 6.4 cm and 4.8 cm , respectively. The ratio of the minimum and the maximum velocities of fluid in this pipe is

- (a) $\frac{9}{16}$
- (b) $\frac{\sqrt{3}}{2}$
- (c) $\frac{3}{4}$
- (d) $\frac{81}{256}$

Sol: From the equation of continuity, $A_1 v_1 = A_2 v_2$

Here, v_1 and v_2 are the minimum and maximum velocities of the fluid in the pipe respectively.

A_1 and A_2 are the maximum and minimum areas of the pipe respectively.

$$\Rightarrow \frac{v_1}{v_2} = \frac{A_2}{A_1} = \frac{\pi(4.8)^2/4}{\pi(6.4)^2/4} = \frac{9}{16}$$

Ans: (a)

89. Two identical strings X and Z made of same material have tension T_x and T_z in them respectively. If their fundamental frequencies are 450 Hz and 300 Hz , respectively, then the ratio T_x/T_z is

- (a) 2.25
- (b) 0.44
- (c) 1.25
- (d) 1.5

Sol: Using $f = \frac{1}{2l} \sqrt{\frac{T}{\mu}}$

Where, T = tension and $\mu = \frac{\text{mass}}{\text{length}}$

$$f_x = \frac{1}{2l} \sqrt{\frac{T_x}{\mu}} \quad \text{and} \quad f_z = \frac{1}{2l} \sqrt{\frac{T_z}{\mu}}$$

$$\frac{f_x}{f_z} = \frac{450}{300} = \sqrt{\frac{T_x}{T_z}} \quad \therefore \frac{T_x}{T_z} = \frac{9}{4} = 2.25$$

Ans: (a)

90. A particle is moving 5 times as fast as an electron. The ratio of the de-Broglie wavelength of the particle to that of the electron is 1.878×10^{-4} . The mass of the particle is close to (Use here, mass of the electron $(m_e) = 9.1 \times 10^{-31} \text{ kg}$)

- (a) $4.8 \times 10^{-27} \text{ kg}$ (b) $9.1 \times 10^{-31} \text{ kg}$ (c) $1.2 \times 10^{-28} \text{ kg}$ (d) $9.7 \times 10^{-28} \text{ kg}$

Sol: de Broglie wavelength

$$\lambda = \frac{h}{mv} \Rightarrow m = \frac{h}{\lambda v}$$

Clearly, $m \propto \frac{1}{\lambda v}$

If λ and v respectively be the wavelength and velocity of electron and λ' and v' respectively be the wavelength and velocity of the particle, then

$$\Rightarrow \frac{m'}{m} = \frac{v\lambda}{v'\lambda'} = \frac{1}{5} \times \frac{1}{1.878 \times 10^{-4}}$$

$$\Rightarrow m' = \frac{9.1 \times 10^{-31}}{5 \times 1.878 \times 10^{-4}} = 9.7 \times 10^{-28} \text{ kg}$$

Ans: (d)

Biology

Multiple Choice Questions with one correct answer. A correct answer carries 4 marks. A wrong answer carries a penalty of 1 mark. **90 x 4 = 360**

91. The number of species that are known and described range between
(a) 2 - 3 million (b) 1.7 - 1.8 million (c) 3 - 4 million (d) 5 million

Sol: 1.7 - 1.8 million

Ans: (b)

92. Read the two statements .

A - They could be crystallised and crystals consist largely of proteins.

B - They have a nucleoprotein and the genetic material is infectious.

