Do not open this Test Booklet until you are asked to do so.

1. A seat marked with Reg. No. will be allotted to each student. The student should ensure that he/she occupies the correct seat only. If any student is found to have occupied the seat of another student, both the students shall be removed from the examination and shall have to accept any other penalty imposed upon them.

2. Duration of Test is 3½ Hours and Questions Paper Contains 200 Questions. The Max. Marks are 200.

3. Student can not use log tables and calculators or any other material in the examination hall.

4. Student must abide by the instructions issued during the examination, by the invigilators or the centre incharge.

5. Before attempting the question paper ensure that it contains all the pages and that no question is missing.

6. Each correct answer carries 1 marks, while one third mark will be deducted from the total of individual subject for each incorrect answer.

Note: In case of any Correction in the test paper, please mail to dlpcorrections@allen.ac.in within 2 days along with Paper code and Your Form No.

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1. Let the angle between two non zero vectors \( \vec{A} \) and \( \vec{B} \) be 120° and its resultant be \( \vec{C} \). Correct relation is:

(1) C must be equal to |\( \vec{A} - \vec{B} \) |
(2) C must be less than |\( \vec{A} - \vec{B} \) |
(3) C must be greater than |\( \vec{A} - \vec{B} \) |
(4) C may be equal to |\( \vec{A} - \vec{B} \) |

2. A solid sphere, a hollow sphere and a disc, all having same mass and radius, are placed at the top of an inclined plane and released. The friction between the objects and the incline is absent. Then at the bottom of incline plane:

(1) Solid sphere will reach first
(2) Hollow sphere will reach first
(3) Disc will reach first
(4) All will reach together

3. A current flows in a circular coil of radius R and the magnetic field at its centre is \( B_0 \). At what distance from the centre of the coil, on the axis, the magnetic field will be \( \frac{B_0}{8} \) ?

(1) \( \sqrt{R} \)  
(2) \( \sqrt{3R} \)  
(3) 2R  
(4) 8R

4. When a stone hangs from one end of a sonometer wire of vibrating length \( \ell_1 \) it is in resonance with a tuning fork. When the stone hangs wholly immersed in water, the resonant length gets reduced to \( \ell_2 \). The relative density of stone is:

(1) \( 1 - \frac{\ell_2}{\ell_1} \)  
(2) \( 1 - \left( \frac{\ell_2}{\ell_1} \right)^2 \)  
(3) \( \frac{1}{1 - \left( \frac{\ell_2}{\ell_1} \right)^2} \)  
(4) \( \frac{1}{1 - \frac{\ell_2}{\ell_1}} \)
5. Figure shows position of a particle moving on x-axis as a function of time. The correct statement about particle is :-

![Graph showing position vs time](image)

(1) The particle comes to rest 6 times.
(2) The maximum speed is at \( t = 8 \) s.
(3) The velocity remains positive for \( t = 0 \) to \( t = 6 \) s.
(4) The average velocity for the total period shown is positive.

6. A thin wire of length \( L \) and uniform linear density \( \lambda \) is bent into a circular loop (ring) with centre \( O \) as shown. The moment of inertia of the loop about the axis \( XX' \) is :-

![Diagram of circular loop](image)

\[
\begin{align*}
(1) & \quad \frac{3L^3}{8\pi} \\
(2) & \quad \frac{3L^3}{16\pi^2} \\
(3) & \quad \frac{5L^3}{16\pi^2} \\
(4) & \quad \frac{3\lambda L^3}{8\pi^2}
\end{align*}
\]

7. The inductance of a solenoid is 5 H and its resistance is 5Ω. If it is connected to a 10 volt battery, then time taken by current to reach \( \frac{9}{10} \) of its maximum value is :-

(1) 4.0 s  (2) 2.3 s  (3) 1.4 s  (4) 1.2 s

8. The pressure of a medium is changed from \( 1.01 \times 10^5 \) Pa to \( 1.165 \times 10^5 \) Pa to change its volume by 10% keeping the temperature constant. The bulk modulus of the medium is :-

(1) \( 204.8 \times 10^5 \) Pa  (2) \( 102.4 \times 10^5 \) Pa  (3) \( 15.5 \times 10^5 \) Pa  (4) \( 1.55 \times 10^5 \) Pa

9. The resultant amplitude due to superposition of two waves \( y_1 = 5 \sin (\omega t - kx) \) and \( y_2 = -5 \cos (\omega t - kx - 150^\circ) \) is :-

(1) 5  (2) \( 5\sqrt{3} \)  (3) \( 5\sqrt{2} - \sqrt{3} \)  (4) \( 5\sqrt{2} + \sqrt{3} \)
10. An ideal gas undergoes a process $1 \rightarrow 2$ as shown in the figure. The heat supplied and work done in the process are $\Delta Q$ and $\Delta W$ respectively. The ratio $\Delta Q : \Delta W$ is:

\[ \frac{\gamma - 1}{\gamma} \]

(1) $\gamma = \gamma - 1$ (2) $\gamma$ (3) $\gamma - 1$ (4) $\frac{\gamma - 1}{\gamma} - 1$

11. A superconductor exhibits perfect:

(1) Ferromagnetism
(2) Antiferromagnetism
(3) Paramagnetism
(4) Diamagnetism

12. The temperature-entropy cycle of a reversible engine is given in the figure. Its efficiency is:

\[ \frac{T_0 - S}{T_0 - S_0} \]

(1) $\frac{2}{3}$ (2) $\frac{1}{3}$ (3) $\frac{1}{4}$ (4) $\frac{1}{2}$

13. A standing wave pattern of amplitude $A$ in a string of length $L$ shows two nodes (plus those at two ends). If one end of the string corresponds to the origin and $v$ is the speed of progressive wave, the disturbance in the string, could be represented (with appropriate phase) as:

(1) $y(x, t) = A \sin \left( \frac{2\pi x}{L} \right) \cos \left( \frac{2\pi vt}{L} \right)$
(2) $y(x, t) = A \cos \left( \frac{3\pi x}{L} \right) \sin \left( \frac{3\pi vt}{L} \right)$
(3) $y(x, t) = A \cos \left( \frac{4\pi x}{L} \right) \sin \left( \frac{4\pi vt}{L} \right)$
(4) $y(x, t) = A \sin \left( \frac{3\pi x}{L} \right) \cos \left( \frac{3\pi vt}{L} \right)$
14. A liquid takes 5 minutes to cool from 80°C to 50°C. How much time will it take to cool from 60°C to 30°C, if temperature of surroundings is 20°C?
   (1) 10 min  (2) 12 min  (3) 5 min  (4) 9 min

15. An inductor of inductance L = 400 mH and resistance R_1 = 2 Ω and R_2 = 2 Ω are connected to a battery of emf 12 V as shown in the figure. The internal resistance of the battery is negligible. The switch S is closed at t = 0. The potential drop across L as function of time is:
   (1) 6(1 – e^{−t/2})V  (2) 12 e^{−5t} V  (3) 6 e^{−5t} V  (4) \frac{12}{t} e^{−3t} V

16. A sphere of radius r is charged to a potential V. The outward pull per unit area of its surface is given by:
   (1) \frac{4\pi\varepsilon_0 V^2}{r^2}  (2) \frac{\varepsilon_0 V^2}{2r^2}  (3) \frac{2\varepsilon_0 V^2}{r^3}  (4) \frac{\varepsilon_0 V^2}{4r^3}

17. Monochromatic radiation of wavelength λ is incident on a hydrogen sample containing atoms in the ground state. Hydrogen atoms absorb the light and subsequently emit radiation of ten different wavelengths. The value of λ is:
   (1) 95 nm  (2) 103 nm  (3) 73 nm  (4) 88 nm

18. 10 g of ice at 0°C is kept in a calorimeter of water equivalent 10 g. How much heat should be supplied to the system to evaporate the water?
   {\text{L}}_f = 80 \text{cal/gm}, {\text{L}}_v = 540 \text{cal/gm},
   {\text{S}}_w = 1 \text{cal/gm}
   (1) 6200 cal  (2) 7200 cal  (3) 13600 cal  (4) 8200 cal
19. A bob is suspended by a thread of length \( \ell \). The minimum horizontal speed which has to be imparted to the sphere for it to reach the height of suspension is :-

(1) \( 2\sqrt{g\ell} \) (2) \( \sqrt{2g\ell} \) (3) \( 2g\ell \) (4) \( g\ell \)

20. The output of a step-down transformer is measured to be 24V when connected to a 12 W light bulb. The peak value of current is :-

(1) \( \frac{1}{\sqrt{2}} A \) (2) \( 2A \) (3) 2A (4) \( 2\sqrt{2} A \)

21. A radioactive substance is being produced at a constant rate of 10 nuclei/s. The decay constant of the substance is \( \frac{1}{2} \) s\(^{-1} \). After what time the number of radioactive nuclei will become 10 from zero? Assume decay law holds for the sample :-

