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 3 Hours and Questions Paper Contains 180 Questions. The Max. Marks are 720.

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 4 marks, while 1 mark will be deducted for every wrong answer. Guessing of answer is harmful.

7. A candidate has to write his / her answers in the OMR sheet by darkening the appropriate bubble with the help of Blue / Black Ball Point Pen only as the correct answer(s) of the question attempted.

8. Use of Pencil is strictly prohibited.
1. A tube of semicircular cross section contains some liquid and is placed vertically. The angle of contact is zero. The ratio of forces due to surface tension for circular and plane portion of the tube is :-
   (1) 1 : 1   (2) \( \pi : 2 \)
   (3) 2 : \( \pi \)   (4) none of these

2. Out of following which equation is related with S.H.M. :-
   (1) \( Y = A \sin^2 \omega t \)
   (2) \( Y = A \sin^3 \omega t \)
   (3) \( Y = A \sin(\omega_1 t) \cos(\omega_2 t) \)
   (4) \( Y = A \tan \omega t \)

3. A solid sphere of radius \( R \) and of bulk modulus \( K \) is immersed in a liquid contained in a cylindrical vessel. A piston of area \( A \) and of negligible weight floats on the surface of the liquid. When a weight \( M \) is placed on the piston to compress the liquid, the variation \( \delta R/R \) in the radius of the sphere will be :-
   (1) \( Mg/Ak \)   (2) \( Mg/3AK \)
   (3) \( 3Mg/3AK \)   (4) \( 3Mg/AK \)

4. In open organ pipe open end, compression is reflected. In the form of :-
   (1) Compression
   (2) Rarefaction
   (3) Not reflected
   (4) May be compression may be rarefaction

5. A manometer connected to a closed tap reads \( 3.5 \times 10^5 \) N/m\(^2\). When the valve is opened, the reading of manometer falls to \( 3.0 \times 10^5 \) N/m\(^2\), then velocity of flow of water is :-
   (1) 100 m/s   (2) 10 m/s
   (3) 1 m/s   (4) \( 10\sqrt{10} \) m/s

6. In resonance tube experiment first resonating length is 17 cm and value of end correction is 2 cm then second resonating length is :-
   (1) 55 cm   (2) 51 cm
   (3) 54 cm   (4) 53 cm
7. A square plate of 0.1 m side moves parallel to a second plate with a velocity of 0.1 m/s, both plates being immersed in water. If the viscous force is 0.002 N and the coefficient of viscosity is 0.01 poise, distance between the plates in m is:
   (1) 0.1  (2) 0.05  (3) 0.005  (4) 0.0005

8. A wave represented by the equation $y = \cos(kx - \omega t)$ is superposed with another wave to form a stationary wave such that the point $x = 0$ is a node. The equation for the other wave is:
   (1) $\sin(kx + \omega t)$  (2) $-\cos(kx + \omega t)$
   (3) $-\cos(kx - \omega t)$  (4) $\sin(kx - \omega t)$

9. An application of Bernoulli's equation for fluid flow is found in:
   (1) Dynamic lift of an aeroplane  (2) Viscosity meter  (3) Capillary rise  (4) Hydraulic press

10. If two tuning forks of frequencies 512 Hz and 532 Hz are sounded together, beats produced and heard are respectively:
    (1) 20 and 20  (2) 20 and 0  (3) 0 and 20  (4) 0 and 0

11. If the temperature of a black body is tripled, then the amount of energy radiated will become:
    (1) 27 times  (2) 81 times  (3) 3 times  (4) 9 times

12. A sound wave is passing through an air column during the consequent compressions and rarefactions:
    (1) Boyle's law is obeyed  (2) Total amount of heat remains constant  (3) Density of air remains constant  (4) Bulk modulus of air oscillates
13. A uniform metallic rod rotates about its perpendicular bisector with constant angular speed. If it is heated uniformly to raise its temperature slightly: -
(1) Its angular speed of rotation increases
(2) Its angular speed of rotation decreases
(3) Its angular speed of rotation remains same
(4) Its angular speed increases because its momentum of inertia increases

14. A closed organ pipe and an open organ pipe have their first overtones identical in frequency. Their lengths are in the ratio: -
(1) 1 : 2  (2) 2 : 3  (3) 3 : 4  (4) 4 : 5