These features belong to

- (a) Bacteria (b) Virus (c) Prion (d) viroid

Sol: Virus

Ans: (b)

93. Which of the following groups of organisms are included under chrysophytes

- (a) Diatoms and Desmids (b) Diatoms and Dinoflagellates
(c) Euglenoids (d) Slime moulds

Sol: Diatoms and Desmids

Ans: (a)

94. Sexual reproduction in Fungi occurs by all of the following except

- (a) Oospores (b) Ascospores (c) Zoospores (d) Basidiospores

Sol: Zoospores

Ans: (c)

95. In Chlorophyceae, the pyrenoids are located in

- (a) chloroplasts (b) vacuoles (c) mitochondria (d) cytoplasm

Sol: chloroplasts

Ans: (a)

96. In Bryophytes,

(a) Main plant body is diploid (b) Biflagellate antherozoids are produced

- (c) Female sex organs are absent (d) Fruits are always formed

Sol: Biflagellate antherozoids are produced

Ans: (b)

97. Fusion between morphologically alike gametes is referred to as

- (a) Isogamy (b) Anisogamy (c) Oogamy (d) Syngamy

Sol: Isogamy

Ans: (a)

98. Root hairs arise from

- (a) root cap (b) region of elongation (c) region of maturation (d) meristematic region

Sol: region of maturation

Ans: (c)

99. X is a scar on the seed coat through which the developing seeds were attached to the fruit. Above the X is a small pore called Y. Identify X and Y and select the correct option

X		Y	
(a)	Micropyle	(i)	Hilum
(b)	Hilum	(ii)	Micropyle
(c)	Testa	(iii)	Tegmen
(d)	Chalaza	(iv)	Micropyle

Sol:

X		Y	
(b)	Hilum	(ii)	Micropyle

Ans: (b)

100. The region of the stem where leaves are born is

- (a) node (b) internode (c) plumule (d) none of these

Sol: node

Ans: (a)

101. Lateral roots arise from

- (a) Epidermis (b) Endodermis (c) Pericycle (d) Cambium

Sol: Pericycle

Ans: (c)

102. The cell wall and ----- may be traversed by plasmodesmata which connect the cytoplasm of neighbouring cells.

- (a) cell membrane (b) middle lamellae (c) golgi (d) nucleus

Sol: middle lamellae

Ans: (b)

103. The cell organelle involved in formation of glycoproteins is

- (a) Ribosome (b) Peroxisome (c) Mitochondrion (d) Golgi apparatus

Sol: Golgi apparatus

Ans: (d)

104. Potato and brinjal are two different species but both belong to the genus

- (a) Mangifera (b) Triticum (c) Hibiscus (d) Solanum

Sol: Solanum

Ans: (d)

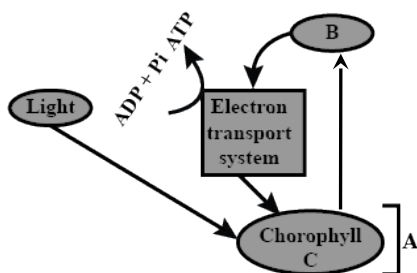
105. The parasitic fungi on mustard is

- (a) Mucor (b) Rhizopus (c) Albugo (d) Aspergillus

Sol: Albugo

Ans: (c)

106. Study the given flow chart of cyclic photophosphorylation and select the correct answer for A, B and C



- | A | B | C |
|-----------|----------------|-----------|
| (a) PS I | e^- acceptor | P_{680} |
| (b) PS I | e^- acceptor | P_{700} |
| (c) PS II | cytochrome | P_{700} |
| (d) PS II | cytochrome | P_{680} |

Sol:

- | A | B | C |
|-----|----------------|-----------|
| PSI | e^- acceptor | P_{700} |

Ans: (b)

107. Which of the following is both a growth promoter as well as growth inhibitor?

- (a) Auxin (b) Gibberellic acid (c) ABA (d) Ethylene

Sol: Ethylene

Ans: (d)

108. The leaf base expands into a sheathy covering on the stem partially or wholly in

- (a) bean (b) pea (c) grass (d) mango

Sol: grass

Ans: (c)

109. What is the function of filiform apparatus in an angiosperm embryo sac?

- (a) It brings about opening of the pollen tube
(b) It guides the pollen tube into a synergid
(c) It prevents entry of more than one pollen tube into a synergid
(d) None of these

Sol: It guides the pollen tube into a synergid

Ans: (b)

110. Other than DNA polymerase, which of the following enzymes are involved in DNA synthesis?

- (a) Restriction enzymes (b) β -galactosidase (c) Permease (d) DNA ligase

Sol: DNA ligase

Ans: (d)