(1) 2.45 s (2) \( \log(2) \) s (3) 1.386 s (4) \( \frac{1}{\ln 2} \) s

22. Five moles of helium are mixed with two moles of hydrogen to form a mixture. Ratio of \( C_p \) and \( C_v \) of the mixture is :-

(1) 1.59  (2) 1.53  (3) 1.56  (4) None

23. A particle is moving in a circle of radius \( R \) in such a way that centripetal and tangential components of its acceleration are equal. If its speed at \( t = 0 \) is \( v_0 \) the time taken by the particle to complete first revolution is :-

(1) \( \frac{R}{v_0} \) (2) \( \frac{R}{v_0}(1 - e^{-2\pi}) \)

(3) \( \frac{R}{v_0}e^{-2\pi} \) (4) \( \frac{2\pi R}{v_0} \)

24. A flexible chain of weight \( W \) hangs between two fixed points A and B as shown in the figure. Tension at the mid point C of the chain is :-

(1) \( \frac{W}{2} \) cosec \( \theta \) (2) \( \frac{W}{2} \) tan \( \theta \)

(3) \( \frac{W}{2} \) cot \( \theta \) (4) Zero
25. A parallel plate capacitor of capacitance C is connected to a battery and is charged to a potential V. Another capacitor of capacitance 2C is similarly charged to a potential of 2V. Charging battery in now disconnected and capacitors are connected to each other with opposite polarities. The final energy of the configuration is :-

(1) $3CV^2$  
(2) $\frac{3}{2} CV^2$  
(3) Zero  
(4) $\frac{9}{2} CV^2$

26. A particle is executing simple harmonic motion on a line 4 cm long. If its velocity at mean position is 12 cm/s, its frequency is :-

(1) $\frac{\pi}{2}$ Hz  
(2) $\frac{\pi}{3}$ Hz  
(3) $\frac{\pi}{3}$ Hz  
(4) $\frac{\pi}{2}$ Hz

27. A long spring, when stretched by x has a potential energy U. On increasing the length of spring by nx on stretching, the potential energy stored in the spring will be :-

(1) $U$  
(2) nU  
(3) $n^2U$  
(4) $\frac{U^2}{n}$

28. A charged particle is released from rest in a region of steady and uniform electric and magnetic fields which are parallel to each other. The particle will move in a :-

(1) Straight line  
(2) Circle  
(3) Helix  
(4) Cycloid

29. The power of sound from the speaker of a radio is 20 mW. By turning the volume control knob the power of sound is increased to 400 mW. The power increase in decibel as compared to the original power is :-

(1) 13 dB  
(2) 10 dB  
(3) 20 dB  
(4) 800 dB
31. A block of mass m moving at speed v collides with another block of mass 3m at rest. The lighter block comes to rest after collision. The coefficient of restitution is :-

(1) \( \frac{1}{2} \)  
(2) \( \frac{1}{3} \)  
(3) \( \frac{1}{4} \)  
(4) None

32. In the figure shown a hole of radius 2 cm is made in a semicircular disc of radius 6 cm at a distance of 8 cm from its centre. The distance of centre of mass of this system from centre C is :-

(1) 4 cm  
(2) 8 cm  
(3) 6 cm  
(4) 12 cm

33. The electric potential energy of interaction between nucleus of an atom and an electron is given by \( U = U_0 \times n \left( \frac{r}{r_0} \right) \) where \( r_0 \) is a constant.

Assuming Bohr's model to be applicable, the correct relation between \( r_n \) (Bohr's radius) and principal quantum number \( n \) is :-

(1) \( r_n \propto n \)  
(2) \( r_n \propto \frac{1}{n} \)  
(3) \( r_n \propto n^2 \)  
(4) \( r_n \propto \frac{1}{n^2} \)

34. In the circuit shown, the capacitor \( C_1 \) has initial charge \( q_0 = 10 \mu C \). When switch S is closed, the respective charges \( q_1 \) and \( q_2 \) on the capacitors \( C_1 \) and \( C_2 \) are :-

(1) 10 \( \mu \)C, 0  
(2) 5 \( \mu \)C, 5 \( \mu \)C  
(3) 15 \( \mu \)C, 5 \( \mu \)C  
(4) 20 \( \mu \)C, 10 \( \mu \)C

31. एक ब्लॉक वजन m के सप्तक \( v \) से आ रहा है जो \( 2m \) वजन का क्षय आता है। दीजिए यह होता है कि \( \frac{1}{2} \) \( \frac{1}{3} \) \( \frac{1}{4} \) या कोई भी अन्य अनुदान।

32. दी छवि में दिखाया गया है कि एक वर्तक वैद्युतिक रूप से एक सीरिज के तरीके से क्षय का खंडन हो जाता है। सीरिज के तरीके से \( C_1 \) के केंद्र के साथ \( +10V \) लगाने के पश्चात \( C_1 \) के वैद्युतिक रूप से क्षय का होना है।

33. एक प्रथम उर्मिला के नाम पर एक इंजीनियर तथा एक व्यक्ति \( n \) के मध्य पर दिखाया गया है।

34. दिए गए प्रत्येक तथा संभावना \( q_0 = 10 \mu C \) है। जानिए कि यह \( C_1 \) से \( C_2 \) पर क्षय आता है।
35. A solid sphere is hung from a massless spring. When the sphere is in vertical oscillations its time period is found to be T. The sphere is now completely immersed in a liquid of density \( \frac{1}{8} \) that of sphere. The time period of vertical oscillations with the sphere always remaining immersed in the liquid will be equal to:

(1) \( T \)  
(2) \( \sqrt[7]{8} T \)  
(3) \( \frac{7}{8} T \)  
(4) \( \sqrt[7]{7} T \)

36. A cube has side length \( 1.2 \times 10^{-2} \) m. Volume of the cube will be:

(1) \( 1.7 \times 10^{-6} \) m\(^3\)  
(2) \( 1.73 \times 10^{-6} \) m\(^3\)  
(3) \( 1.70 \times 10^{-6} \) m\(^3\)  
(4) \( 1.728 \times 10^{-6} \) m\(^3\)

37. A uniform rod AB of mass m and length \( \ell \) is at rest on a smooth horizontal surface. An impulse P is applied to the end B in a direction perpendicular to the length of rod. The time taken by the rod to turn through angle of 90° is:

(1) \( \frac{2\pi m\ell}{P} \)  
(2) \( \frac{\pi m\ell}{3P} \)  
(3) \( \frac{\pi m\ell}{12P} \)  
(4) \( \frac{2\pi m\ell}{3P} \)

38. The current through 5Ω resistor is:

(1) 10 A  
(2) 1 A  
(3) 2.5 A  
(4) 0.4 A

39. A soap bubble having radius \( \frac{1}{\sqrt{\pi}} \) cm is expanded to a bubble of radius \( \frac{2}{\sqrt{\pi}} \) cm. If the surface tension of soap solution is 0.03 Nm\(^{-1}\). The work done is:

(1) 0.36 J  
(2) \( 3.6 \times 10^{-5} \) J  
(3) \( 7.2 \times 10^{-5} \) J  
(4) 0.72 J

40. A common emitter amplifier has a voltage gain of 50, an input impedance of 100 Ω and an output impedance of 200 Ω. The power gain of the amplifier is:

(1) 500  
(2) 1000  
(3) 1250  
(4) 100
41. Solubility product constants (Ksp) of salts of type MX, MX₂, and M₃X at temperature T are 4.0 × 10⁻⁸, 3.2 × 10⁻¹⁴, and 2.7 × 10⁻¹⁵ respectively. The solubilities (mol dm⁻³) of the salts at a temperature T in order are:

(1) MX > MX₂ > M₃X  
(2) M₃X > MX > MX₂  
(3) M₃X > MX > MX₂  
(4) MX > MX₂ > M₃X

42. 2 mol of an ideal gas expanded isothermally and reversibly from 1 L to 10 L at 300 K. What is the enthalpy change?

(1) 4.98 kJ  
(2) 11.47 kJ  
(3) –11.47 kJ  
(4) 0 kJ

43. Arrange given amines in descending order of their reactivity when react with chloroform in presence of a base:

\[
\begin{align*}
\text{NH}_2 & \quad \text{I} \\
\text{CH}_2\text{NH}_2 & \quad \text{II} \\
\text{OCH}_3 & \quad \text{IV} \\
\end{align*}
\]

(1) I > II > III > IV  
(2) IV > II > I > III  
(3) III > IV > II > I  
(4) IV > III > II > I

44. Which of the following molecule is associated with facts:

(i) Planar  
(ii) σ – bond  
(iii) µ = 0  
(1) SO₂  
(2) NF₃  
(3) BF₃  
(4) PH₃

45. Which of the following statements is false?

(1) Work is a state function.  
(2) Temperature is a state function.  
(3) Work appears at the boundary of the system.  
(4) Change in the state is completely defined when the initial and final states are specified.

46. Energy required to remove both the electrons from He atom is 79.0 ev. The energy required to remove first electron from He atom.

