1. एक अनुसूची से नंबर दिये गए सीट मार्कर का सीट दिवसीय रूप से एक विद्यार्थी को दिया जाएगा। यदि कोई विद्यार्थी अन्य एक विद्यार्थी का सीट ले जाता है, तो वह दोनों को परीक्षा से निष्काशित कर दिया जाएगा।

2. परीक्षा का अंतर्गत 3 घंटे का समय है और प्रश्न पत्र में 180 प्रश्न हैं।

3. परीक्षा का समय नियंत्रक द्वारा निर्देशित किया जाएगा।

4. परीक्षा के दौरान, पत्र के साथ निर्देशित किया जाएगा।

5. परीक्षा के प्रश्न के साथ एक पूरा पत्र होता है और यह पत्र के साथ निर्देशित किया जाएगा।

6. हर उत्तर के लिए 4 मार्केंट का समावेश करता है और यह पत्र के साथ निर्देशित किया जाएगा।

7. पत्र के साथ निर्देशित किया जाएगा।

8. चित्‌ली का प्रयोग निरपेक्ष है।

Note: In case of any correction in the test paper please mail to dlpcorrections@allen.ac.in within 2 days.
1. In the process shown in figure, for helium, the heat supplied to changing the state from \((P_0, V_0)\) to \((P_1, V_1)\) :-

\[
\begin{align*}
T & \quad 1 \\
V & \quad 1 \\
P & \quad x_10^5 \text{ N/m}^2
\end{align*}
\]

(1) \(7.5 \times 10^5\) joule  
(2) \(30 \times 10^5\) joule  
(3) \(12 \times 10^5\) joule  
(4) \(6 \times 10^5\) joule

2. If the temperature of a hot body is increased by 50% then the increase in the quantity of emitted heat radiation will be :-

(1) 125%  
(2) 200%  
(3) 300%  
(4) 400%

3. A certain amount of an ideal gas is enclosed in a vessel. If undergoes a process such that pressure varies with temperature as shown in figure. Ratio of density of gas at A to that of B is :-

\[
\begin{align*}
B & \quad 2P' \\
P & \quad P' \\
A & \quad P \\
\end{align*}
\]

(1) 2 : 1  
(2) 1 : 2  
(3) 4 : 1  
(4) 1 : 4

4. The coefficient of thermal conductivity of copper is nine times of steel in the composite cylindrical bar shown in the figure. What will be the temperature at the junction of copper and steel :-

\[
\begin{align*}
100^\circ C & \quad \text{Copper} \\
& \quad \text{Steel} \\
0^\circ C & \quad 18\text{ cm} \\
& \quad 6\text{ cm}
\end{align*}
\]

(1) 75°C  
(2) 67°C  
(3) 33°C  
(4) 25°C

5. Two gases A and B having the same temperature \(T\), same pressure \(P\) and same volume \(V\) are mixed. If the mixture is at the same temperature \(T\) and occupies a volume \(V\), the pressure of the mixture is :-

\[
\begin{align*}
P & \quad 2P \\
P & \quad P \\
P & \quad P/2 \\
P & \quad 4P
\end{align*}
\]

(1) 2P  
(2) \(P\)  
(3) \(P/2\)  
(4) \(4P\)
6. A larger cylindrical tank has a hole of area \(A\) at its bottom. Water is poured in the take by a tube of equal cross-sectional area \(A\) ejecting water at the speed \(v\), then:
   (1) The water level in the tank will keep on rising
   (2) No water can be stored in the tank
   (3) The water level will rise to a height \(\frac{V^2}{2g}\) and then stop
   (4) None of these

7. The change in state of a gas from A to B is shown in figure. The work done in the process is:

   (1) \(6 \times 10^5\) J
   (2) \(7 \times 10^5\) erg
   (3) \(7 \times 10^5\) J
   (4) \(12 \times 10^5\) J

8. A 20 N metal block is suspended by a spring balance. A beaker containing same water is placed on a weighing machine which reads 40 N. The spring balance is now lowered so that the block gets immersed in the water. The spring balance now reads 16 N. The reading of the weighing machine will be:
   (1) 36 N
   (2) 60 N
   (3) 44 N
   (4) 56 N

9. A gas mixture consists of 2 moles of oxygen and 4 moles of argon at temperature \(T\). Neglecting all vibrational modes the total internal energy of the system is:
   (1) \(4\) RT
   (2) \(15\) RT
   (3) \(9\) RT
   (4) \(11\) RT

10. Water is flowing continuously from a tap having an internal diameter \(8 \times 10^{-3}\) m. The water velocity as it leaves the tap is 0.4 ms\(^{-1}\). The diameter of the water stream at a distance 20 cm below the tap is:
    (1) \(9.6 \times 10^{-3}\) m
    (2) \(3.6 \times 10^{-3}\) m
    (3) \(5 \times 10^{-3}\) m
    (4) \(7.5 \times 10^{-3}\) m

11. 1 kg of diatomic gas is at a pressure of \(8 \times 10^4\) N/m\(^2\). The density of the gas is 4 kg/m\(^3\). What is the energy of the gas due to its thermal motion?
    (1) \(3 \times 10^4\) J
    (2) \(5 \times 10^4\) J
    (3) \(6 \times 10^4\) J
    (4) \(7 \times 10^4\) J
12. A thin liquid film formed between a U-shaped wire and a light slider wire supports a weight of $1.5 \times 10^{-2}$ N. The length of the slider is 30 cm and its weight negligible. The surface tension of liquid film is:

(1) 0.025 N/m  (2) 0.0125 N/m
(3) 0.1 N/m  (4) 0.05 N/m

13. If $C_p$ and $C_v$ denote the specific heats of nitrogen per unit mass at constant pressure and constant volume respectively, then:

(1) $C_p - C_v = \frac{R}{28}$  (2) $C_p - C_v = \frac{R}{14}$
(3) $C_p - C_v = R$  (4) $C_p - C_v = 28 R$

14. The maximum load a wire can withstand without breaking, when its length is reduced to half of its original length will:

(1) Be double
(2) Will become four times
(3) Will remain same
(4) Be half

15. Two vessels having equal volume contain atomic hydrogen at one atmosphere and atomic helium at two atmospheres respectively. What is the ratio of rms speed of hydrogen atom to that of helium atom if both the samples are at same temperature:

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

16. Modulus of rigidity of ideal liquid is:

(1) Infinity
(2) Zero
(3) Unity
(4) None of these

17. N moles of a monoatomic gas is carried round the rectangular cycle ABCDA as shown in the diagram. The temperature at A is $T_0$. The thermodynamic efficiency of the cycle is:

(1) 15%  (2) 50%
(3) 20%  (4) 25%
18. A sound source emits waves of wavelength 60 cm. This source is moving towards north with a speed of \( \frac{1}{5} \) th of the speed of sound. The apparent wavelengths of the waves in the north and south directions of the moving source will be-
(1) 72 cm, 48 cm (2) 48 cm, 72 cm
(3) 60 cm, 75 cm (4) 75 cm, 60 cm

19. Which of the following are not related to adiabatic process :-
(1) \( \Delta Q = 0 \)
(2) \( \frac{P}{\rho^\gamma} \) = constant
(3) \( W = \frac{(P_f V_e - P_e V_f)}{(1-\gamma)} \)
(4) \( W = 2.3026 RT \log_{10} \left( \frac{V_e}{V_f} \right) \)

20. Two trains A and B are moving in the same direction with velocities 30 m/s and 10 m/s respectively, B is behind from A blows a horn of frequency 450 Hz. Then the apparent frequency heard by the observers (velocity of sound) is 330 m/s :
(1) 425 Hz (2) 300 Hz
(3) 450 Hz (4) 350 Hz

21. In the condensation of a gas the mean kinetic energy (K) and potential energy (U) of molecules change; thus :-
(1) K decreases, U decreases
(2) K increases, U keeps constant
(3) K keeps constant, U decreases
(4) K keeps constant, U increases