15. Water flows in a streamlined manner through a capillary tube of radius \( a \), the pressure difference being \( P \) and the rate of flow \( Q \). If the radius is reduced to \( a/2 \) and the pressure increased to \( 2P \), the rate of flow becomes: -
(1) \( 4Q \)  
(2) \( Q \)  
(3) \( \frac{Q}{4} \)  
(4) \( \frac{Q}{8} \)

16. The speed of transverse waves in a stretched string is 700 cm/s. If the string is 2 m long, the frequency with which it resonates in fundamental mode is: -
(1) \( (7/2) \) Hz  
(2) \( (7/4) \) Hz  
(3) \( (14) \) Hz  
(4) \( (2/7) \) Hz

17. The temperature entropy diagram a reversible engine cycle is given in the figure. Its efficiency is:
(1) \( \frac{2}{3} \)  
(2) \( \frac{1}{3} \)  
(3) \( \frac{1}{4} \)  
(4) \( \frac{1}{4} \)

18. Velocity of sound in air 320 m/s. A pipe closed at one end has a length of 1m. Neglecting end correction, the air column in the pipe can resonate for sound of frequency: -
(a) 80 Hz  
(b) 240 Hz  
(c) 320 Hz  
(d) 400 Hz
(1) Only a  
(2) Only a & d  
(3) a, b, d  
(4) a, b, c
19. In a particular experiment an ideal gas undergoes adiabatic expansion satisfying the equation \( VT^{3/2} = \text{const.} \). Therefore, the ratio of specific heats \( \gamma \) is:

- (1) 1.5
- (2) 3
- (3) \( \frac{5}{3} \)
- (4) \( \frac{4}{3} \)

20. In an organ pipe at displacement-nodes:

- (1) Pressure is maximum
- (2) Sound is maximum
- (3) Particle speed is minimum
- (4) All of above

21. In a pressure cooker the cooking is fast, because:

- (1) The boiling point of water is raised by increased pressure inside the cooker
- (2) The boiling point of water is lowered by pressure
- (3) More steam is available to cook the food at 100°C
- (4) More pressure is available to cook the food at 100°C

22. Pressure is increased by 1 atmosphere and temperature also increased by 1°C, velocity of sound:

- (1) increases by 61 m/s
- (2) decreases by 61 m/s
- (3) increases by 0.61 m/s
- (4) decreases by 0.61 m/s

23. The ratio of momentum of \( \text{H}_2 \) and \( \text{O}_2 \) gas at same temperature is:

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

24. Amplitude of a wave represented by the displacement equation:

\[ y = \frac{1}{\sqrt{a}} \sin \theta \pm \frac{1}{\sqrt{b}} \cos \theta \]

will be:

- (1) \( \sqrt{\frac{a+b}{ab}} \)
- (2) \( \sqrt{\frac{a-b}{ab}} \)
- (3) \( \sqrt{\frac{a+\sqrt{b}}{ab}} \)
- (4) \( \sqrt{\frac{a-\sqrt{b}}{ab}} \)

25. An equation is given here:

\[ \left( P + \frac{a}{V^2} \right) = \frac{B}{V} \]

where \( P \) = Pressure, \( V \) = Volume, \( a \) and \( B \) are constant.

What will be the dimension formula of \( B \)?

- (1) \( ML^2T^{-2} \)
- (2) \( M^1L^2T^{-2} \theta^{-1} \)
- (3) \( M^1L^2T^{-2} \) mol
- (4) \( M^1L^2T^{-2} \)

26. An equation is given here:

\[ \frac{2}{a} \left( \frac{P}{B} \right) = \sqrt{\frac{a}{V^2}} \]

where \( a \) = const. What will be the dimension formula of \( B \)?