(1) 38.2 ev  
(2) 49.2 eV  
(3) 51.8 ev  
(4) 24.6 ev
47. In given reaction \[
\begin{array}{c}
\text{Cl} \\
\text{Cl} \\
\text{O} \\
\text{CH}_3 \\
\text{O} \\
\text{Cl} \\
\text{O} \\
\text{Cl} \\
\text{Cl}
\end{array}
\xrightarrow{\text{CH}_3\text{OH} \rightarrow P}
\]
The product (P) is :-

1. \[
\begin{array}{c}
\text{Cl} \\
\text{Cl} \\
\text{O} \\
\text{CH}_3 \\
\text{O} \\
\text{Cl} \\
\text{O} \\
\text{Cl} \\
\text{Cl}
\end{array}
\]
2. \[
\begin{array}{c}
\text{O} \\
\text{CH}_3 \\
\text{Cl} \\
\text{O} \\
\text{Cl} \\
\text{O} \\
\text{Cl} \\
\text{Cl}
\end{array}
\]
3. \[
\begin{array}{c}
\text{Cl} \\
\text{Cl} \\
\text{O} \\
\text{CH}_3 \\
\text{O} \\
\text{Cl} \\
\text{O} \\
\text{Cl} \\
\text{Cl}
\end{array}
\]
4. \[
\begin{array}{c}
\text{O} \\
\text{CH}_3 \\
\text{Cl} \\
\text{O} \\
\text{Cl} \\
\text{O} \\
\text{Cl} \\
\text{Cl}
\end{array}
\]

48. The decreasing order of the boiling point of the following hydrides is :-
(I) NH$_3$  (II) PH$_3$  (III) AsH$_3$
(IV) SbH$_3$  (V) H$_2$O
(1) V > IV > I > III > II
(2) V > I > II > III > IV
(3) II > IV > III > II > V
(4) IV > III > I > II > V

49. If a graph is drawn for 1 mol ideal gas in such a way, PV is drawn in y-axis and P in x-axis then which of the following be the value for the intercept of the graph in y-axis :-

1. \( RT + \frac{ab}{V^2} - aV \)
2. \( RT + pb + a \)
3. \( RT + pb + ab \)
4. \( RT \)

50. If doubling the concentration of a reactant 'A' increases the rate 4 times and tripling the concentration of 'A' increases the rate 9 times, the rate is proportional to :-

1. Concentration of 'A'
2. Square of concentration of 'A'
3. Under root of the concentration of 'A'
4. Cube of concentration of 'A'
51. \[ \text{HO} - \text{OH} + \text{MeC} = \text{O} \xrightarrow{\text{HCl}} (A) \]

The compound (A) is:

1. \( \text{HO} - \text{Me} \)
2. \( \text{HO} - \text{Me} \)
3. \( \text{HO} - \text{OH} \)
4. \( \text{HO} - \text{O} \)

52. Among the following molecules:

(i) \( \text{XeO}_3 \)
(ii) \( \text{XeOF}_4 \)
(iii) \( \text{XeF}_6 \)

those having same number of lone pair on Xe are

1. (i) & (ii) only
2. (i) & (ii) only
3. (ii) & (iii) only
4. (i), (ii) & (iii) only

53. \( \text{FeCl}_3 \) on reaction with \( \text{K}_4[(\text{Fe(CN)}_6)] \) in aqueous solution gives blue colour. These are separated by a semipermeable membrane AB. Due to osmosis there is:

1. blue colour formation in side X.
2. blue colour formation in side Y.
3. blue colour formation in both sides
4. no blue colour formation.

54. 10 moles \( \text{SO}_2 \) and 15 moles \( \text{O}_2 \) were allowed to react. The unreacted moles of \( \text{SO}_2 \) and \( \text{O}_2 \) respectively?

1. 0 mol, 10 mol
2. 2 mol, 8 mol
3. 4 mol, 5 mol
4. 8 mol, 2 mol
55. ArSN reaction: $\text{NO}_2\text{Cl}\text{Cl} + \text{HO}^n(1\text{mole}) \rightarrow \text{P}$; The product is:

(1) $\text{NO}_2\text{OH}\text{Cl}$
(2) $\text{NO}_2\text{OH}\text{Cl}$
(3) $\text{ClOHCl}$
(4) $\text{OH}\text{OH}\text{OH}$

56. In which of the following pair size of 1st element is higher as compare to IIInd:
(1) Zn, Sc
(2) Sc, La
(3) Cu, Ag
(4) La, Hf

57. In a cubic close packed structure of mixed oxides, the lattice is made up of oxide ions. One-fifth of tetrahedral voids are occupied by divalent ($X^{2+}$) ions, while one-half of the octahedral voids are occupied by trivalent ions ($Y^{3+}$), then the formula of the oxide is:
(1) $XY_2O_4$
(2) $X_2YO_4$
(3) $X_4Y_5O_{10}$
(4) $X_5Y_4O_{10}$

58. The IUPAC name of given compound.
$\text{N}\equiv\text{C}–\text{CH}_2–\text{CH}_2–\text{C}≡\text{N}$
(1) Ethane-1, 2-dicarbonitrile
(2) Butane-1, 4-dinitrile
(3) 1, 2-Dicyano ethane
(4) 3-isocyanopropanenitrile

59. $\text{CH}_3\text{MgBr} + \text{H}_{2}\text{O} \rightarrow \text{A} \xrightarrow{\text{HBr}} \text{B}$

The compound D is:
(1) Me CH$_2$OH
(2) Me CH$_2$OH
(3) OH CH$_3$
(4) CH$_3$OH
60. Select the correct order from the following:--
(1) $N_2O < N_2O_3 < NO$ Acidic character
(2) $MgO > Al_2O_3 > SiO_2$ Basic Character
(3) $Fe^{2+} < Fe^{3+} < Mn^{2+}$ Ionic radius order
(4) $Sc > La > Y$ Ionisation energy order

61. Which of the following is not a concentration cell:--
(1) $Pt(s); H_2(g) | H^+ \ || H^+ | H(g); Pt(s)$
(2) $Ni(s) | Ni^{2+} \ || Ni^{3+} | Ni(s)$
(3) $Fe(s) | Fe^{2+} \ || Fe^{3+} | Fe(s)$
(4) None of these

62. Which of the following is functional isomer of 4-methyl carbolic acid.
(1) $\text{CH}_3 - \text{CH} - \text{CH}_2 - \text{C} - \text{OH}$
(2) $\text{CH}_3 - \text{C} - \text{C} - \text{OH}$
(3) $\text{CH}_3 - \text{OH}$
(4) $\text{O} - \text{CH}_3$

63. Which of the following is homopolymer ?
(1) Nylon–6
(2) Nylon–6,6
(3) Bakelite
(4) Urea formaldehyde resin

64. Laborer's working with phosphores suffer from a disease in which bones decay
(1) Arthritis  (2) Phossy-Jaw
(3) Rickets  (4) Cancer

65. The molar entropy of vaporization of acetic acid is 14.4 calK$^{-1}$mol$^{-1}$ at its boiling point 123°C. The latent heat of vaporization of acetic acid is :-
(1) 490 Cal mol$^{-1}$ (2) 640 Cal mol$^{-1}$
(3) 5760 Cal mol$^{-1}$ (4) 240 Cal mol$^{-1}$

66. $\text{CH}_3 \quad \text{CH}_3 \rightarrow \text{Product}$
Product of above reaction will be :-
(1) Racemic mixture (2) Diasteromer
(3) Meso (4) Constitutional
67. A unit formed by the attachment of a base to '1' position of sugar and phosphoric acid at '5' position the unit formed is known as :-
(1) Nucleotide (2) Nucleoside (3) DNA (4) RNA

68. During electrolytic refining of copper, some metals present at impurity settle as "anode mud" these are :-
(1) Sn & Ag (2) Pb & Zn (3) Ag & Au (4) Fe & Ni

69. How many grams of CaC$_2$O$_4$ will present in one litre of saturated solution? $K_{sp}$ of CaC$_2$O$_4$ is $2.5 \times 10^{-9}$ and its molecular weight is 128
(1) 0.0064 g (2) 0.0128 g (3) 0.0032 g (4) 0.0640 g

70. The major product of this reaction is :-
(1) CH$_3$Br (2) BrCH$_3$ (3) CHBr$_2$ (4) CH$_2$Br

71. If the configuration of Y$^+$ & X$^-$ is 2$s^2$, 2$p^6$ then:-
(1) IP of X = IP of Y (2) EA of X > EA of Y (3) IP of X$^-$ = IP of Y$^+$ (4) IP of X$^-$ > IP of Y$^+$

72. In which metal carbonyl C-O bond order is minimum
(1) [Mn(CO)$_6$]$_2^+$ (2) [Fe(CO)$_5$] (3) [Cr(CO)$_6$] (4) [V(CO)$_5$]$_2^-$