22. A uniform rope of mass 0.1 kg and length 2.5 m hangs from ceiling. The speed of transverse wave in the rope at upper end and at a point 0.5 m distance from lower end will be :
(1) 5 m/s, 2.24 m/s (2) 10 m/s, 3.23 m/s
(3) 7.5 m/s, 1.2 m/s (4) none of these
23. An ideal gas goes from state A to state B via three different processes indicated in the P-V diagram:

\[ \text{If } Q_1, Q_2, Q_3 \text{ indicate the heat absorbed by the gas along the three processes and } \Delta U_1, \Delta U_2, \Delta U_3 \text{ indicate the change in internal energy along the three processes respectively, then:} \\
(1) Q_1 = Q_2 = Q_3 \text{ and } \Delta U_1 > \Delta U_2 > \Delta U_3 \\
(2) Q_3 > Q_2 > Q_1 \text{ and } \Delta U_1 > \Delta U_2 > \Delta U_3 \\
(3) Q_1 > Q_2 > Q_3 \text{ and } \Delta U_1 = \Delta U_2 = \Delta U_3 \\
(4) Q_3 > Q_2 > Q_1 \text{ and } \Delta U_1 = \Delta U_2 = \Delta U_3 \]

24. Air is blown at the mouth of a tube (length equal to 25 cm and diameter equal to 2 cm) open at both ends as shown in the diagram. Velocity of sound is 330 m/s per second. The sound emitted by the tube will have all the frequencies in the group (Ignore end correction)

(1) 660, 1320, 1980 Hz
(2) 660, 1000, 330 Hz
(3) 302, 664, 1320 Hz
(4) 330, 990, 1690 Hz

25. A ball A has twice the diameter as another ball B of the same material and with same surface finish. A and B are both heated to the same temperature and allowed to cool radiatively; then:

(1) rate of cooling of A is same as that of B
(2) rate of cooling of A is twice that of B
(3) rate of cooling of A is half that of B
(4) rate of cooling of A is four times that of B

26. Two tuning fork when sounded together produces 5 beats per second the first tuning fork is in resonance with 16.0 cm wire of a sonometer and second is in the resonance with 16.2 cm wire of the same sonometer the frequencies of the tuning forks are:

(1) 100 Hz, 105 Hz
(2) 200 Hz, 205 Hz
(3) 300 Hz, 305 Hz
(4) 400 Hz, 405 Hz
27. One end of a copper rod of length 1.0 m and area of cross-section $10^{-3}$ m$^2$ is immersed in boiling water and the other end in ice. If the coefficient of thermal conductivity of copper is 92 cal/m-s-C$^0$ and the latent heat of ice is $8 \times 10^4$ cal/kg, then the amount of ice which will melt in one minute is:

- (1) $9.2 \times 10^{-3}$ kg
- (2) $8 \times 10^3$ kg
- (3) $6.9 \times 10^{-3}$ kg
- (4) $5.4 \times 10^{-3}$ kg

28. At the room temperature the velocity of sound in O$_2$ gas is $v$. Then in mixture of H$_2$ and O$_2$ gas the speed of sound at same temperature:

- (1) will be less than $v$
- (2) will be more than $v$
- (3) will be equal to $v$
- (4) nothing can be said

29. In a room where the temperature is 30ºC a body cools from 61ºC to 59ºC in 4 minute. The time taken by the body to cool from 51ºC to 49ºC will be:

- (1) 4 minute
- (2) 6 minute
- (3) 5 minute
- (4) 8 minute

30. Velocity of sound in air is 320 m/s. A pipe closed at one end has a length of 1 m neglecting end corrections, the air column in the pipe can resonate for sound of frequency:

- (a) 80 Hz
- (b) 240 Hz
- (c) 500 Hz
- (d) 400 Hz

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

31. Two spheres of the same material have radii 1 m and 4 m and temperature 4000 K and 2000 K respectively. The ratio of the energy radiated per second by the first sphere to that by the second is:

- (1) 1 : 1
- (2) 16 : 1
- (3) 4 : 1
- (4) 1 : 9

32. Frequency of tuning fork A is 256 Hz. It produces four beats/second with tuning fork B. When wax is applied at tuning fork B then 6 beats/second are heard. Frequency of B is:

- (1) 250 Hz
- (2) 260 Hz
- (3) 262 Hz
- (4) 1 & 3 both may possible
33. A black body at a temperature of 1640 K has the wavelength corresponding to maximum emission equal to 1.75 µ. Assuming the moon to be a perfectly black body, the temperature of the moon, if the wavelength corresponding to maximum emission is 14.35 µ is:
(1) 100 K  (2) 150 K  (3) 200 K  (4) 250 K

34. A wave travelling in positive X-direction with A = 0.2 m, velocity = 360 m/s and λ = 60 m, then correct expression for the wave is:
(1) \( y = 0.2 \sin \left[ 2\pi \left( 6t + \frac{x}{60} \right) \right] \)
(2) \( y = 0.2 \sin \left[ \pi \left( 6t + \frac{x}{60} \right) \right] \)
(3) \( y = 0.2 \sin \left[ 2\pi \left( 6t - \frac{x}{60} \right) \right] \)
(4) \( y = 0.2 \sin \left[ \pi \left( 6t - \frac{x}{60} \right) \right] \)

35. The figure shows the displacement time graph of a particle executing S.H.M. If the time period of oscillation is 2 s the equation of motion of its SHM is:
\[ x(\text{in mm}) \]
\[ 10 \quad 5 \quad 0 \quad t(s) \]

\[ (1) x = 10 \sin(\pi t + \pi/3) \quad (2) x = 10 \sin\pi t \]
\[ (3) x = 10 \sin(\pi t + \pi/6) \quad (4) x = 10 \sin(2\pi t + \pi/6) \]

36. The force constant of spring A is greater than that of spring B. If their lengths are elongated by same amount, which of the following statement is correct:
(1) the work done on A will be greater than that on B
(2) the work done on B will be greater than that on A
(3) work done on both the springs will be equal, if their initial lengths are same.
(4) work done on both of them will be equal

33. एक क्षृतिक का वर्तमान 640 K तथा प्रभाव जन्म उत्तर में कहीं के संगत गुरु 7.5 प्रति क्षृतिक के सहायक के स्थान हैं। चन्द्र जो के एक दृश्य क्षृतिक का वर्तमान मानते हैं, चन्द्र जो तथा प्रभाव जन्म उत्तर में कहीं के संगत गुरु 5.35 प्रति क्षृतिक हैं:
(1) 100 K  (2) 150 K  (3) 200 K  (4) 250 K

34. एक ग्रह जो स्थान को गतिकरण करता है तथा जिसका आयत मित्र = 0.2 मी, तो आयत = 360 मी / सेकंड गुरु 60 मी है। तब तरंग को रूपान्तरण के तरीके में गतिकरण है?
(1) y = 0.2 \sin \left[ 2\pi \left( 6t + \frac{x}{60} \right) \right] \)
(2) y = 0.2 \sin \left[ \pi \left( 6t + \frac{x}{60} \right) \right] \)
(3) y = 0.2 \sin \left[ 2\pi \left( 6t - \frac{x}{60} \right) \right] \)
(4) y = 0.2 \sin \left[ \pi \left( 6t - \frac{x}{60} \right) \right] \)

35. एक सल आग बर्तन गतिकरण करते हैं, का के विस्तार फर्क व संपातिक माध्यम 1 फिचवा नु मारपोह लाभ है। यदि दो वांक आग बर्तन दो सेकंड हैं तब इतने सल अगर गति की समीकरण होगी?
(1) \( x = 10 \sin(\pi t + \pi/3) \)
(2) \( x = 10 \sin\pi t \)
(3) \( x = 10 \sin(\pi t + \pi/6) \)
(4) \( x = 10 \sin(2\pi t + \pi/6) \)

36. निम्न आर तलाव में विस्तार रमण के अधिक करे गाया। यदि उसकी तलाव का हंस जो वर्तमान में सा न बिस्तर रमण के रूप से कहे नहीं हैं?
(1) A प्रक्षिप्त कर बा ये B प्रक्षिप्त गति का ये से अधिक करे गा।
(2) B प्रक्षिप्त कर बा ये A प्रक्षिप्त गति का ये से अधिक करे गा।
(3) दो ने प्रक्षिप्त कर बा ये सा नहीं गा विद्य उनकी प्रायोजन होगा और इसे या सा नहीं है।
(4) दो ने प्रक्षिप्त कर बा ये से दिने व सा नहीं गा।
37. The graph shows the variation of displacement of a particle executing S.H.M. with time. We infer from this graph that:

1. the force is zero at time $\frac{3T}{4}$
2. the velocity is maximum at time $\frac{T}{2}$
3. the acceleration is maximum at time $T$
4. the P.E. is equal to half of total energy at time $\frac{T}{2}$

![Graph showing variation of displacement with time](image)

38. A mass $m$ is suspended from a spring of length $l$ and force constant $K$. The frequency of vibration of mass is $f_1$. The spring is cut into three equal parts and the same mass is suspended from one of the parts. The new frequency of vibration of mass $m$ is $f_2$. Which of the following relations between the frequencies is correct?