111. During transcription in eukaryotes, heterogenous nuclear RNA(hnRNA) is transcribed by

- (a) RNA polymerase I (b) RNA polymerase II
(c) RNA polymerase III (d) All of these

Sol: RNA polymerase II

Ans: (b)

112. Who suggested that in order to code for all the 20 amino acids, the code should be made up of three nucleotides?

- (a) Mendel (b) Hershey and Chase
(c) George Gamow (d) Griffith

Sol: George Gamow

Ans: (c)

113. Which of following is the beginning of translation?

- (a) When the large subunit of protein factory of cell encounters an mRNA.

- (b) When the small subunit of protein factory of cell encounters an mRNA.

(c) When the small subunit of protein factory of cell encounter a tRNA.

(d) When the large subunit of protein factory of cell encounters a tRNA

Sol: When the small subunit of protein factory of cell encounters an mRNA.

Ans: (b)

114. The stop codons are

- (a) UAA (b) UAG (c) UGA (d) All of these

Sol: All of these

Ans: (d)

115. _____ is the term used for a part of the plant taken out and grown in a test tube, under sterile conditions in special nutrient media, during the process of tissue culture is

- (a) implant (b) explant (c) both (a) and (b) (d) none of these

Sol: explant

Ans: (b)

116. Biopesticides are

- (a) The chemicals which are used to destroy the pests
 (b) The living organisms or their products which are used for the pest control
 (c) The organisms which destroy the crops
 (d) None of these

Sol: The living organisms or their products which are used for the pest control

Ans: (b)

117. Orchid flower petal and female bee colour show

- (a) competitive release (b) co-evolution (c) parasitism (d) all of these

Sol: co-evolution

Ans: (b)

118. When the population density reaches the carrying capacity, the logistic growth curve is said to be in

- (a) Lag phase (b) Phase of acceleration
 (c) Phase of deceleration (d) Asymptote

Sol: Asymptote

Ans: (d)

119. Select the option that correctly identifies A, B and C in the given table

Organism	Trophic level	Food chain
Eagle	A	Grazing

Earthworm	Primary consumer	B
Frog	C	Grazing

- A** (a) Top carnivore
B (b) Top carnivore
C (c) Secondary consumer
 (d) Scavenger
- A** (a) Top carnivore
B (b) Detritus
C (c) Secondary consumer
 (d) Producer

Sol: **A** (a) Top carnivore
B (b) Detritus
C (c) Secondary consumer

Ans: (a)

120. The curve shown by human population is

- (a) J - shaped (b) Z - shaped (c) S - shaped
 (d) None of these

Sol: S - shaped

Ans: (c)

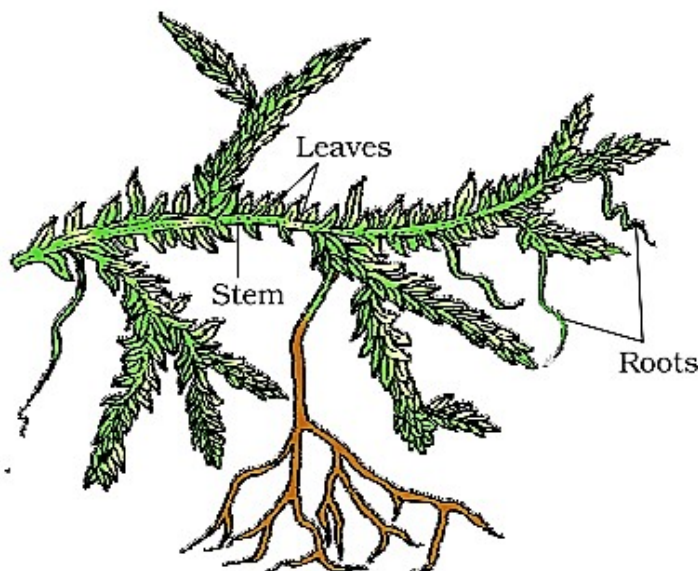
121. The annual net primary productivity of the whole biosphere is approximately ----- tons (dry weight) of organic matter.