73. NH$_3$ gas is liquefied more easily than N$_2$ thereby:-
(1) Vander Waals constants a and b of NH$_3$ is higher than that of N$_2$
(2) Vander Waals constant a and b of NH$_3$ is less than that of N$_2$
(3) a of NH$_3$ > a of N$_2$, but b of NH$_3$ < b of N$_2$
(4) a of NH$_3$ < a of N$_2$, but b of NH$_3$ > b of N$_2$
74. \[
\begin{array}{c}
\text{OCH}_3 \\
\text{CH}_3
\end{array}
\xrightarrow{\text{Na/NH}_3} \text{Product}
\]

The major product of this reaction is:

(1) \[
\begin{array}{c}
\text{OCH}_3 \\
\text{OCH}_3
\end{array}
\]

(2) \[
\begin{array}{c}
\text{OCH}_3 \\
\text{OCH}_3
\end{array}
\]

(3) \[
\begin{array}{c}
\text{OCH}_3 \\
\text{OCH}_3
\end{array}
\]

(4) \[
\begin{array}{c}
\text{OCH}_3 \\
\text{OCH}_3
\end{array}
\]

75. The bond length of the species \( \text{O}_2^+ \), \( \text{O}_2^- \) and \( \text{O}_2^* \) are in the order:

(1) \( \text{O}_2^+ > \text{O}_2^- > \text{O}_2^* \)
(2) \( \text{O}_2^+ > \text{O}_2^- > \text{O}_2^* \)
(3) \( \text{O}_2^- > \text{O}_2^+ > \text{O}_2^* \)
(4) \( \text{O}_2^- > \text{O}_2^+ > \text{O}_2^* \)

76. In the following complex order of paramagnetism is:

\[
\begin{align*}
P : [\text{FeF}_6]^{3+} \\
Q : [\text{CoF}_6]^{3-} \\
R : [\text{V (H}_2\text{O})_6]^{3+} \\
S : [\text{Ti (H}_2\text{O})_7]^{3+}
\end{align*}
\]

(1) \( P < Q > R > S \)
(2) \( P > Q > R > S \)
(3) \( P = Q = R = S \)
(4) \( P > R > Q > S \)

77. CsBr has bcc structure with edge length 4.3 Å. The shortest interionic distance in between Cs\(^+\) and Br\(^-\) is:

(1) 3.72 Å
(2) 1.86 Å
(3) 7.44 Å
(4) 4.3 Å

78. \[
\begin{array}{c}
\text{CH}_3\text{C–OH + CH}_3\text{CH}_2\text{OH} \\
\xrightarrow{\text{LiAlH}_4/\text{H}_2\text{O}} \text{A}
\end{array}
\]

\[
\begin{array}{c}
\text{O} \\
\xrightarrow{\text{LiAlH}_4/\text{H}_2\text{O}} \text{B (Products), Products B will be:–}
\end{array}
\]

(1) \( \text{CH}_3\text{CHO + C}_2\text{H}_5\text{OH} \)
(2) Only \( \text{C}_2\text{H}_5\text{OH} \)
(3) \( \text{C}_2\text{H}_5\text{OH + C}_2\text{H}_5\text{OH} \)
(4) Only \( \text{C}_2\text{H}_5\text{OH} \)

79. Which of the following molecular orbital has two nodal planes:

(1) \( \sigma^2\text{s} \)
(2) \( \pi^2\text{p}_y \)
(3) \( \pi^2\text{p}_y \)
(4) \( \sigma^2\text{p}_x \)

80. Which of the following is not correctly matched:

(1) \([\text{Fe (CN)}_4]^{3-} \rightarrow \text{d}^3\text{sp}^3 \) paramagnetic
(2) \([\text{Fe (CO)}_2 (\text{NO})_2]^{-} \rightarrow \text{d}^3\text{sp}^3 \) diamagnetic
(3) \([\text{Fe (en)}_3]^{3+} \rightarrow \text{sp}^3\text{d}^2 \) paramagnetic
(4) \([\text{FeCl}_2 (\text{PPh}_3)_2]^{-} \rightarrow \text{sp}^3 \) paramagnetic

81. \( \text{O}_2^+, \text{O}_2^- \) और \( \text{O}_2^* \) में कौन सा लक्ष्य है?

(1) \( \text{O}_2^+ > \text{O}_2^- > \text{O}_2^* \)
(2) \( \text{O}_2^+ > \text{O}_2^- > \text{O}_2^* \)
(3) \( \text{O}_2^- > \text{O}_2^+ > \text{O}_2^* \)
(4) \( \text{O}_2^- > \text{O}_2^+ > \text{O}_2^* \)

82. निम्न वक्ता ला दिए जिनके में अम्ल का चुंबन दिया है?

(1) \( P < Q > R > S \)
(2) \( P > Q > R > S \)
(3) \( P = Q = R = S \)
(4) \( P > R > Q > S \)

83. CsBr का बीस से रचना रखता है जिसके केवल लक्ष्य है?

(1) 3.72 Å
(2) 1.86 Å
(3) 7.44 Å
(4) 4.3 Å

84. \( \text{CH}_3\text{C–OH + CH}_3\text{CH}_2\text{OH} \)

\[
\begin{array}{c}
\xrightarrow{\text{LiAlH}_4/\text{H}_2\text{O}} \text{A}
\end{array}
\]

\[
\begin{array}{c}
\text{O} \\
\xrightarrow{\text{LiAlH}_4/\text{H}_2\text{O}} \text{B (उ) उ, घ, घ, प और ब हो} में
\end{array}
\]

(1) \( \text{CH}_3\text{CHO + C}_2\text{H}_5\text{OH} \)
(2) के बल\( \text{C}_2\text{H}_5\text{OH} \)
(3) \( \text{C}_2\text{H}_5\text{OH + C}_2\text{H}_5\text{OH} \)
(4) के बल\( \text{C}_2\text{H}_5\text{OH} \)

85. \( \text{इनमें से कौन से अभिक चक्कर के में दो} \) नाक लेकर है?

(1) \( \sigma^2\text{s} \)
(2) \( \pi^2\text{p}_y \)
(3) \( \pi^2\text{p}_y \)
(4) \( \sigma^2\text{p}_x \)

86. \( \text{कौन सा गलत मु} \) में लिखा है?

(1) \([\text{Fe (CN)}_4]^{3-} \rightarrow \text{d}^3\text{sp}^3 \) अम्ल का चुंबन
(2) \([\text{Fe (CO)}_2 (\text{NO})_2]^{-} \rightarrow \text{d}^3\text{sp}^3 \) रित्स का चुंबन
(3) \([\text{Fe (en)}_3]^{3+} \rightarrow \text{sp}^3\text{d}^2 \) अम्ल का चुंबन
(4) \([\text{FeCl}_2 (\text{PPh}_3)_2]^{-} \rightarrow \text{sp}^3 \) अम्ल का चुंबन
81. Which of the following statement is incorrect?
(1) Diatoms form kieselgurh due to presence of \( \text{CaCO}_3 \) in their cell wall.
(2) Spirogyra shows isogamous type of sexual reproduction.
(3) Gemmae are asexual buds, found in some liver-worts and meant for asexual reproduction.
(4) Sporophyte of spermatophytes is differentiated into roots, stem and leaves.

82. Find out the type of embryo and identify the parts scutellum coleoptile, epiblast and coleorhiza respectively from the given diagram:

(1) Monocot embryo A, B, C, D
(2) Dicot embryo B, C, D, E
(3) Dicot embryo A, E, B, F
(4) Monocot embryo A, C, D, E

83. Find the correct match:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Auxin</td>
<td>Apical dominance</td>
</tr>
<tr>
<td></td>
<td>Gibberellin</td>
<td>Flowering in pineapple</td>
</tr>
<tr>
<td></td>
<td>Cytokinin</td>
<td>Phloem transport</td>
</tr>
<tr>
<td></td>
<td>ABA</td>
<td>Promotes seed dormancy</td>
</tr>
<tr>
<td>2</td>
<td>Auxin</td>
<td>Parthenocarpy</td>
</tr>
<tr>
<td></td>
<td>Gibberellin</td>
<td>Bolting</td>
</tr>
<tr>
<td></td>
<td>Cytokinin</td>
<td>Richmond-lang effect</td>
</tr>
<tr>
<td></td>
<td>ABA</td>
<td>Closure of stomata</td>
</tr>
<tr>
<td>3</td>
<td>Auxin</td>
<td>Malting</td>
</tr>
<tr>
<td></td>
<td>Gibberellin</td>
<td>Herbicide</td>
</tr>
<tr>
<td></td>
<td>Cytokinin</td>
<td>Flowering in mango</td>
</tr>
<tr>
<td></td>
<td>ABA</td>
<td>Overcomes apical dominance</td>
</tr>
<tr>
<td>4</td>
<td>Auxin</td>
<td>Phloem transport</td>
</tr>
<tr>
<td></td>
<td>Gibberellin</td>
<td>Closure of stomata</td>
</tr>
<tr>
<td></td>
<td>Cytokinin</td>
<td>Parthenocarpy</td>
</tr>
<tr>
<td></td>
<td>ABA</td>
<td>Bolting</td>
</tr>
</tbody>
</table>

81. निम्न में से कौन सा समानार्थी नहीं है?
(1) \( \text{डी स्नॉट में कोई कैम्परसियॉर सिस्ट्रोसीमा} \) के कारण उनकी स्केल कर लेते हैं।
(2) स्पिरोग्रा भूखी तुलसी का प्रथम प्रकार का सिल्वर दांत है।
(3) श्वेत परिकल्पना से एक लंबी नींद होती है।
(4) रसोईं टूक फाइट का प्रथम या फाइट ज्ञात है, तन्त्र कहीं दिखाएँ झुका है।

82. नीचे दिखाए गए चित्र में \( \text{B} \) \( \text{A} \) प्रकार का प्रथम प्रकार है देखि रसोईं टूक लगा। \( \text{B} \) \( \text{A} \) \( \text{C} \), \( \text{D} \), \( \text{E} \) और \( \text{F} \) \( \text{D} \) \( \text{E} \) \( \text{A} \) \( \text{C} \) \( \text{F} \), \( \text{A} \) \( \text{C} \) \( \text{D} \) \( \text{E} \) अन्य.