1. $f_1 = \sqrt{3} f_2$
2. $f_1 = f_2$
3. $f_1 = 3f_2$
4. $f_2 = \sqrt{3} f_1$

39. Two particles execute S.H.M. of same amplitude and frequency along the same straight line. They pass one another when going in opposite directions, each time their displacement is $\frac{1}{\sqrt{2}}$ times of their amplitude. The phase difference between them is:

1. $30^\circ$
2. $60^\circ$
3. $90^\circ$
4. $120^\circ$
40. Two simple pendulums of lengths 1 meter and 16 meters respectively are both given small displacements in the same direction at the same instant. They will again be in same phase after the shorter pendulum has completed n oscillations where n is-

(1) \( \frac{1}{4} \)  
(2) \( \frac{4}{3} \)  
(3) 5  
(4) 4

41. A pendulum is suspended in a lift and its period of oscillation when the lift is stationary is \( T_0 \). What must be the acceleration of the lift for the period of oscillation of the pendulum to be \( \frac{T_0}{2} \) ?

(1) 2\( g \) downward  
(2) 2\( g \) upward  
(3) 3\( g \) downward  
(4) 3\( g \) upward

42. A man of mass 60 kg is standing on a platform which is oscillating up and down with frequency 2 oscillations/s and amplitude 50 cm. A machine on the platform indicates weights of the man with respect to time, then the maximum reading of the machine will be-

(g = 10 m/s\(^2\))

(1) 10 kg  
(2) 532.8 kg  
(3) 10\(^3\) kg  
(4) 10\(^4\) kg

43. A system is shown in the figure. The time period for small oscillations of the two blocks will be [Friction is absent]

\[ \text{Period} = 2\pi \sqrt{\frac{3m}{k}} \]

(1) \( 2\pi \sqrt{\frac{3m}{k}} \)  
(2) \( 2\pi \sqrt{\frac{3m}{2k}} \)  
(3) \( 2\pi \sqrt{\frac{3m}{4k}} \)  
(4) \( 2\pi \sqrt{\frac{3m}{8k}} \)
44. On a smooth inclined plane, a body of mass M is attached between two springs. The other ends of the springs are fixed to firm support. If each spring has force constant k, the period of oscillation of the body (assuming the springs as massless) is:

\[ T = \sqrt{\frac{2\pi^2 M}{k}} \]

\[ T = \sqrt{\frac{2\pi^2 M}{2k}} \]

\[ T = \sqrt{\frac{2\pi^2 M}{2Mg\sin^2 \theta}} \]

\[ T = \sqrt{\frac{2\pi^2 M}{2Mg}} \]

45. A particle is executing SHM according to \( x = a \cos \omega t \). Then which of the graphs represents variations of potential energy:

(1) (I) & (III)

(2) (II) & (IV)

(3) (I) & (IV)

(4) (II) & (III)
46. The correct increasing order of bond energy of the following is :-
   (1) N₂ < O₂ < Cl₂ < F₂  
   (2) Cl₂ < F₂ < N₂ < O₂  
   (3) F₂ < Cl₂ < O₂ < N₂  
   (4) O₂ < Cl₂ < F₂ < N₂  

47. Which arrangement represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species :-
   (1) S < O < Cl < F  
   (2) O < S < F < Cl  
   (3) Cl < F < S < O  
   (4) F < Cl < O < S  

48. Match List-I Atomic Number of Element) with List–II (Block to Which the Element Belongs) and select the correct answer using the codes given below the lists :-

<table>
<thead>
<tr>
<th>List-I (Atomic Number of Element)</th>
<th>List-II (Block to which the element belongs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) 24</td>
<td>(i) p</td>
</tr>
<tr>
<td>(B) 38</td>
<td>(ii) f</td>
</tr>
<tr>
<td>(C) 49</td>
<td>(iii) s</td>
</tr>
<tr>
<td>(D) 59</td>
<td>(iv) d</td>
</tr>
</tbody>
</table>

49. In which of the following arrangements, the order is not correct according to the property indicated against it :-
   (1) Increasing size : Al³⁺ < Mg²⁺ < Na⁺ < F⁻  
   (2) Increasing IE₁ : B < C < N < O  
   (3) Increasing EA₁ : I < Br < F < Cl  
   (4) Increasing metallic radius : Li < Na < K < Rb  

50. Which among the following factors is the most important in making fluorine, the strongest oxidising halogen :-
   (1) Bond dissociation energy  
   (2) Ionisation enthalpy  
   (3) Hydration enthalpy  
   (4) Electron affinity
51. Match List–I (Element) with List–II (Valency Shell Electronic Configuration) and select the correct answer using the codes given below the lists:

<table>
<thead>
<tr>
<th>List-I (Element)</th>
<th>List-II (Valency Shell Electronic Configuration)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Ag</td>
<td>(i) $4d^75s^1$</td>
</tr>
<tr>
<td>(B) Rh</td>
<td>(ii) $4d^85s^1$</td>
</tr>
<tr>
<td>(C) Pd</td>
<td>(iii) $4d^{10}5s^0$</td>
</tr>
<tr>
<td>(D) Ru</td>
<td>(iv) $4d^{10}5s^1$</td>
</tr>
</tbody>
</table>

Code:

<table>
<thead>
<tr>
<th>Code</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>(1)</td>
<td>i</td>
<td>iii</td>
<td>ii</td>
<td>iv</td>
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<tr>
<td>(2)</td>
<td>iv</td>
<td>ii</td>
<td>iii</td>
<td>i</td>
</tr>
<tr>
<td>(3)</td>
<td>i</td>
<td>ii</td>
<td>iii</td>
<td>iv</td>
</tr>
<tr>
<td>(4)</td>
<td>iv</td>
<td>iii</td>
<td>ii</td>
<td>i</td>
</tr>
</tbody>
</table>

52. Which of the following has highest ionic radius:

(1) $F^-$
(2) $B^{3+}$
(3) $O^{2-}$
(4) $Li^+$

53. Twelve silicate units combine to form the above structure. The formula of silicate is:

(1) $Si_{24}O_{36}$
(2) $Si_{23}O_{35}$
(3) $Si_{22}O_{34}$
(4) $Si_{23}O_{36}$

54. $P_4$ reacts with $O_2$ in presence of $N_2$ to form mainly:

(1) $P_4O_6$
(2) $P_4O_{10}$
(3) $H_3PO_3$
(4) $H_3PO_4$

55. Which of the following is true:

(1) Conduction in graphite is anisotropic
(2) Number of C-C bonds in fullerine is 60
(3) Number of pentagonal rings in fullerine is 40
(4) Graphite is unstable than diamond

56. Which reaction is correctly matched:

(1) $P_4 + NaOH \rightarrow NaH_2PO_2 + PH_3$; oxidation of NaOH
(2) $H_3PO_4 \rightarrow H_4P_2O_7$; hydrolysis
(3) $H_2S_2O_7 \rightarrow H_2S_2O_8$; decomposition
(4) $PCl_5 \rightarrow H_3PO_4$; hydrolysis
57. Which has tendency to form polymer.
   (1) BCl₃          (2) Be(OH)₂
   (3) Ba(OH)₂        (4) Ca(OH)₂

58. Na[B₃O₃(OH)₄] has
   (1) All triangular units
   (2) One triangular unit
   (3) All tetrahedral unit
   (4) One tetrahedral unit