- (a) 700 billion (b) 170 billion (c) 70 billion (d) 100 million

Sol: 170 billion

Ans: (b)

122. Which of the following statement is incorrect for the given picture:



- (a) It belong

- (b) It is heterosporous
- (c) It is a first terrestrial plants to possess vascular tissues
- (d) the main plant body is a sporophyte

Sol: It belongs to Sphenopsida

Ans: (a)

123. In Calotropis and Guava , the phyllotaxy is

- (a) Alternate
- (b) Opposite
- (c) whorled
- (d) pinnately compound

Sol: Opposite

Ans: (b)

124. Ovary is said to be half-inferior in which of the following conditions?

- (a) Hypogynous
- (b) Perigynous
- (c) Epigynous
- (d) Both (b) and (c)

Sol: Perigynous

Ans: (b)

125. Polyarch vascular bundles generally occur in

- (a) Monocot stem
- (b) Dicot stem
- (c) Dicot root
- (d) Monocot root

Sol: Monocot root

Ans: (d)

126. Select the wrong statement with respect to the structure of a plant cell

- (a) Cellulosic cell wall is present inside the cell membrane
- (b) Centrioles are usually absent
- (c) A large central vacuole is present
- (d) Golgi apparatus performs the function of packaging materials in the cells

Sol: Cellulosic cell wall is present inside the cell membrane

Ans: (a)

127. Light is rarely a limiting factor in nature except in

- (a) maize
- (b) sugarcane
- (c) Sorghum
- (d) plants in shade or in dense forests

Sol: plants in shade or in dense forests

Ans: (d)

128. The enzyme that is not found in C_3 plant is

- (a) RuBP carboxylase
- (b) PEP carboxylase
- (c) NADP reductase
- (d) ATP synthase

Sol: PEP carboxylase

Ans: (b)

129. Match column I with column II and select the correct option from the codes given below

Column I		Column II	
A	TCA cycle	(i)	Inner mitochondrial region
B	$F_0 - F_1$ Particle	(ii)	Hans Krebs
C	End product of glycolysis	(iii)	Oxidative decarboxylation
D	Pyruvate dehydrogenase	(iv)	Pyruvic acid

(a) A-(ii), B-(i), C-(iv), D-(iii)

(b) A-(i), B-(ii), C-(iv), D-(iii)

(c) A-(ii), B-(iii), C-(iv), D-(i)

(d) A-(iii), B-(ii), C-(i), D-(iv)

Sol: A-(ii), B-(i), C-(iv), D-(iii)

Ans: (a)

130. GM plants are useful for

- (a) reducing reliance on chemical pesticides (pest-resistant crops).
- (b) enhancing nutritional value of food
- (c) to create tailor-made plants to supply alternative resources to industries
- (d) All the above

Sol: All the above

Ans: (d)

131. The proteins encoded by the genes cryIAc and cryIIAb control the

- (a) boll worms
- (b) corn borer
- (c) leaf spot
- (d) root infection

Sol: boll worms

Ans: (a)

132. Bottled juices are clarified by the use of

- (a) pectinases
- (b) proteases
- (c) chitinases
- (d) Both (a) and (b)

Sol: Both (a) and (b)

Ans: (d)

133. Correction of a genetic defect by delivering a normal gene into the individual or embryo to take over the function of and compensate for the non-functional gene is called

- (a) gene therapy (b) hormone therapy
(c) vaccination (d) none of the above

Sol: gene therapy

Ans: (a)

134. At present, about -----A----- recombinant therapeutics have been approved for human-use the world over. In India-----B----- of these are presently being marketed. A and B are respectively

- (a) 12,13 (b) 30,12 (c) 30,30 (d) 20,30

Sol: 30,12

Ans: (b)

135. Functioning of Statins is based on

- (a) Allosteric inhibition (b) Non-competitive inhibition
(c) Competitive inhibition (d) End product inhibition

Sol: Competitive inhibition

Ans: (c)

136. The cross section of the body of an invertebrate is given below. Identify the animal which has this body plan



- (a) Cockroach (b) Roundworm (c) Taenia (d) Earthworm

Sol: Taenia

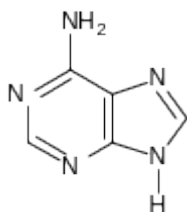
Ans: (c)

137. Select the incorrect statement

(a) According to the 2011 census report, the population growth rate was less than 2 per cent.