83. सही मिला न फूंका निष्ठुर.
84. Match the following columns and find correct combination:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Darwin</td>
<td>p. Mutation theory</td>
</tr>
<tr>
<td>b. De Vries</td>
<td>q. Protobiosis</td>
</tr>
<tr>
<td>c. Pasteur</td>
<td>r. Origin of species</td>
</tr>
<tr>
<td>d. Fox</td>
<td>s. Special creation</td>
</tr>
<tr>
<td>t. Swan-Necked Flask Experiment</td>
<td></td>
</tr>
</tbody>
</table>

(1) a = r, b = p, c = t, d = q  
(2) a = p, b = q, c = r, d = s  
(3) a = t, b = r, c = q, d = p  
(4) a = r, b = t, c = p, d = q

85. Consider the following plants:

- Cycas, Funaria, Adiantum, Ginkgo, Marchantia, Salvinia.

Which of the following is common among them?

1. They all possess archegoniophores  
2. They all have xylem and phloem  
3. They all have motile male gametes  
4. They all are heterosporous

86. Read the following statements carefully out of following which are incorrect?

(A) Simple epithelium has protective function as it does in our skin.  
(B) Cuboidal epithelium found in ducts of glands and tubular parts of nephrons.  
(C) Ciliated epithelium moves particles or mucus in a specific direction.  
(D) Compound epithelium has main role in secretion and absorption.

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

87. Imagin that you are a doctor and you observed that a patient is suffered by "SORE THROAT" condition and he does not properly swallow the food. You told him that certain type of tonsils are infected and now required tonsillectomy. Which types of tonsils are surgically removed during above condition?

1. Lingual tonsils  
2. Nasopharyngeal tonsil  
3. Palatine tonsil  
4. Tubal tonsils
88. On Galapagos island, Darwin observed variation in beaks of birds (Darwin's finches) and he concluded:–
   (1) Interspecies variation
   (2) Intraspecies variation
   (3) Natural selection according to food
   (4) Inheritance of acquired characters

89. Find out correct option for the given figure:–
   (1) It is Asterias, it has ambulacral system.
   (2) It is Ophiura, it is marine.
   (3) It is Asterias, it is radially symmetric.
   (4) It is Ophiura, it has direct development.

90. Identify the correct matching pair:–

<table>
<thead>
<tr>
<th></th>
<th>Enamel</th>
<th>Hardest tissue</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Blood</td>
<td>Softest tissue</td>
</tr>
<tr>
<td>(2)</td>
<td>Elastic cartilage</td>
<td>Nasal septum</td>
</tr>
<tr>
<td>(3)</td>
<td>Osteoclast</td>
<td>Bone forming cell</td>
</tr>
</tbody>
</table>

91. Carefully read the following properties of muscles?
   (a) They are cylindrical and branched.
   (b) They are multinucleated.
   (c) They have intercalated discs.
   (d) They are controlled by both CNS and ANS.

   How many properties are shown by cardiac muscles?
   (1) One
   (2) Two
   (3) All of these
   (4) None

92. Using imprints from a plate from complete medium and carrying bacterial colonies, you can select streptomycin resistant mutants and prove that such mutations do not originate as adaptation. These imprints need to be used–
   (1) On plates with and without streptomycin
   (2) Only on plates with streptomycin
   (3) On plates with minimal medium
   (4) Only on plates without streptomycin
93. Study the following statements carefully and give the answer :-
(A) Guard cells in monocots are dumb-bell shaped.
(B) Root hairs are generally unicellular.
(C) First formed secondary xylem are protoxylem and later formed are metaxylem.
(D) Roots have exarch and stem have enarch xylem.
(1) A, B are correct
(2) C, D are correct
(3) A, B and C are correct
(4) A, B, D are correct

94. Read the following statements about cockroach :-
(a) In male cockroach, a characteristic mushroom shaped gland is present in the 6th – 7th abdominal segments which functions as an accessory reproductive gland.
(b) Cockroach is uricolotelic.
(c) The fat body and uricose gland help in excretion.
(d) Blood from sinuses enter into heart through ostia and is pumped antery to sinuses again.
Which of the above statements are correct ?
(1) a, b and d
(2) b and c
(3) a and d
(4) a, b, c and d

95. Blood pressure lowering hormone is :-
(1) Thyroxine
(2) ANF
(3) Aldosterone
(4) Nor-adrenaline

96. Which is/are the infectious disease/diseases?
(a) Small pox (b) Polio
(c) Diphtheria (d) Pneumonia
(e) Tetanus
(1) c, d
(2) b, d, e
(3) a, c, e
(4) a, b, c, d, e

97. Xylem is water and mineral conducting tissue, it is made of four kinds of elements. In gymnosperms which of them is not present :-
(1) Tracheids
(2) Vessels
(3) Xylem fibres
(4) Xylem parenchyma

98. Three of the following statements are correct while one is incorrect. Find out the incorrect statement.
(1) Electron microscopic study of a ciliom show that they are covered with plasma membrane
(2) The golgi apparatus principally performs the function of packaging of material
(3) Cell membrane is composed of lipids that are arranged in a bilayer and also possess protein and carbohydrates
(4) During anaphase centrioles are move to opposite poles.
Read the following four statements carefully and answer the question given below:

(A) HCG exerts an interstitial cell to release the testosterone in embryonic stage cause the testis descend in to the scrotum.

(B) HCG is a glycoprotein work as a leuteinizing hormone.

(C) HCG maintain the corpus luteum, so the pregnancy begins and continued.

(D) HCG release from trophoblast in initial stage and from placenta in later stage of pregnancy.

How many statements are correct?

(1) A, B and C
(2) B, C and D
(3) A, C and D
(4) A, B, C and D

Cancer detection is based on :-

(a) Biopsy
(b) Histopathological studies of tissue
(c) Blood test
(d) Bone marrow test

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

In the given table match the type of tissue with their character and correct function :-

<table>
<thead>
<tr>
<th>Types of tissue</th>
<th>Character</th>
<th>Main function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Parenchyma</td>
<td>1 thin walled tissue</td>
<td>P Primary and secondary growth</td>
</tr>
<tr>
<td>(B) Meristem</td>
<td>2 often contain chloroplast</td>
<td>Q Photosynthesis, storage and secretion</td>
</tr>
<tr>
<td>(C) Collenchyma</td>
<td>3 Dividing tissue</td>
<td>R Mechanical support to growing plant parts</td>
</tr>
<tr>
<td>(D) Sclerenchyma</td>
<td>4 Thickened cell wall of lignin</td>
<td>S Mechanical support to all organs in which present</td>
</tr>
</tbody>
</table>

(1) (A)-2, Q (B)-3, Q (C) – 1,Q (D) – 1,P
(2) (A)-1, P (B)-2, R (C) – 3,P (D) – 2,Q
(3) (A)-1, Q (B)-3, P (C) – 2,R (D) – 4,S
(4) (A)-4, S (B)-1, S (C) – 4,S (D) – 3,R
102. Match the column :-

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Structural gene</td>
<td>(i) Binding site for repressor protein</td>
</tr>
<tr>
<td>(B) Operator gene</td>
<td>(ii) Codes for repressor protein</td>
</tr>
<tr>
<td>(C) Promoter gene</td>
<td>(iii) Induces lactose transport from the medium</td>
</tr>
<tr>
<td>(D) Regulator gene</td>
<td>(iv) Codes for enzyme</td>
</tr>
<tr>
<td></td>
<td>(v) Binding site for RNA polymerase</td>
</tr>
</tbody>
</table>

(1) A-ii, B-v, C-i, D-iv  (2) A-iv, B-i, C-v, D-ii  
(3) A-iv, B-i, C-v, D-iii (4) A-ii, B-v, C-iv, D-v