59. Hardness in water can be removed by
   (1) Na₂B₄O₇·10H₂O     (2) Na₆P₆O₁₈
   (3) Both             (4) None

60. A diatomic molecule has a dipole moment of 1.2D. If the bond distance is 1.0 Å what fraction of an electronic charge exists on each atom?
   (1) 25%          (2) 33%
   (3) 45%          (4) 75%

61. Which decomposition is different from other :-
   (1) Ag₂CO₃        (2) Mg₂CO₃
   (3) Li₂CO₃        (4) PbCO₃

62. What is ∠HCH in cyclic C₃H₆?
   (1) 109°28'       (2) 114°
   (3) 180°          (4) 60°

63. Which of the following will disproportionate in water :-
   (a) Cl₂          (b) P₄
   (c) P₄O₁₀        (d) Na metal
   (1) a, b & c    (2) a & b
   (3) a, c, d     (4) only b

64. The thermal stability of II gp carbonate is :-
   (1) BeCO₃ > MgCO₃ > CaCO₃ > SrCO₃ > BaCO₃
   (2) BaCO₃ > SrCO₃ > MgCO₃ > CaCO₃ > BeCO₃
   (3) BeCO₃ < MgCO₃ < SrCO₃ < CaCO₃ < BaCO₃
   (4) BeCO₃ < MgCO₃ < CaCO₃ < SrCO₃ < BaCO₃

65. The extent of hydration of Li⁺ is α & extent of its hydrolysis is β then.
   (1) α > β       (2) α < β
   (3) α = β       (4) α ≤ β
66. Give the correct statement :
   (1) In Li+(aq) and Cs+(aq), Li+ will have relatively higher coordination number
   (2) TlI3 can’t exist due to inert pair effect
   (3) PbO2 is stronger oxidant than SnO2
   (4) Metal sulphides are more ionic than oxides.

67. In the molecule IF5, I–F bond is formed by the overlapping of –
   (1) sp3d2–s (2) sp3d2–2p
   (3) sp3d–2p (4) p–p (Colateral)

68. Which of the following pairs of molecule have bond order three and are isoelectronics :-
   (1) CN–, CO (2) NO+, CO+
   (3) CN–, O2+ (4) C2–, O2–

69. Which of the following is wrongly matched :-
   (1) WC – interstitial carbide
   (2) B4C – Ionic carbide
   (3) Mg2C3 – Allylide
   (4) Be2C – Methanide

70. The incorrect statement is :-
   (1) CH4 has six bond angles of 109°28'
   (2) ClF3 has one bond angle of 120°
   (3) NH3 has three bond angles of 107°
   (4) IF7 has ten bond angles of 90°

71. Which of the following pair of compounds have all three type of bonds :-
   (1) K2[CuCl4], KCN (2) NH4OH, CaCO3
   (3) KNO3, (NH4)2S (4) NaNO2, ZnCO3

72. Which orbital is not involved in the formation of PCl5 molecule :-
   (1) s (2) d2 (3) d2-2 (4) p2

73. Dative Bond is present in :-
   (1) KI (2) KNO2
   (3) KHF2 (4) All

74. Which of the following compound gives acidic and basic oxide on heating :-
   (1) Na2CO3 (2) MgCO3
   (3) ZnCO3 (4) PbCO3

75. Correct solubility order of compounds is :-
   (1) BeSO4 > MgSO4 > CaSO4
   (2) Be(OH)2 < Mg(OH)2 < Ca(OH)2
   (3) NaHCO3 < KHCO3 < RbHCO3
   (4) All

76. क्यों कहा जा सकता है?
   (1) Li+(aq) और Cs+(aq) में Li+ की सबसे बड़ी संख्या और क्षेत्रीय अधिक क्षमता है।
   (2) अक्सर हल्दी या वानस्पतिक लाइम के लिए ज्यादा अक्सर नहीं है।
   (3) PbO2 और SnO2 की औसत अधिकता के लिए बड़े हैं।
   (4) लीमी सैंडकॉर्सर, वे सबसे ज्यादा लाइम में अधिकता है।

77. IF5 और F2 बनाने के विभिन्न रूप में खनिज या हाइड्रोक्लोराइट नहीं हैं -
   (1) sp3d2–s (2) sp3d2–2p
   (3) sp3d–2p (4) p–p (सामान संख्या)

78. निम्न में से अनौपचारिक या अछुसा हैं -
   (1) CN–, CO (2) NO+, CO+
   (3) CN–, O2+ (4) C2–, O2–

79. निम्न में से खास न तो में लिख नहीं हैं वरना -
   (1) WC – अंतर ताल या बाल छोड़ ठहराना
   (2) C2– – अवस्थित या बाल एड
   (3) Mg2C3 – होली छोड़ ठहराना
   (4) Be2C – में ठहराना एड

80. बाल बन्ध नहीं है -
   (1) CH4 से 109°28' के 6 बंध वह पह है
   (2) ClF3 में एक बंध का 220° है
   (3) NH3 में 107° के 3 बंध के लिए है
   (4) IF7 में 90° के 10 बंध के पह है

81. निम्न में से खनिज गैर-अनुपान में सबसे बड़ी गैरों में तीन न पह है वह बंध उपस्थित है -
   (1) K2[CuCl4], KCN (2) NH4OH, CaCO3
   (3) KNO3, (NH4)2S (4) NaNO2, ZnCO3

82. PCl5 अनुपान के बनने में का नस का क्षमता क्षमता नहीं है लेब है -
   (1) s (2) d2 (3) d2-2 (4) p2

83. किसी उपचार या अंत बंध उपस्थित है -
   (1) KI (2) KNO2
   (3) KHF2 (4) सभी तीन

84. निम्न नालिके में से किस नालिके गिरने करते पह अंत या वह शारीरिक बनाना है -
   (1) Na2CO3 (2) MgCO3
   (3) ZnCO3 (4) PbCO3

85. वे गिरने की बिल्ले या क्षेत्र नहीं है -
   (1) BeSO4 > MgSO4 > CaSO4
   (2) Be(OH)2 < Mg(OH)2 < Ca(OH)2
   (3) NaHCO3 < KHCO3 < RbHCO3
   (4) सभी तीन
76. In which reaction hybridization of underlined atom does not changed :-

(1) \( BF_3 + F^- \rightarrow BF_4^- \)

(2) \( NH_3 + H^+ \rightarrow NH_4^+ \)

(3) \( BF_3 + NH_3 \rightarrow BF_3 \cdot NH_3 \)

(4) \( SiF_4 + 2F^- \rightarrow SiF_6^{2-} \)

77. Which can shows conductance :-

(1) \( PCl_5 \) (Solid)

(2) \( CaCl_2 \) (Molten)

(3) \( AlCl_3 \) (Molten)

(4) \( NaCl \) (Solid)

78. Which shows lowest density :-

(1) Sc

(2) Ti

(3) Cu

(4) La

79. Which element is common in Brass, Bronze and gun metal :-

(1) Sn

(2) Zn

(3) Cu

(4) All of these

80. Which of the following oxide is acidic in nature :-

(1) \( NiO \)

(2) \( ZnO \)

(3) \( CoO \)

(4) \( FeO \)

81. Which ion gives colored solution :-

(1) \( Cu^{+} \)

(2) \( Zn^{2+} \)

(3) \( Ag^{+} \)

(4) \( Fe^{2+} \)

82. Which of the following oxide is acidic in nature :-

(1) \( CrO \)

(2) \( Cr_2O_3 \)

(3) \( CrO_3 \)

(4) \( CrO_2 \)

83. \( Fe^{2+} \) is present in :-

(A) Green vitriol

(B) Prussian blue

(C) Mohr salt

(1) A, B

(2) A, C

(3) B, C

(4) A, B, C

84. Sodium reacts more vigorously than lithium because

(1) It is a metal

(2) It has higher atomic mass

(3) It is more electronegative

(4) It is more electropositive

85. Magnesium burns in air to give :-

(1) \( MgO \)

(2) \( MgCO_3 \)

(3) \( Mg_3N_2 \)