(b) In all assisted reproductive technologies, fertilisation occurs outside the female's body.

Sol:



Ans: (d)

141. In *Drosophila melanogaster*, the genes white and yellow shows __A__ recombination and genes white and miniature wing shows ____B____ linkage

- (a) A-98.7%, B-37.2% (b) A-98.7%, B-62.8% (c) A-1.3%, B-37.2% (d) A-1.3%, B-62.8%

Sol: A-1.3%, B-62.8%

Ans: (d)

142. Vital capacity of lungs is

- (a) IRV+ERV (b) IRV + ERV +TV - RV (c) IRV+ERV+TV+RV (d) IRV+ERV+TV

Sol: IRV+ERV+TV

Ans: (d)

143. Identify the correct statement for human heart.

- (a) Volume of both the atria is greater than the volume of both the ventricles.
 (b) Volume of both the ventricle is greater than the volume of both atria.
 (c) Interventricular septum separates the right and the left atria
 (d) Atrioventricular septum separates the right and the left atria

Sol: Volume of both the ventricle is greater than the volume of both atria.

Ans: (b)

144. The maximum amount of electrolytes are reabsorbed in

- (a) Ascending limb of loop of Henle (b) Distal convoluted tubule
 (c) Proximal convoluted tubule (d) Descending limb of loop of Henle

Sol: Proximal convoluted tubule

Ans: (c)

145. Ultrafiltration is due to pressure in the glomerulus because the diameter of afferent arteriole is greater than

- (a) Glomerular capillaries (b) Afferent venule
 (c) Efferent venule (d) Efferent arteriole

Sol: Efferent arteriole

Ans: (d)

146. Read the following statements and choose the correct option.

- (1) Cerebellum has very convoluted surface in order to provide space for more neurons.
(2) The medulla is connected to the spinal cord
(3) When a neuron is not conducting any impulse i.e. the axoplasm inside the axon contains high concentration of K^+ and negatively charged proteins and low concentration of Na^+ .

- (a) All are correct (b) Only 1 is correct
(c) Only 1 and 2 are correct (d) Only 2 is correct

Sol: All are correct

Ans: (a)

147. The posterior pituitary gland is not a true endocrine gland because

- (a) It is provided with duct (b) It only stores and releases hormones
(c) It is under regulation of hypothalamus (d) It secretes enzyme

Sol: It only stores and releases hormones

Ans: (b)

148. The law based on fact that the characters do not show any blending and both the characters are

recovered as such in F_2 generation although one character was absent in F_1 progeny, is

- (a) law of segregation (b) law of independent assortment
(c) law of incomplete dominance (d) law of dominance

Sol: law of segregation

Ans: (a)

149. $2n = 16$ is in a primary spermatocyte which is in metaphase of first meiotic division. What shall be the total number of chromatids, in each of the secondary spermatocyte?

- (a) 16 (b) 24 (c) 32 (d) 8

Sol: 16

Ans: (a)

150. All of the following statements are correct about active immunity, except

- (a) It is slow and takes time to give its full effective response
(b) Memory cells are formed
(c) Antibodies are not formed during primary response
(d) Exposure of antigen is a pre-requisite for the development of active immunity

Sol: Antibodies are not formed during primary response

Ans: (c)

151. Match the following and choose the correct option

Column I		Column II	
A	Trophoblast	(i)	Embedding of blastocyst in the endometrium
B	Cleavage	(ii)	Group of cells that would differentiate as embryo
C	Inner cell mass	(iii)	Outer layer of blastocyst attached to endometrium
D	Implantation	(iv)	Mitotic division of zygote

(a) A-(ii), B-(i), C-(iii), D-(iv)

(b) A-(iii), B-(iv), C-(ii), D-(i)