103. Which component helps in the movement of sperm from vagina to fallopian tube through uterus?  
(1) Oxytocin  (2) Prostaglandin  
(3) (1) and (2) both  (4) Cortisol and oestrogen

104. Mark the incorrectly matched options :-

(A) Leaves of *Cannabis sativa*  
(B) Opium poppy  
(C) Flowing branch of *Datura*  

(1) A and B  (2) B and C  
(3) A, B and C  (4) Only C

105. Select the correctly matched pairs from the following?  
(i) Whorled phyllotaxy – *Alstonia*  
(ii) Spadix – Maize  
(iii) Hilum – Scar on seed  
(iv) Shield shaped cotyledon – Coleoptile  
(1) Only iv  (2) Only i, ii  
(3) Only i, iii  (4) i, ii, iii

106. Which component helps in the movement of sperm from vagina to fallopian tube through uterus?  
(1) Oxytocin  (2) Prostaglandin  
(3) (1) and (2) both  (4) Cortisol and oestrogen

107. Mark the incorrectly matched options :-

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(C) Flowing branch of *Datura*  

(1) A and B  (2) B and C  
(3) A, B and C  (4) Only C

108. Select the correctly matched pairs from the following?  
(i) Whorled phyllotaxy – *Alstonia*  
(ii) Spadix – Maize  
(iii) Hilum – Scar on seed  
(iv) Shield shaped cotyledon – Coleoptile  
(1) Only iv  (2) Only i, ii  
(3) Only i, iii  (4) i, ii, iii
106. In Sickle cell anaemia glutamic acid is replace by valine. Which of the following triplet codes for valine :-
   (1) GGG  (2) AAG  (3) GAA  (4) GUG

107. Hyperplasia takes place in endometrium in the presence of :-
   (1) Oestrogen  (2) Progesterone  (3) FSH  (4) LH

108. Producer Pri Sec Top
(I) Plant → Insect → Frog → Eagle
(II) Plant → Rat → Snake → Peacock

When food chain I will connected with food chain-II and snake eats frog than snake is :-
   (1) Primary consumer  (2) Secondary consumer  (3) Tertiary consumer  (4) Top consumer

109. The given floral diagram belongs to :-
   (1) Petunia (Solanaceae)  (2) Gloriosa (Fabaceae)  (3) Lupin (Fabaceae)  (4) Both (2) and (3)

110. More than two form of a gene on same locus is called (a). They form by (b) on same gene. Most common example of this (c).

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Epistatic gene</td>
<td>Crossing over</td>
<td>Polydactylly</td>
</tr>
<tr>
<td>2</td>
<td>Complementary gene</td>
<td>Crossing over</td>
<td>Flower colour in Lathyrus</td>
</tr>
<tr>
<td>3</td>
<td>Multiple allele</td>
<td>Mutation</td>
<td>Human 'ABO' blood group</td>
</tr>
<tr>
<td>4</td>
<td>Multiple allele</td>
<td>Crossing over</td>
<td>Human blood group</td>
</tr>
</tbody>
</table>

106. एक रूप अलग अलग से खून द्वारा लिया गया एक रूप है। निम्न में से कौन सा रूप है?
   (1) GGG  (2) AAG  (3) GAA  (4) GUG

107. ऐप्स्ट्रा में मूल रूप से हाइपरप्लेसिया जिसमें न की होती है?
   (1) प्रोगेस्टरन (2) फ़ीसी  (3) लीडेर देगा (4) एस्ट्रोड्रोन

108. उर पदक प्रातिक्षिप्त के उत्पाद
(I) पदप → कीट → मछली चील
(II) पदप → चूहा → सेवन मूर्ति आगरा या पशु खंड या पशु खंड लाल से सेवन जिहाद में जमे तथा सैंपल ड्रॉ करके खा। भाग त्रै खा पहले गा
   (1) प्रातिक्षिप्त के उत्पाद (2) द्वितीय पद फागें केंद्र (3) तृतीय पद फागें केंद्र (4) चूहा उत्पाद केंद्र

109. नीचे दिया गया पुष्पचक्र किसे सब धीरत है?

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>एक्स्टेंशन टेक्नोलॉजी ब्लू जेन विश्व पेन लिडल टेक्नोलॉजी (1)</td>
<td>पूरा ग्रैंड जेन विश्व पेन लिडल (2)</td>
<td>पूरा ग्रैंड फॉर जेन विश्व पेन लिडल (3)</td>
</tr>
<tr>
<td>2</td>
<td>जेन विश्व पेन (1)</td>
<td>पूरा ग्रैंड जेन (2)</td>
<td>पूरा ग्रैंड जेन विश्व पेन (3)</td>
</tr>
<tr>
<td>3</td>
<td>ब्लू जेन मविकल पी (1)</td>
<td>उर परानतित (2) मा मानचे (3)</td>
<td>उर परानतित मा मानचे खाता (4)</td>
</tr>
<tr>
<td>4</td>
<td>ब्लू जेन मविकल पी (1)</td>
<td>पूरा ग्रैंड जेन विश्व पेन (2)</td>
<td>पूरा ग्रैंड जेन विश्व पेन (3)</td>
</tr>
</tbody>
</table>
111. Match the names given under column I with their relations given under column II. Choose the answer which gives the correct combination of the alphabets of the two columns:

<table>
<thead>
<tr>
<th>Column I Name</th>
<th>Column II Relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Bombbyx mori</td>
<td>p Disease of silkworm</td>
</tr>
<tr>
<td>B Morus alba</td>
<td>q Larva</td>
</tr>
<tr>
<td>C Caterpillar</td>
<td>r Silk moth</td>
</tr>
<tr>
<td>D Pebrane</td>
<td>s Mulberry plant</td>
</tr>
<tr>
<td></td>
<td>t Freshly hatched silkworm</td>
</tr>
</tbody>
</table>

(1) A-q, B-r, C-s, D-t  
(2) A-r, B-s, C-q, D-p  
(3) A-r, B-q, C-t, D-s  
(4) A-s, B-r, C-q, D-t  

112. Identify the biome A, B, C, D, E, F from above graph.

113. Which of the following exhibits a fascinating array of patterns and designs in the structure of pollen?

(1) Intine  
(2) Germ pore  
(3) Exine  
(4) Tapetum

Time Management is Life Management
114. Consider the following statements (A to C) each with one blanks. Which option gives the correct fill up for the blanks

**Statements**
(A) Method of producing thousands of plants through tissue culture is called __I__.
(B) In 2000 hybrid maize was developed which contain twice the amount of amino acid __II__, compared to existing maize hybrids.
(C) The rice varieties IR-8 were developed in __III__.

1. I → Explant, II → Arginine, III → India
2. I → Micropropagation, II → Arginine, III → Mexico
3. I → Micropropagation, II → Lysine, III → Philippines
4. I → Micropropagation, II → Lysine, III → India

115. Eri Silk worm is grown on :-
1. Mulberry leaf
2. Neem leaf
3. Khaire leaf
4. Castor leaf

116. Match the column I, II, III and IV choose the correct option for resources.

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Coal</td>
<td>Renewable</td>
<td>Nonrenewable</td>
</tr>
<tr>
<td>b)</td>
<td>Solar energy</td>
<td>Wind energy</td>
<td>Water</td>
</tr>
<tr>
<td>c)</td>
<td>Solar energy</td>
<td>Coal</td>
<td>Species</td>
</tr>
<tr>
<td>d)</td>
<td>Hydropower</td>
<td>Solar energy</td>
<td>Wild life</td>
</tr>
</tbody>
</table>

(1) Only a is correct
(2) b and c are correct
(3) a, b, c are correct
(4) a and d are correct

117. Which of the following statements are true?
(i) Pollen release and stigma receptivity are always synchronised in all species.
(ii) Pollination does not guarantee the transfer of the right type of pollen.
(iii) Micropyle represents the basal part of ovule.
(iv) Most zygotes divide only after certain amount of endosperm is formed.

1. i, iii
2. ii, iv
3. ii, iv
4. ii, iii, iv

118. Which of the following compounds are electron acceptor in photosynthesis and electron and proton donor in respiration respectively?
1. PGA, PGA
2. PGAL, PGA
3. DHAP, PGAL
4. PGA, PGAL

114. Which of the following compounds are electron and proton acceptor in photosynthesis and electron and proton donor in respiration respectively?

1. I
2. II
3. III
4. IV

117. Which of the following statements are true?

1. I
2. II
3. III
4. IV

118. Which of the following compounds are electron acceptor in photosynthesis and electron and proton donor in respiration respectively?
119. Silk consists of:
(1) Central core of sericin
(2) Central core of fibroin
(3) Both (1) and (2)
(4) A fine mixture of fibroin and albumin

120. Recently formed biosphere Reserve of India is:
(1) Cold desert (H.P.)
(2) Sundar bons (W.B.)
(3) Panna (M.P.)
(4) Seshachalam hills (A.P.)