(4) (1) & (3) both
86. Which will give dihydrogen with highest purity?
   (1) Electrolysis of pure water
   (2) Electrolysis of saline water using Hg electrode
   (3) Electrolysis of Ba(OH)\(_2\) solution using Ni electrode
   (4) All

87. Which of the following reaction related to coal gasification is :-
   (1) Coal + O\(_2\) \(\rightarrow\) CO\(_2\) + H\(_2\)O
   (2) C + O\(_2\) \(\rightarrow\) CO\(_2\)
   (3) C + H\(_2\)O \(\rightarrow\) CO
   (4) C + H\(_2\)O \(\rightarrow\) CO\(_2\)

88. Change in oxidation state will be maximum for which of the underlined atoms :-
   (1) Fe \(\rightarrow\) HCl
   (2) Cr\(_2\)O\(_7\) \(\rightarrow\)
   (3) NH\(_4\)NO\(_2\) \(\rightarrow\)
   (4) FeSO\(_4\)(aq) + NO \(\rightarrow\)

89. Which of the following is an example of symmetrical H-bonding :-
   (1) F \(\cdots\) HF (2) HF \(\cdots\) HF
   (3) [Ni(dmg)\(_2\)] \(\rightarrow\) (4) (1) & (3) both

90. H\(^+\) ion has strong tendency to associate with other atom or molecules because :-
   (1) Resemblance with alkali metals
   (2) Resemblance with halogen
   (3) Size of order of nucleus
   (4) All
91. Read the following four statement (a-d) and answer as asked next to them:
(a) Locomotion is one of the significant features of living beings
(b) Streaming of protoplasm in the unicellular organism is a simple form of locomotion
(c) All locomotion are movements
(d) All movements are locomotions.
How many of the above statements are correct?
(1) Four (2) Three (3) Two (4) One

92. Which of the following is the feature on the basis of which any chemical cannot consider as growth inhibitor
(1) Responsiveness to wound & stress of biotic & abiotic origin
(2) Dormancy promotion
(3) Abscission promotion
(4) Delayin senescence

93. The total number of bones together in the fore limbs, ribs and vertebral column of human are?
(1) 80 (2) 100 (3) 110 (4) 140

94. PGR take part in :-
(1) Intrinsic control exclusively
(2) Intrinsic, Intercellular control exclusively
(3) Intrinsic intracellular control exclusively
(4) Intrinsic inter cellular control & assinsting of few external factor also

95. Identify the incorrectly matched pair.

<table>
<thead>
<tr>
<th>Pairs of skeletal parts</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Femur and radius</td>
<td>Appendicular skeleton</td>
</tr>
<tr>
<td>(2) Stapes and incus</td>
<td>Ear ossicles</td>
</tr>
<tr>
<td>(3) Skull and sternum</td>
<td>Axial skeleton</td>
</tr>
<tr>
<td>(4) Clavicle and scapula</td>
<td>Pelvic girdle</td>
</tr>
</tbody>
</table>

96. Select out the correct match :-
(1) Auxin    Break of dormancy
(2) Gibberellin Delay in senescence
(3) Cytokinin Root hair formation
(4) Ethylene Adventitious shoot formation
97. Which of the following pairs of structures is correctly matched with their correct description?

<table>
<thead>
<tr>
<th>Structure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Shoulder joint and elbow joint</td>
<td>Hinge joint</td>
</tr>
<tr>
<td>(2) Tibia and fibula</td>
<td>from parts of knee joint</td>
</tr>
<tr>
<td>(3) 11th and 12th pairs of ribs</td>
<td>False ribs and articulate indirectly with sternum</td>
</tr>
<tr>
<td>(4) Frontal and parietal</td>
<td>Bones of cranium</td>
</tr>
</tbody>
</table>

98. What will happen if seeds of winter varieties are allowed to be planted in spring? :-

1. No flowering
2. Flowering occur but no seed setting
3. Neither flowering nor seed setting
4. Either (1) or (2)

99. Sprain is :-

1. Stretching of tendon
2. Stretching of ligament
3. Stretching of muscle
4. Involuntary contraction in skeletal muscle

100. Which of the following is conclusion of given diagram? :-

1. Tip of coleoptile is the site of transmittable influence
2. Tip is the photoperceptive structure for phototaxis
3. Stump is the site of transmittable influence
4. Stump is the photoperceptive structure for phototropism
101. In the given diagram, the bones of the right arm is shown from front. It has certain mistakes in labelling. Two of the wrongly labelled bones are:

- Clavicle
- Ulna
- Humerus
- Scapula
- Radius
- Carpals
- Metacarpals
- Phalanges

Options:
1. Radius and carpels
2. Ulna and radius
3. Humerus and radius
4. Carpels and humerus

102. In the sequence of development process in plant life which of the following is correct:

1. Plasmatic growth always results in elongation
2. Plasmatic growth always results in cell division
3. Maturation is the result of differentiation
4. Mature cell never undergo senescence

103. The special contractile protein called actin is found in:

1. Thick filaments of A-bonds
2. Thin filaments of I-bonds
3. Both thick and thin filaments
4. Thick filaments of H-zone

104. Which of the following is an outcome of redifferentiation:

1. Callus formation from leaf
2. Interfascicular cambium
3. Tumour formation
4. Cork

Options:
1. A-bonds of the matrix tend to elongate
2. I-bonds of the matrix tend to elongate
3. Both thick and thin filaments of the matrix tend to elongate
4. Thick filaments of the matrix tend to elongate
105. During muscle contraction :-
   (1) Chemical energy is converted into the electrical energy
   (2) Electrical energy is converted into the mechanical energy
   (3) Chemical energy is converted into the mechanical energy
   (4) Mechanical energy is converted into the chemical energy

106. Regarding to growth which of the following is incorrect :-
   (1) It is most fundamental & conspicuous feature of living beings
   (2) It is metabolic process
   (3) It occur at expense of energy
   (4) One of the distinguishing feature of living beings.

107. The below diagram represents the TS of Gut. identify A, B, C and D :-

108. In C₄ plants significant number of ATP & NADPH + H⁺ required for biosynthetic phase are coming from :-
   (1) Photophosphorylation in mesophyll chloroplast
   (2) Photophosphorylation in Bundle sheath Chloroplast
   (3) Respiration in mesophyll cell
   (4) Non cyclic photophosphorylation of Bundle sheath cells
109. Match the columns and choose the correct option:

<table>
<thead>
<tr>
<th>Column-I</th>
<th>Column-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Salivary amylase</td>
<td>I. Proteins</td>
</tr>
<tr>
<td>B. Bile Salts</td>
<td>II. Milk proteins</td>
</tr>
<tr>
<td>C. Rennin</td>
<td>III. Starch</td>
</tr>
<tr>
<td>D. Pepsin</td>
<td>IV. Lipids</td>
</tr>
</tbody>
</table>

(1) A-III, B-IV, C-I, D-II  
(2) A-III, B-IV, C-II, D-I  
(3) A-IV, B-III, C-II, D-I  
(4) A-I, B-II, C-III, D-IV

110. Which of the following transfer of e⁻/H⁺ is passive:

(1) PS-II → Pheophytion  
(2) PS-I → FRS  
(3) Stromal H⁺ → Lumon  
(4) Luminal H⁺ → Stroma

111. Find out the incorrect sequence of substrate, enzyme and product:

(1) Small intestine : Proteins → Pepsin → Peptide → Amino acids  
(2) Stomach : Fats → Bile → Micelles  
(3) Duodenum : Triglycerides → Lipase → Dioglycerides  
(4) Small intestine : Starch → α-Amylase → Maltose

112. Select out the incorrect statement about photophosphorylation:

(1) \( \text{O}_2 \) production = Net consumption of \( 2\text{H}_2\text{O} \)  
(2) \( \text{O}_2 \) production = Exposure of 8 photons on PS-II  
(3) \( \text{O}_2 \) production = Excitations of 4 e⁻ from PS-II  
(4) \( \text{O}_2 \) production = Excitation of 4e⁻ from PS-I

113. In addition to neural control, hormones also influence the:

(1) Gastric secretions  
(2) Intestinal secretions  
(3) Muscular activities of different parts of alimentary canal  
(4) All

114. Photochemical phase does not includes:

(1) Photosplitting of water  
(2) Formation of ATP & NADPH  
(3) Release of \( \text{O}_2 \)  
(4) Fixation of \( \text{CO}_2 \)
115. Which of the following statements is false?
(1) The break down of most of biomacromolecules occurs in duodenum.
(2) Simple substances (digested foods) are absorbed in the jejunum and ileum.
(3) Very significant digestive activity occurs in small intestine.
(4) Digested and absorbed substances are passed on to the large intestine.