(c) A-(iii), B-(i), C-(ii), D-(iv)

(d) A-(ii), B-(iv), C-(iii), D-(i)

Sol: A-(iii), B-(iv), C-(ii), D-(i)

Ans: (b)

152. Read the given statements and select the correct option

Statement (1): MTP is considered relatively safe during the first trimester of pregnancy

Statement (2): Fetus becomes intimately associated with the maternal tissues after the first trimester

(a) Both statements (1) & (2) correct

(b) Statement (1) correct but statement (2) incorrect

(c) Statement (1) incorrect but statement (2) correct

(d) Both statements (1) & (2) are incorrect

Sol: Both statements (1) & (2) correct

Ans: (a)

153. Which of the following is correct for the condition when plant $YyRr$ is back crossed with the double recessive parent?

(a) 9:3:3:1 ratio of Phenotype only

(b) 9:3:3:1 ratio of genotype only

(c) 1:1:1:1 ratio of phenotype only

(d) 1:1:1:1 ratio of Phenotype and genotype

Sol: 1:1:1:1 ratio of Phenotype and genotype

Ans: (d)

154. Which of the following is incorrect regarding ZZ-ZW type of sex determination?

- (a) It occurs in birds and some reptiles
- (b) Females are homogametic and males are heterogametic
- (c) 1:1 sex ratio is produced in the offsprings
- (d) All of these

Sol: Females are homogametic and males are heterogametic

Ans: (b)

155. Sickle cell anemia is an example of

- (i) Mendelian disorder
- (ii) Genetic disorder
- (iii) Chromosomal disorder
- (iv) Inborn error of metabolism
- (v) Point mutation
- (vi) Frame shift mutation
- (vii) Sex linked disease
- (viii) Recessive disorder
- (ix) Qualitative disorder
- (x) Quantitative disorder
- (xi) Autosomal disorder

- (a) i, ii, iv, v, viii, x, xi
- (b) i, v, viii, ix, xi
- (c) i, ii, v, viii, ix, xi
- (d) ii, iii, v, vii, ix

Sol: i, ii, v, viii, ix, xi

Ans: (c)

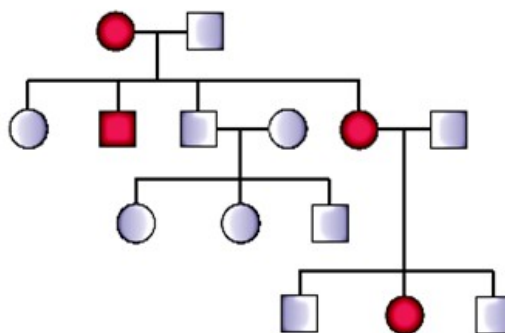
156. According to David Tilman's long term ecosystem experiments, the total biomass in plots with more species shows,

- (a) Average variation from year-to-year.
- (b) No variation from year-to-year.
- (c) Less variation from year-to-year.
- (d) High variation from year-to-year.

Sol: Less variation from year-to-year

Ans: (c)

157. Analyse the given pedigree chart and select the option that is correct regarding it.



- (a) Autosomal dominant trait –Cystic fibrosis
- (b) Sex-linked dominant trait- Myotonic dystrophy
- (c) Autosomal dominant trait- Myotonic dystrophy
- (d) Autosomal recessive trait- Phenylketonuria

Sol: Autosomal dominant trait- Myotonic dystrophy

Ans: (c)

158. Consider the following statements

(I) Natural selection is a process in which heritable variations enabling better survival are enabled to reproduce and leave greater number of progeny.

(II) Darwinian variations were small and directional

Select the correct option

- (a) I is true, II is false
- (b) I is false, II is true
- (c) Both I and II are true
- (d) Both I and II are false

Sol: Both I and II are true

Ans: (c)

159. Which of these statements about cancer is incorrect?

(a) Cellular oncogenes(c - onc) are present in normal cells which have not become cancerous

(b) Antibodies against cancer specific antigens are used for detection of certain cancers

(c) MRI uses strong magnetic fields and ionizing radiations to accurately detect pathological and physiological changes in the living tissues

(d) Cancer can be treated using alpha interferon which activates immune system and helps in destroying tumour cells

Sol: MRI uses strong magnetic fields and ionizing radiations to accurately detect pathological and physiological changes in the living tissues

Ans: (c)

160. Choose the correct statement about the patterns of biodiversity.

(a) The diversity of plants and animals is uniform and evenly distributed throughout the world.