DIRECTIONS FOR Q. NO. 121 TO 180
These questions consist of two statements each, printed as Assertion and Reason. While answering these Questions you are required to choose any one of the following four responses.
A. If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
B. If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
C. If Assertion is True but the Reason is False.
D. If both Assertion & Reason are False.

121. Assertion:- The image of a white object formed by a concave mirror on a screen appears coloured.
Reason:- Concave mirror suffers from chromatic aberration.
(1) A (2) B (3) C (4) D

122. Assertion:- It is difficult to stop bleeding from cut in the body at high altitudes.
Reason:- The atmospheric pressure at high altitude is lesser than the blood pressure.
(1) A (2) B (3) C (4) D

123. Assertion:- The ionizing power of β-particles is less as compared to α-particles.
Reason:- The mass of β-particles is less than the mass of α-particles.
(1) A (2) B (3) C (4) D

124. Assertion:- Soft iron is used as a core of transformer.
Reason:- Area of hysteresis loop for soft iron is relatively small.
(1) A (2) B (3) C (4) D

125. Assertion:- When a particle performing SHM is at extreme position its momentum is maximum.
Reason:- At extreme position, the velocity of particle is maximum.
(1) A (2) B (3) C (4) D
126. **Assertion:** A beaker is completely filled with water at 4°C. It will overflow, either heated or cooled.

**Reason:** There is expansion of water below and above 4°C.

(1) A (2) B (3) C (4) D

127. **Assertion:** Molecules of ice at 0°C and water at 0°C will have same potential energy.

**Reason:** Potential energy depends only on temperature of the system.

(1) A (2) B (3) C (4) D

128. **Assertion:** For faster action, n-p-n transistor is used.

**Reason:** In n-p-n transistor, the mobility of majority charge carriers is greater.

(1) A (2) B (3) C (4) D

129. **Assertion:** Voltage always gets dropped across the internal resistance inside the battery.

**Reason:** Voltage across a battery is always less than its emf.

(1) A (2) B (3) C (4) D

130. **Assertion:** During earthquake speed of p-wave always more than s-wave.

**Reason:** Earthquake generates infrasonic waves.

(1) A (2) B (3) C (4) D

131. **Assertion:** Charge can not exist without mass.

**Reason:** The mass of a conducting body will increase when it is positively charged.

(1) A (2) B (3) C (4) D

132. **Assertion:** Tension in string always acts away from body.

**Reason:** Friction always opposes motion.

(1) A (2) B (3) C (4) D

133. **Assertion:** Photosensitivity of a metal is high if its work function is small.

**Reason:** Work function = hf₀ where f₀ is the threshold frequency.

(1) A (2) B (3) C (4) D
135. **Assertion** :- Displacement of a body may be zero when distance travelled by it is not zero.

**Reason** :- Displacement is the longest distance between initial & final positions.

(1) A (2) B (3) C (4) D

136. **Assertion** :- A solenoid tends to expand, when a current passes through it.

**Reason** :- Two straight another parallel metallic wires carrying current in same direction repel each other.

(1) A (2) B (3) C (4) D

137. **Assertion** :- In given situation beat phenomenon will occur.

**Reason** :- In given situation beat phenomenon will occur.

(1) A (2) B (3) C (4) D

138. **Assertion** :- A body of mass m moving with speed v collides with another stationary body of mass M. The maximum energy loss possible is given as

\[
\Delta E = \frac{1}{2} m v^2 \left( \frac{M}{M+m} \right).
\]

**Reason** :- Maximum energy loss occurs when bodies get stuck together as a result of the collision.

(1) A (2) B (3) C (4) D

139. **Assertion** :- Gravitational force between two particles is negligibly small as compared to the electrical force.

**Reason** :- Charged particles experience electric force.

(1) A (2) B (3) C (4) D

140. **Assertion** :- Force can not be subtracted from momentum.

**Reason** :- Physical quantities with different nature and dimensions can not be subtracted.

(1) A (2) B (3) C (4) D
141. **Assertion** :- The enthalpy of formation of \( \text{H}_2\text{O}(\ell) \) is greater than that of \( \text{H}_2\text{O}(g) \).

**Reason** :- Enthalpy change is positive for the condensation reaction

\[
\text{H}_2\text{O}(g) \rightarrow \text{H}_2\text{O}(\ell)
\]

(1) A (2) B (3) C (4) D

142. **Assertion** :- Addition of HCl to propene in presence of peroxide gives 1-chloropropane.

**Reason** :- The reaction occurs by carboxonium ion intermediate.

(1) A (2) B (3) C (4) D

143. **Assertion** :- The number of Oxygen atoms in 16 g of Oxygen and 16 g of \( \text{O}_2 \) is same.

**Reason** :- Each of these species represent 1 g atom of Oxygen.

(1) A (2) B (3) C (4) D

144. **Assertion** :- Ethyl chloride is more reactive than vinyl chloride towards nucleophilic substitution reactions.

**Reason** :- In vinyl chloride the \(-\text{Cl}\) is bonded to sp-hybridized carbon of an alkene.

(1) A (2) B (3) C (4) D

145. **Assertion** :- Catalyst increases the rate of a reaction.

**Reason** :- It lowers threshold energy of the reaction.

(1) A (2) B (3) C (4) D

146. **Assertion** :- \((\text{CH}_3)_2\text{CH}^-\text{C}^2\text{--NH}_3\) undergoes faster hoffmann bromamide reaction in comparison to \(\text{CH}_2\text{CH}^-\text{C}^2\text{C}^-\text{NH}_3\).

**Reason** :- \((\text{CH}_3)_2\text{CH}^-\text{C}^2\text{--NH}_3\) migrates faster than \(\text{CH}_3\text{CH}^-\text{C}^2\text{C}^-\text{NH}_3\) at electron deficient nitrogen atom.

(1) A (2) B (3) C (4) D

147. **Assertion** :- If water is heated to 350 K, pOH will decreases

**Reason** :- Kw (ionic product of water) increases with increase in temperature.

(1) A (2) B (3) C (4) D

148. **Assertion** :- All tetrahedral complexes are mainly high spin and the low spin configurations are rarely observed.

**Reason** :- \(\Delta_t\) is always much smaller even with stronger field ligands and it is never energetically favourable to pair up the electrons.

(1) A (2) B (3) C (4) D
149. **Assertion:** If $Q_c$ (reaction quotient) < $K_c$ (equilibrium constant) the reaction moves in direction of reactants.

**Reason:** Reaction quotient is defined in the same way as equilibrium constant at any stage of the reaction.

(1) A (2) B (3) C (4) D

150. **Assertion:** CO, CN$^-$, NO$^+$ and phosphines ligands acts as $\pi$ acceptor

**Reason:** In $[\text{MnO}_4^-]$ and $[\text{Cr}^{VI} \text{O}_4]^{2-}$, the ligands act as $\pi$ donor and transfer charge from ligand to metals in $\pi$ interactions as well as $\sigma$ interactions.

(1) A (2) B (3) C (4) D

151. **Assertion:** In CsCl crystal, the co-ordination number of Cs$^+$ ions is 6.

**Reason:** Cl$^-$ ions in CsCl adopt B.C.C arrangement.

(1) A (2) B (3) C (4) D

152. **Assertion:** PF$_5$ keeps trigonal bipyramidal structure in gas as well as in solid state.

**Reason:** PCl$_5$ in gas and liquid state is covalent but in solid state it is ionic and exists as $[\text{PCl}_4]^+$ and $[\text{PCl}_6]^-$. 

(1) A (2) B (3) C (4) D

153. **Assertion:** The IUPAC name of the given compound is 1-cyno-3-hydroxy-1-methyl butanesulphonic acid.

**Reason:** Number of carbon atoms in P.C.C. is four.

(1) A (2) B (3) C (4) D

154. **Assertion:** $\text{Cl} \quad \text{F}$, bond angle P is equal to the bond angle Q but not precisely equal to 90°.

**Reason:** The molecule is T-Shaped and there is repulsion between lone pairs of electrons.

(1) A (2) B (3) C (4) D
155. **Assertion**: Isobutylene is more reactive then β-butylene towards electrophilic addition reaction.  
**Reason**: Isobutylene is more stable than β-butylene.

(1) A (2) B (3) C (4) D

156. **Assertion**: In cyanide process for the extraction of gold and silver from their native ores, the cyanide solution acts as a reducing agent to reduce the gold and silver compounds present in the ores into the metallic states.  
**Reason**: In the extraction of gold and silver, the cyanide solution acts as complexing reagent in the presence of air and form their respective soluble complexes.

(1) A (2) B (3) C (4) D

157. **Assertion**: The correct IUPAC name for the compound 
\[\text{CH}(\text{CH}_3)_2\text{CH} = \text{CH}_2\] is 1-methyl ethyl cyclopentane.  
**Reason**: It is named as derivative of cyclopentane because the number of carbon atoms in the ring is more than the side chain.