116. Regarding to absorption and action spectrum which of the following is correct:-
(1) Absorption and action spectrum show one to one overlap.
(2) Action of blue is highest while absorption of Red is maximum.
(3) Absorption depends on chemical nature of pigment while action depends on suitability of progression of ETC.
(4) Absorption and action spectrum does not show any kind of resemblance.

117. Which of the following is not the function of large intestine?
(1) Absorption of some water, minerals and certain drugs.
(2) Nutrient absorption.
(3) Secretion of mucus to lubricate faeces.
(4) Temporary storage of faeces in rectum.

118. During Oxidation of glucose how many dehydrogenations occur in mitochondrial matrix:
(1) Ten (2) Six (3) Twelve (4) Eight

119. Read the following statement (a–d) and answer as asked next to them:-
(a) The water we take plays an important role in metabolic processes and also prevents dehydration of the body.
(b) Digestion is carried out by our digestive system by mechanical and biochemical methods.
(c) Oral cavity has a number of teeth and a muscular tongue.
(d) All mammals including human beings forms two act of teeth during their life.

How many of the above statements are correct?
(1) Four (2) Two (3) Three (4) One

120. Formation of succinyl CoA from Isocitric acid is the result of:-
(1) Two decarboxylation
(2) Two dehydrogenation
(3) Two decarboxylations and one oxidation
(4) Two decarboxylation and two oxidations.
121. How many enzymes in the list given below work in the Alkaline medium?
   Enterokinase, Chymotrypsin, Aminopeptidase, Pepsin, Lactase, Rennin, Carboxypeptidase, Nuclease.
   (1) Six (2) Three (3) Four (4) Five

122. Which of the following is common in both alcoholic fermentation and lactic acid fermentation?
   (1) Pyruvate decarboxylase (2) Lactate dehydrogenase (3) Reoxidation of NADH to NAD⁺ (4) Alcoholic dehydrogenase

123. Which one of the following items gives its correct total number?
   (1) Types of diabetes – 3 (2) Cervical vertebrae in humans – 8 (3) Floating ribs in humans – 4 (4) Amino acids found in proteins – 16

124. Regarding to glycolysis which of the following is incorrect?
   (1) Partial oxidation (2) In anaerobes the only process of energy (3) Oxidative decarboxylation (4) Core respiration

125. Identify the correct and incorrect match about respiratory volume and capacities and mark the correct answer.
   i. **Inspiratory capacity (IC) = Tidal Volume + Residual Volume**
   ii. **Vital Capacity (VC) = Tidal Volume (TV) + Inspiratory Reserve Volume (IRV) + Expiratory Reserve Volume (ERV).**
   iii. **Residual Volume (RV) = Vital Capacity (VC) – Inspiratory Reserve Volume (IRV)**
   iv. **Tidal Volume (TV) = Inspiratory Capacity (IC) – Inspiratory Reserve Volume (IRV)**

   Options:
   (1) (i) Incorrect, (ii) Incorrect, (iii) Incorrect, (iv) Correct
   (2) (i) Incorrect, (ii) Correct, (iii) Incorrect, (iv) Correct
   (3) (i) Correct, (ii) Correct, (iii) Incorrect, (iv) Correct
   (4) (i) Correct, (ii) Incorrect, (iii) Correct, (iv) Incorrect
126. **Respiration is the:**
(1) Amphibolism
(2) Production of usable energy currency
(3) Source of carbon skeletons for synthesis of other useful compounds
(4) All the above

127. The oxygen-haemoglobin dissociation curve will show a right shift in case of:
(1) High pCO₂
(2) High pO₂
(3) Low temperature
(4) Less H⁺ concentration

128. Select out the incorrect statement about deficiency symptoms of essential elements:
(1) These are morphological changes
(2) Deficiency symptoms vary from element to element
(3) They can be overcome by providing to plant
(4) The parts of the plants that show the deficiency symptoms does not depend on mobility of element in plant body

129. Match the terms given under Column ‘I’ with their functions given under Column ‘II’ and select the answer from the options given below:

<table>
<thead>
<tr>
<th>Column-I</th>
<th>Column-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Lymphatic System</td>
<td>i. Carries oxygenated blood</td>
</tr>
<tr>
<td>B. Pulmonary vein</td>
<td>ii. Immune Response</td>
</tr>
<tr>
<td>C. Thrombocytes</td>
<td>iii. To drain back the tissue fluid to the circulatory system</td>
</tr>
<tr>
<td>D. Lymphocytes</td>
<td>iv. Coagulation of blood</td>
</tr>
</tbody>
</table>

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

130. Manganese is not associated with activation of enzymes of which of the following process:
(1) Photosynthesis
(2) Respiration
(3) Nitrogen Metabolism
(4) Flowering
131. Match the abnormal conditions given in Column-I with their explanations given in Column-II and Choose the correct option

<table>
<thead>
<tr>
<th>Column-I</th>
<th>Column-I</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Glycosurea</td>
<td>Accumulation of uric acid in joints</td>
</tr>
<tr>
<td>B. Renal calculi</td>
<td>Inflammation in glomeruli</td>
</tr>
<tr>
<td>C. Glomerular nephritis</td>
<td>Mass of crystallised nephritis salts within the kidney</td>
</tr>
<tr>
<td>D. Gout</td>
<td>Presence of glucose in urine</td>
</tr>
</tbody>
</table>

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

132.

In this given diagram A is significant because:

(1) It facilitate root respiration  
(2) It increase surface area of root  
(3) It facilitate root photosynthesis  
(4) All of these

133. Which one of the following options is incorrect?

(1) Hinge joint – between Humerus and Pectoral girdle  
(2) Pivot joint – between atlas, axis and occipital condyle  
(3) Gliding joint – between the carpals  
(4) Saddle joint – between carpel and metacarpals of thumb

134. In hydroponics method which of the following is not required :-

(1) Purified water  
(2) Purified mineral salts  
(3) Purified organic nutrient  
(4) Small sized plant

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**MAJOR TEST**

**26-03-2013**

131. बाँ कुमें दो गई अख गई पर्सियश्त कियों। का बाँ कुमें दो गई उनकी य खा अभिनेत के धैर्मिक और फिर वही विकट पच निष्ठ।

<table>
<thead>
<tr>
<th>वे खं</th>
<th>वे खं</th>
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</thead>
<tbody>
<tr>
<td>A. गर्लेकें सूर सिख</td>
<td>i. जोड़े, जों में सूर फिन आकर का पत्ताजिल हो, जाना</td>
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<td>B. बूंकं की फाय ती</td>
<td>ii. बूंकं के के शिक का गूस छोते। ना सूर जाना</td>
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<tr>
<td>C. गर्लेमें रुला ने प्रि हिट बूंकं के में टीकटली बागे क्यों पेड़ शूल आगामी।</td>
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<td>D. गाउट</td>
<td>iv. मूंत्र में रुल को जानी उ पर्सियश्त ति</td>
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132.

सिद्धांत गर्म चित्र बोधी के बहार व निष्ठ में से जिसके संदेश में है नेक है?

(1) रू मूंल के बहार में खाय कहाँ है?
(2) रू मूंल के भगीरथ बोधी बहार है?
(3) रू मूंल के बाल के बोधी के संदेश के पर्सियश्त कहाँ है?
(4) उ बोधी के बाल कहाँ?

133. निर्देश निष्ठ में से के के न-ह विकट पत्ता है?

(1) के उ संदेश चुका मासाबर और अंग वह खाय के बी च
(2) हु रा गा-बैनिके पैंए साले और अंग का लावर्श यं के दां बी बी बी बी
(3) बिसीं संदेश पैंए सके बी च
(4) सेद लं संदेश गो दृश्य से के बार लावर्श में टा बार लावर्श के बी बी बी बी

134. ज्ञान संयम न तकनी (हाइड्रो) बें निष्ठ में से जिसे अ विश्वनार हो या ही है?