(b) The tropics harbour more species than the temperate or polar regions.

(c) Speciation is a function of time as the tropical latitudes have been disturbed by frequent glaciations in the past.

(d) Lesser solar energy in the temperate regions contributes to higher productivity and greater diversity in species.

Sol: The tropics harbour more species than the temperate or polar regions

Ans: (b)

161. Assertion: Intrauterine devices (IUDs) are very effective contraceptive method.

Reason: IUDs don't allow sperms to enter the uterus.

(a) Assertion & Reason are true and the reason is the correct explanation of the assertion

(b) Assertion & Reason are true but the reason is not the correct explanation of the assertion.

(c) Assertion is true statement but Reason is false

(d) Both Assertion and Reason are false statements

Sol: Assertion is true statement but Reason is false

Ans: (c)

162. The recombination frequency between the genes A and C is 5%, B and C is 15%, B and D is 9%, A and B is 20%, C and D is 24% and A and D is 29%. What will be the sequence of these genes on a linear chromosome?

(a) A, D, B, C

(b) D, B, A, C

(c) A, B, C, D

(d) A, C, B, D

Sol: A, C, B, D

Ans: (d)

163. Which is the correct path for the secretion and transport of milk in mammary gland?

(a) Alveoli → Cavity of alveoli → Mammary tubule → Mammary duct → Mammary ampulla → Lactiferous duct

(b) Mammary duct → Mammary tubule → Alveoli → Lactiferous duct → Mammary ampulla → Cavity of alveoli

(c) Mammary duct → Cavity of alveoli → Lactiferous duct → Mammary ampulla → Mammary tubule → Alveoli

(d) Alveoli → Mammary tubule → Mammary ampulla → Cavity of alveoli → Mammary duct → Lactiferous duct

Sol: Alveoli → Cavity of alveoli → Mammary tubule → Mammary duct → Mammary ampulla → Lactiferous duct

Ans: (a)

164. In lactational amenorrhoea, there is no ovulation or menstruation during the period of intense lactation following parturition, due to high level of prolactin, which?

(a) Inhibits the release of gonadotropins

- (b) Inhibits the release of estrogen and progesterone
- (c) Stimulate the release of FSH and LH
- (d) Stimulates the release of estrogen and progesterone

Sol: Inhibits the release of gonadotropins

Ans: (a)

165. Which is incorrect about colour blindness?

- (a) This is due to defect in either red or green cone of eye resulting in failure to discriminate between red and green colour.
- (b) A daughter will not normally be colour blind, unless her mother is a carrier and her father is colour blind.
- (c) If female has X^cX then it is called carrier but when male has X^cY then it will be colour blind
- (d) The son of a woman who carries the gene has a zero percent chance of being colour blindness

Sol: The son of a woman who carries the gene has a zero percent chance of being colour blindness

Ans: (d)

166. Cystic fibrosis is an autosomal recessive disease. In an island having a population of 200 people, 98

people suffer from cystic fibrosis. How many people are carriers of this disease?

- (a) 42
- (b) 84
- (c) 18
- (d) 64

Sol: 84

Ans: (b)

167. Identify the correct sequence of stages in the evolution of modern humans

- (i) Neanderthal man
 - (ii) Cro-Magnon man
 - (iii) Australopithecines
 - (iv) Homo habilis
 - (v) Homo erectus
 - (vi) Modern human
- (a) (iv), (iii), (v), (ii), (i), (vi)
 - (b) (iii), (v), (iv), (ii), (i), (vi)
 - (c) (iii), (iv), (v), (i), (ii), (vi)
 - (d) (iii), (iv), (v), (ii), (i), (vi)