(1) A (2) B (3) C (4) D

158. **Assertion**: In acid solution permanganate is reduced to Mn$^{2+}$ by an excess of reducing agent.  
**Reason**: MnO$_4^-$ reduced in Mn$^{2+}$ in acidic medium and the product in the presence of an excess of permanganate is MnO$_2$.

(1) A (2) B (3) C (4) D

159. **Assertion**: C–H bond in ethyne is shorter than C–H bonds in ethene.  
**Reason**: Carbon atom in ethene is sp-hybridised while it is sp$^2$ in ethyne.

(1) A (2) B (3) C (4) D

160. **Assertion**: Hydrochloric acid is not used to acidify a KMnO$_4$ solution in volumetric analysis of Fe$^{2+}$ and C$_2$O$_4^{2-}$ because.  
**Reason**: Part of the oxygen produced from KMnO$_4$ and HCl is used up in oxidising HCl to Cl$_2$.

(1) A (2) B (3) C (4) D

161. **Assertion**: Bacteria show complex behaviour.  
**Reason**: Bacteria have extensive metabolic diversity.

(1) A (2) B (3) C (4) D
162. **Assertion:** Atrionatriuretic factor works as antagonist to ADH.

**Reason:** Atrionatriuretic factor acts as vasodilator.

(1) A  (2) B  (3) C  (4) D

163. **Assertion:** Fishes are poikilothermous.

**Reason:** They lack the capacity to regulate their body temperature.

(1) A  (2) B  (3) C  (4) D

164. **Assertion:** Neural signal of sympathetic nerves increase the cardiac output.

**Reason:** Neural signal of sympathetic nerve inhibits the activities of SAN.

(1) A  (2) B  (3) C  (4) D

165. **Assertion:** The veins in dicot leaf vary in thickness and form reticulate venation.

**Reason:** The size of vascular bundles in dicot leaf are dependent on size of the veins and they form a network.

(1) A  (2) B  (3) C  (4) D

166. **Assertion:** Excitable stage of neuron is conducting part of nerve working.

**Reason:** Na⁺ – K⁺ pump and Na⁺ VGC helps in conduction of impulse.

(1) A  (2) B  (3) C  (4) D

167. **Assertion:** In cymose inflorescence the main axis terminates in a flower.

**Reason:** The flowers are borne in a acropetal order in cymose inflorescence.

(1) A  (2) B  (3) C  (4) D

168. **Assertion:** Excessive secretion of estrogen and progesterone automatically decrease the production of gonadotropins.

**Reason:** Excess amount of estrogen and progesterone give the negative feedback to gonadotropins.

(1) A  (2) B  (3) C  (4) D

169. **Assertion:** Shoot develops from plumule of embryo.

**Reason:** Epicotyl is present above the level of cotyledon.

(1) A  (2) B  (3) C  (4) D

170. **Assertion:** Combination of oestrogen and LH are present in oral pills.

**Reason:** Combination of oestrogen & LH prevent the ovulation.

(1) A  (2) B  (3) C  (4) D
171. **Assertion:** Tapetum considered as nutritive layer of anther.<br>**Reason:** Tapetum manufacture food for the anther.<br>(1) A (2) B (3) C (4) D

172. **Assertion:** Cattle breeds can be improved by superovulation and embryo transplantation.<br>**Reason:** Superovulation in high milk-yielding cows is induced by hormonal injection.<br>(1) A (2) B (3) C (4) D

173. **Assertion:** Blood is a fluid connective tissue.<br>**Reason:** Blood helps in transport of various substances.<br>(1) A (2) B (3) C (4) D

174. **Assertion:** Analogous structures are a result of convergent evolution.<br>**Reason:** Different structures evolving for the same function and hence having similarity.<br>(1) A (2) B (3) C (4) D

175. **Assertion:** In tailing, adenylate residues are added at 3'-end of hn-RNA.<br>**Reason:** In capping an unusual nucleotide is added to the 5' end of hn-RNA.<br>(1) A (2) B (3) C (4) D

176. **Assertion:** Principle of vaccination is based on the property of 'memory' of the immune system.<br>**Reason:** In vaccination, a preparation of antigenic protein of pathogens or inactivated/weakened pathogen are introduced into the body.<br>(1) A (2) B (3) C (4) D

177. **Assertion:** DNA fragments are separated by gel electrophoresis.<br>**Reason:** In gel electrophoresis DNA fragments can be visualised only after staining with ethidium bromide followed by exposure to x-rays.<br>(1) A (2) B (3) C (4) D

178. **Assertion:** The tiger census in our national Park and tiger reserve is often based on Pug Mark and fecal Pellets.<br>**Reason:** By this method we measure relative density of tiger not absolute.<br>(1) A (2) B (3) C (4) D
179. **Assertion** :- Proton gradient is broken due to movement of protons across the thylakoid membrane to the stroma through peripheral membrane protein (F₀) of the ATPase.

**Reason** :- F₀ protrude on the outer surface of the thylakoid membrane.

(1) A (2) B (3) C (4) D

180. **Assertion** :- Most of birds and mammals attain greater body size in cold region and lesser in warm region.

**Reason** :- Bergman & Allens rule mostly applicable on endothermal animals.

(1) A (2) B (3) C (4) D

181. Who among the following is the youngest to receive the Nobel prize?

(1) Lawrence Bragg
(2) Malala Yousafzai
(3) Carl D. Anderson
(4) Tawakkol Karman

182. What is the full form of 'MODEM'?

(1) Modulating Electronic Machine
(2) Modulator-DeModulator
(3) Modulation of Electronic Media
(4) Mode of Electronic Modulation

183. Which of the following Indians won Ramon Magsaysay award-2015?

(1) Sanjeev Chaturvedi and Anshu Gupta
(2) Kailash Satyarthi and J. Manjula
(3) Rajendra Singh and Ritu Beri
(4) Sunil Sabarwal and Sameer Anjan

184. Which one of the following allow bank customers to effective transfer of funds from their deposit accounts and other financial transactions at retail establishments?

(1) DBS (2) CBS
(3) IBS (4) POS

185. Earth Hour is a global environmental movement by WWF. In which month it is celebrated world wide?

(1) February (2) March
(3) April (4) May

186. Which of the following biosphere reserve is located on Garo Hills?

(1) Dehang-Dibang
(2) Nokrek
(3) Agasthyamalai
(4) Manas
187. Which one of the following universities founded by freedom fighter Madan Mohan Malviya is celebrating 100 years of its establishment in 2016?
(1) The Hindu College
(2) Madan Mohan Malviya University of Technology
(3) Banaras Hindu University
(4) Aligarh Muslim University

188. Which part of the world is recently being blamed for birth defect due to Zika, the mosquito born virus?
(1) South America
(2) Africa
(3) Latin America
(4) Northern Europe

189. India has won the UNESCO prize 'Award of Excellence' 2015 for cultural heritage conservation for 'Sree Vadakkunnathan Temple' at Thrissur. It is located in which state?
(1) Tamil Nadu
(2) Kerala
(3) Andhra Pradesh
(4) Karnataka

190. A mental condition, present from early childhood, characterized by great difficulty in communicating, learning and forming relationships with other people, is :
(1) Autism
(2) Dyslexia
(3) Dengvaxia
(4) Leukemia

191. According to 'Swachh Sarvekshan-2016' survey which city of India topped the list?
(1) Surat (Gujarat)
(2) Dhanbad (Jharkhand)
(3) Mysuru (Karnataka)
(4) Chandigarh (Punjab)

192. 'Bailadila' is famous for production of which mineral?
(1) Iron ore
(2) Bauxite
(3) Coal
(4) Mica

193. 'Azad Bachpan Ki Aur' is a book on child labour and slavery. Who is the writer of this book?
(1) Kiren Bedi
(2) Kailash Satyarthi
(3) Romila Thapar
(4) Meera Kumar

194. Which Prime Minister of India was first to resign from office?
(1) Morarji Desai
(2) Atal Bihari Vajpayee
(3) Guljarli Lal Nanda
(4) V.P. Singh

195. World Food Day is observed on which date across the world?
(1) 12th November
(2) 16th October
(3) 14th November
(4) 5th September

196. In 'Pedology' the study is made of :
(1) Soil
(2) Plant disease
(3) Pollution
(4) Atmosphere
197. The largest postal network in the world is in: -
   (1) USA          (2) China
   (3) India        (4) Brazil

198. Which animal is the symbol of World Wildlife Fund?
   (1) Tiger        (2) Giant Panda
   (3) Hornbill     (4) White Bear

199. Who was/is the sender of the first email, who decided to use the '@' symbol to separate the recipient's name and location?
   (1) Ray Tomlison (2) Willard S. Boyal
   (3) Leszek Miller (4) John Shepherd Barron

200. India's Sumit Nagal is a famous personality in which sport?
   (1) Tennis       (2) Basketball
   (3) Volleyball   (4) Hockey

---

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Your Target is to secure Good Rank in Pre-Medical 2016
SPACE FOR ROUGH WORK / रफ का यंत्र के लिए जाह