(1) पर्सियश्त दिला 
(2) पर्सियश्त दिला नी जलकण 
(3) पर्सियश्त दिला बंब निक पैंए क 
(4) थुंटे अ बार के पदन
135. Which one of the following is not a disorder of bone?  
(1) Arthritis  
(2) Osteoporosis  
(3) Rickets  
(4) Atherosclerosis

136. Movement of water in main stem xylem is mainly governed by :-  
(1) $\Psi_S$  
(2) $\Psi_p$  
(3) $\Psi_g$  
(4) $\Psi_M$

137. Which one of the following statements is true:  
(1) Head of humerus bone articulates with acetabulum of pectoral girdle.  
(2) Head of humerus bone articulates with glenoid cavity of pectoral girdle.  
(3) Head of humerus bone articulates with a cavity called acetabulum of pelvic girdle.  
(4) Head of humerus bone articulates with a glenoid cavity of pelvic girdle.

138. What force does a plant use to move water molecules into leaf parenchyma cells where they are needed :-  
(1) Evaporation tension  
(2) Cohesive force  
(3) Adhesive force  
(4) Tensile strength

139. During swallowing of food which of the following structures prevent the entering of food into the glottis ?  
(1) Semilunar Valve  
(2) Circular Muscular flap  
(3) Cartilaginous flap  
(4) Circular sphincter

140. Capillarity is the ability to rise in thin tubes in plants this ability is aided by :-  
(1) Lignified walls of tracheary elements  
(2) Small diameter of tracheary elements  
(3) Root pressure  
(4) Lateral pores in tracheary elements

141. Ventricular systole is due to the activity of :-  
(1) Organ system  
(2) Organ  
(3) Tissue  
(4) Cell

142. Which of the following is thought to be responsible to force the inner walls into a crescent shape :-  
(1) Bulge out of outer walls of guard cells  
(2) Radially oriented microfibrils  
(3) Differential thickening of walls  
(4) All the above
143. Which one of the following is correct regarding the excretion?
(1) Large amount of water from renal filtrate is reabsorbed in DCT and a less amount is reabsorbed by PCT
(2) The descending limb of loop of Henle is completely impermeable to NaCl salt.
(3) Malpighian corpuscle is found in medulla region of kidney.
(4) The colour of urine is pale yellow and is slightly alkaline in nature.

144. The immediate cause of opening or closing of the stomata is a change in:
(1) Osmotic pressure of Guard cells
(2) Turgidity of Guard cells
(3) Turgidity of subsidiary cells
(4) pH of guard cells

145. The conducting part of the respiratory tract does not help in:
(1) Transport the atmospheric air to the alveoli.
(2) Clear air from foreign particles
(3) Humidify and bring the air to body temperature
(4) Diffusion of \( O_2 \) and \( CO_2 \) between blood and air

146. In this given diagram which of the following condition will not set up equilibrium:
(1) By applying external pressure in funnel
(2) By decreasing solute concentration in funnels
(3) By decreasing solute concentration in beaker
(4) By increasing solute concentration in beaker
147. Which one of the following statement is incorrect?
   (1) The Principle of countercurrent flow facilitates efficient respiration in gills of fishes.
   (2) In insects, circulating body fluids serve to distribute oxygen to tissues.
   (3) The residual air in lungs slightly decreases the efficiency of respiration in mammals.
   (4) The Presence of non-respiratory air sacs, increase the efficiency of respiration in birds.

148. Regarding to membrane transport select out the incorrect statement :-
   (1) Protein channels of plasma membrane are not strictly always open
   (2) Porins are responsible for construction of membrane channels
   (3) Across plasma membrane water always move through water channels
   (4) Water can also move through lipid molecules

149. In which of the following nitrogenous waste removal kidney does not play any significant role?
   (1) Urea  (2) Uric acid  (3) Ammonia  (4) Amino acids

150. Select out the correct match about Nodule formation :-
   (1) Chemotactic agents = Bacteria
   (2) Nod factor = Plant
   (3) Infection thread = Plant
   (4) Globin of Leg Hb = Bacterioids

151. Which substances are reabsorbed actively in nephron?
   (1) Glucose, water
   (2) Glucose, Na^+
   (3) Amino acids, Urea
   (4) Na^+, water
152. Glucose

3-Phosphoglyceric acid

Pyruvic Acid

D + CO₂

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<tbody>
<tr>
<td>1</td>
<td>PGAL</td>
<td>PEP</td>
<td>C₂H₅OH</td>
<td>Lactic Acid</td>
</tr>
<tr>
<td>2</td>
<td>PGAL</td>
<td>PEP</td>
<td>Lactic Acid</td>
<td>C₂H₅OH</td>
</tr>
<tr>
<td>3</td>
<td>G-6-P</td>
<td>2-PGA</td>
<td>C₂H₅OH</td>
<td>Lactic Acid</td>
</tr>
<tr>
<td>4</td>
<td>F-6-P</td>
<td>PEP</td>
<td>Lactic Acid</td>
<td>C₂H₅OH</td>
</tr>
</tbody>
</table>

153. Which of the following groups of animals are ammonotelic in nature?

1. Many bony fishes, amphibians, Insects
2. Marine fishes, amphibians, aquatic insects
3. Mammals, Birds, Reptiles
4. Many bony fishes, aquatic amphibians, Aquatic insects

154. Select out the incorrect match regarding to enzyme and their cofactor:

1. Carboxypeptidase = Zn
2. Catalase = Haem
3. Alcoholic dehydrogenase = Ca²⁺
4. Pyruvate dehydrogenase= Mg²⁺

155. An artificial pacemaker is implanted subcutaneous and connected to the heart in patients:

1. having 90% blockage in the three main coronary arteries
2. Having a very high blood pressure
3. With irregularity in the heart rhythm
4. Suffering from arteriosclerosis
156.
Which of the following is not correct match:-
(1) Exclusive non cyclic process = A
(2) Exclusive side of Cyclic process = B
(3) Both cyclic a non cyclic = A
(4) Biosynthesis of sucrose = D

157.
When there is a sudden loss of blood from the body, the organ which supplies blood is ?
(1) Heart (2) Lung (3) spleen (4) Liver

158.
For given diagram select the incorrect option:
(1) A path of water and mineral absorption can be achieve in uninterrupted manner
(2) B path can not be achieve in uninterrupted manner
(3) Path B is most rapid and not affected by metabolic inhibitors
(4) Path A is fast up to inner cortical cells and slow from endodermis onwards

159. Which of the following changes can occur in response to increased Angiotensin-II level ?
(1) Decrease in GFR 
(2) Inhibition of aldosterone
(3) Decrease in BCOP
(4) Increase in the glomerular blood pressure
160. Which of the following criterion does not assist to determine essentiality of minerals :-
(1) It's requirement should be absolute
(2) It's requirement should be non specific
(3) It should be directly involved in metabolism
(4) On short supply of it plant should not be capable to complete their life cycle

161. Which statements is incorrect?
(1) Volume of air remaining in the lungs after a normal breathing is 2300 ml
(2) Inspiration can occur if the pressure within the lungs is less than atmospheric pressure
(3) A healthy man can inspire or expire approximately 6000 to 8000 ml of air per minute
(4) When the \( P_{CO_2} \) is high and \( P_{O_2} \) is low as in the alveoli, dissociation of \( CO_2 \) from carbamino-haemoglobin takes place

162. Which of the following is the object of given technique :-
(1) Identification of essential elements
(2) Discovery of deficiency symptoms
(3) Economic utilisation of minerals
(4) Both (1) & (2)

163. Partial pressure of carbon dioxide in Alveoli, atmospheric air and tissues will be :-
(1) 0.3, 40, 45
(2) 40, 0.3, 45
(3) 0.3, 104, 28
(4) 40, 0.3, 28
164. Given below is a sectional view of adrenal gland, mark the option with correct informations about the structures labelled as A and B in the same?