Sol: (iii), (iv), (v), (i), (ii), (vi)

Ans: (c)

168. Select the incorrect statement among the following:-

- (a) Members of phylum ctenophora are commonly known as "Comb Jellies".
- (b) In all chordates heart is ventral
- (c) Earthworm and *Nereis* are monoecious

(d) Body of *Balanoglossus* is composed of proboscis, collar and trunk

Sol: Earthworm and *Nereis* are monoecious

Ans: (c)

169. Special venous connection between liver and intestine as well as the kidney and lower parts of body are present in frog is called

- (a) Hepatic portal system
- (b) Renal portal system
- (c) Hepatic portal system and renal portal system respectively
- (d) Renal portal system and hepatic portal system respectively

Sol: Hepatic portal system and renal portal system respectively

Ans: (c)

170. Which of the following option is incorrect?

- (a) All the elements present in a sample of earth's crust are also present in a sample of living tissue
- (b) The relative abundance of carbon and hydrogen with respect to other elements is higher in any living organism than in earth's crust
- (c) The % weight of nitrogen in earth's crust is very high in comparison to human body
- (d) The % weight of silicon in earth's crust is very high in comparison to human body

Sol: The % weight of nitrogen in earth's crust is very high in comparison to human body

Ans: (c)

171. Angina occurs due to the

- (a) Benign growth in heart
- (b) Decreased supply of oxygen to heart muscle
- (c) The deposition of carbohydrates in artery
- (d) Increased blood pressure

Sol: Decreased supply of oxygen to heart muscle

Ans: (b)

172. During expiration diaphragm becomes

- (a) Flattened
- (b) Dome-shaped
- (c) Oblique
- (d) Normal

Sol: Dome-shaped

Ans: (b)

173. In the measurement of the blood pressure the denominator and numerator represents

- (a) Resting and pumping pressure respectively
- (b) Pumping and resting pressure respectively
- (c) Systolic and diastolic pressure respectively
- (d) Both (b) and (c)

Sol: Resting and pumping pressure respectively

Ans: (a)

174. Which of the following is abundant in red muscles?

- (a) Glucose and Haemoglobin (b) Myosin and Actin
(c) Myoglobin and Mitochondria (d) None of these

Sol: Myoglobin and Mitochondria

Ans: (c)

175. Which one of the following hormone never reaches to cytoplasm?

- (a) Estrogen (b) FSH (c) Progesterone (d) Testosterone

Sol: FSH

Ans: (b)

176. A woman had an extreme premature delivery. She gave birth to a baby boy at 23 weeks of gestation. The birth weight of the baby was 950 gm. Which of the following is most likely to be observed in this baby?

- (a) The baby's heart will not be adequately formed
(b) The baby's limbs and digits will not be adequately formed
(c) The baby's external genitalia will not be adequately formed
(d) The baby's eyelashes will not be adequately formed

Sol: The baby's eyelashes will not be adequately formed

Ans: (d)

177. One of the following is not true of haemophilia

- (a) Royal disease (b) Bleeder's disease (c) X-linked disorder (d) Y-linked disorder

Sol: Y-linked disorder

Ans: (d)

178. When more than one adaptive radiation appeared to have occurred in an isolated geographical area, it is

- (a) Convergent evolution (b) Divergent evolution
(c) Natural Selection (d) Genetic drift

Sol: Convergent evolution

Ans: (a)

179. A disease caused by an autosomal primary non-disjunction is

- (a) Sickle Cell Anemia (b) Down's Syndrome (c) Klinefelter's Syndrome (d) Turner's Syndrome

Sol: Down's Syndrome

Ans: (b)

180. There is a forest next to Raju's village which is a natural habitat for an endangered species of lotus. The Government plans to develop a highway through the forest which will cause disturbance in the habitat and may lead to extinction of the endangered species. Being an environmental activist, what must have Raju suggested the Government in order to save the species as the highway project is also important for the development of the village?

- (a) In situ conservation (b) Migration (c) Ex situ conservation (d) Deforestation

Sol: Ex situ conservation

Ans: (c)

Key Answers:

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