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
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<tbody>
<tr>
<td>1</td>
<td>Secretes</td>
<td>Secretes corticoides</td>
</tr>
<tr>
<td></td>
<td>catecholamines</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Regulated by</td>
<td>Regulated by our</td>
</tr>
<tr>
<td></td>
<td>pituitary gland</td>
<td>will power</td>
</tr>
<tr>
<td>3</td>
<td>Secretes steroid</td>
<td>Secretes hormones of</td>
</tr>
<tr>
<td></td>
<td>hormones</td>
<td>fight and flight</td>
</tr>
<tr>
<td>4</td>
<td>Ectodermal in origin</td>
<td>Mesodermal in origin</td>
</tr>
</tbody>
</table>

165. Which of the following helps in current flow on the inner surface of an axon from site-A to site-B as shown in the figure given below?

(1) Negatively charged proteins
(2) Nissl's granules
(3) Neurofibrils
(4) Neurilemma
166. How many hormones in the list given below?
(A) Thyroid hormone, Epinephrine, GnRH, FSH,
(B) Prolactin, Cortisol, Aldosterone, Glucagon,
(C) Insulin acts mainly on hepatocytes and adipocytes, and inhibits cellular glucose utilisation and glycogenolysis in target cells.
(D) Thymus enlarges in size with age and due to increased production of thymosins, immune responses become strong in old persons.
Which of the above statements are not correct:
(1) B and C
(2) D and E
(3) B, D and E
(4) B, C and E

167. Mark the incorrect one regarding the structures of a nerve cell?
(1) Dendrites - short and branched fibres which contain receptor proteins on their surface
(2) Nissl's granules - found in cyton, dendrites and axon part of neurons
(3) Axon - Functional part of neuron that transmit impulses away from the cyton
(4) Schwann cell - Synthesises myelin sheath around axons in spinal and cranial nerves.

168. How many hormones in the list given below interacts with intracellular receptors and mostly regulate gene expression.
Thyroid hormone, Epinephrine, GnRH, FSH, Prolactin, Cortisol, Aldosterone, Glucagon, Testosterone, Estradiol, Progesterone.
(1) Seven
(2) Six
(3) Four
(4) Five

169. All of the following show faster conduction of nerve impulses except one?
(1) Myelinated fibres than non-myelinated fibres
(2) Electrical synapses than chemical synapses
(3) Thick nerve fibre than thin nerve fibre
(4) Polysynaptic arch than monosynaptic arch

166. निम्न लिस्ट (A-E) के प्रत्येक या तो एक अथवा दो ट्रांसफार्म जारी है?
(A) सेक्रेटिन चिपयह रासायनिक ज्ञाता एवं प्रभावक को कार्य करता है, या उसका 
(b) जा उसका वापस जाता है, एवं अगर 
(RBC) उर्मक्करण के प्रवहित करता है.
(B) इलियुस ग्रांडिया वेव से एच खराब होता है एवं RBC उर्मक्करण के प्रवहित करता है.
(C) जब ध्वनि का बढ़ता है, तो वह ध्वनि का एक्सप्रेस करता है, एवं उसके द्वारा गोश्ती का दर्जा तो है।
(D) इन से रियूम बाएं हिपोटेनुस खाना लख वा त्वचा का प्रकार उत्तर फाइडे का प्री करता है?
(E) उन्हें स्त्री था और उन्हें बुद्धिमत्ता खाना रखता है।
(A) वह हाथ पर नहीं है और उसकी नीचा पुलिंग है?
(B) जो दो बाटों का उत्तर खाता है?
(1) 7, (2) 6
(3) 4, (4) 5

167. त्रिक्ष को विनियम को संरचना अंक के संदर्भ में गल चु निये?
(1) डे. = तु या, ट्याट्स या खिल तु जिकी चह पहुंच हो भी, ना दी हों तो है?
(2) विनियम का का एक गर्मी न का उत्तर ने, डे. = डे. छ� एंट साथ भी?
(3) उन बन या, या बन का चिपक मध्य गज और गज जो के साथ पड रहे जाते है?
(4) जो न से, जो न से, या बन का चिपक मध्य गज और मा इलियुस या बन का संगठन प संक्रमण करता है?

168. त्रिक्ष के छोड़ दें, कर नितिन का चर्चा लें अ वे गज का त्रि बज संबंध हों तो?
(1) स त (2) छ
(3) च र (4) प च

169. विभेद के चौड़ा डा, कर नितिन का आ लें अ वे गज का त्रि बज संबंध हों तो?
(1) ज फ देहि न तंत्रिका तंत्रिका तंत्रिका हों तो उनका त्रि बज में आ बजता है?
(2) या व्यवस्थित से चिपकी न का उल्लंघन में एक्सप्रेस रहता है चिपकी पिसा?
(3) फले तंत्रिका तंत्रिका हों तो उनका त्रि बज में आ बजता है?
(4) मोल अंतिक टिक क पकी उल्लंघन में एक्सप्रेस रहता है?
170. Which of the following chemical acts as second messenger for the hormones which interacts with membrane-bound receptors of target cell?

(1) CAmp and CGmp  (2) IP$_3$ and DG
(3) Ca$^{2+}$ ions  (4) All of these

171. Select the option in which the part of brain is not correctly matched with its function ?

(1) Association area - Responsible for complex functions like intersensory association, memory and communication.
(2) Thalamus - Acts as relay centre of brain and co-ordinates sensory and motor signalling.
(3) Hippocampus - Transformation of short term memory into long term memory.
(4) Limbic system - Regulates sexual behaviour, emotions and motivation alone, without any help of other part of brain.

172. Which of the following is not a function of glucocorticoides, particularly cortisol?

(1) Stimulate gluconeogenesis, lipolysis and proteolysis
(2) Involved in maintaining the cardio-vascular system as well as the kidney function
(3) produces anti inflammatory reaction and suppresses the immune response
(4) Suppresses production of WBCs and RBCs

173. Given below is a diagrammatic presentation of a knee-jerk reflex, which one of the following structure (A to F) is not functionally involved in this monosynaptic reflex?

![Diagram of Knee-Jerk Reflex](image)
174. Which of the following is not a pair of antagonistic hormones?
   (1) Thyrocalcitonin and PTH
   (2) Insulin and glucagon
   (3) Somatostatin and growth hormone releasing hormone
   (4) Adrenaline and Nor-adrenaline

175. Which of followings are the changes occurring in the axon immediately. After an optimum stimulus is applied on its one end (site A)?
   a - The membrane at site -A becomes freely permeable to Na⁺
   b - Opening of Na⁺ VGC
   c - Opening of K⁺ VGC
   d - The Rapid influx of Na⁺
   e - The polarity of the membrane at site-A is reversed

176. Which of the following hormone is responsible for maintaining normal rhythms of sleep-wake cycle and also influences metabolism, menstrual cycle and our defense capability?
   (1) Somatostatin of hypothalamus
   (2) Adrenaline of adrenal gland
   (3) Melatonin of pineal gland
   (4) Thymosin of thymus

177. Given below is figure showing sectional view of cochlea of your internal ear, with structures labelled as A, B, C, D, E and F?

Which one among the above structure acts as centre of hearing and contains hair cells as auditory receptors.

(1) A  (2) C  (3) D  (4) D and F
178. Consider the following facts?
   (i) Non-nutrient chemicals
   (ii) Acts as intercellular messengers
   (iii) Produced in trace amount
   (iv) Produced by ductless glands
   (v) Transported to a distantly located target organ through blood
   (vi) Can be reused in metabolic reactions like enzymes
   (vii) Complex protein molecules with high molecular weight.

How many of the above facts are correct for a hormone molecule:
(1) Three  (2) Four  (3) Five  (4) Six

179. Given below are some terms related with our vision?
   a - Day light vision
   b - Photopic vision
   c - Colour vision
   d - Twilight vision
   e - Scotopic vision

How many of them are correct for rod cells:
(1) Two  (2) Three  (3) Four  (4) All five

180. Which of the following is visible, coloured and opaque portion of our eye?
   (1) Sclera  (2) Cornea  (3) Iris  (4) Lens

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Your moral duty is that to prove ALLEN is ALLEN
Your Target is to secure Good Rank in Pre-Medical 2013