- (1) \( ML^2T^{-2} \)
- (2) \( M^1L^2T^{-2} \theta^{-1} \)
- (3) \( M^1L^2T^{-2} \) mol
- (4) \( M^1L^2T^{-2} \)
26. As a wave propagates, correct statement is :-
   (1) the wave intensity remains constant for a plane wave
   (2) the wave intensity decreases as the inverse of the square of the distance from the source for a spherical wave
   (3) the wave intensity decreases as the inverse of the distance from the source for a cylindrical wave
   (4) All of above

27. For the same rise in temperature of one mole of gas at constant volume, the heat required for non-linear triatomic gas is $k$ times that required for monoatomic gas. What is the value of $k$?
   (1) 0.5
   (2) 1
   (3) 1.5
   (4) 2

28. Which of the following represent a travelling wave?
   (1) $y = A\sqrt{x - vt}$
   (2) $y = A\cos(a + bt)$
   (3) $y = A\log(x - vt)$
   (4) $y = f(x^2 - vt^2)$

29. In a cyclic process, the amount of heat given to a system is equal to :-
   (1) Net work done by the system
   (2) Net increase in internal energy
   (3) Net decrease in internal energy
   (4) Net change in specific heat

30. In a sinusoidal wave, the time required for a particular point to move from maximum displacement to zero displacement is 0.17s. The frequency of the wave is :-
   (1) 1.47 Hz
   (2) 0.36 Hz
   (3) 0.73 Hz
   (4) 2.94 Hz

31. The rms velocity of hydrogen gas molecules at S.T.P. is $V$ m/sec. The gas is heated at constant volume till the pressure becomes four times. The final r.m.s. velocity is :-
   (1) $V$
   (2) $2V$
   (3) $4V$
   (4) $\frac{V}{2}$
32. The intensity of a sound wave gets reduced by 20% on passing through a slab. The reduction in intensity on passage through two such consecutive slabs is:
(1) 40% (2) 36% (3) 30% (4) 50%

33. Equal masses of H₂ and O₂ gases are filled in two vessels A and B at the same temperature. The volume of vessel A is half that of B. Which of the following statements is correct?
(1) \( P_A = P_B \) (2) \( \left( \frac{\mu_{ms}}{\mu_{ms}} \right)_A = \left( \frac{\mu_{ms}}{\mu_{ms}} \right)_B \) (3) \( <E_k>_A = <E_k>_B \) (4) All

34. When an object moves with supersonic speed, the ratio of the speed of object to that of sound is called:
(1) f-number (2) Magic number (3) Rynolds number (4) Mach number

35. Two samples, A and B, which are initially at the same temperature and pressure, are compressed from volume \( V \) to \( \frac{V}{2} \). A isothermally and B adiabatically. If their final pressures are respectively \( P_A \) and \( P_B \), then:
(1) \( P_A < P_B \) (2) \( P_A = P_B \) (3) \( P_A > P_B \) (4) \( P_A = 2P_B \)

36. A radio wave of frequency 840 MHz is sent towards an aeroplane. The frequency of radio echo has a frequency 2.8 kHz more than the original frequency. The velocity of the aeroplane is:
(1) 3 km/s (2) 2 km/s (3) 4 km/s (4) 0.5 km/s

37. The law of equipartition of energy was enunciated by
(1) Maxwell (2) Newton (3) Wien (4) Boltzmann

38. Equation of a stationary wave can be expressed as:
\[ y = a \sin \left( \frac{\pi x}{L} \right) \cos (2\pi ft) \]
where \( x \) and \( y \) are in cm and t in sec.
Amplitude of any of the progressive waves which superimpose to form the given stationary wave is:
(1) 8 cm (2) 4 cm (3) 6 cm (4) 10 cm

39. What are the lower fixed point and upper fixed point in fahrenheit thermometer? (respectively)
(1) 0°F, 100°F (2) 0°F, 32°F (3) 32°F, 180°F (4) 32°F, 212°F
40. If seventh harmonic is set up in a string fixed on both ends, number of nodes and antinodes formed are:
   (1) 8, 7  (2) 7, 7  (3) 8, 9  (4) 9, 8

41. In order to increase the temperature of the gas filled in a closed vessel by 0.5°C its pressure is increased by 2%. The initial temperature of the gas is:
   (1) 250°C  (2) 250 K  (3) 25 K  (4) 25°C

42. In the indicator diagram fig. shown, T_a, T_b, T_c, T_d represent temperature of gas at A, B, C, D respectively. Which of the following is correct relation:
   (1) T_a = T_b = T_c = T_d  (2) T_a = T_c, T_b = T_d  (3) T_a = T_d, T_c = T_b  (4) T_a = T_b, T_c = T_d

43. When a gas in a vessel expands, its internal energy decreases. The process involved is:
   (1) Isothermal  (2) Adiabatic  (3) Isobaric  (4) Isochoric

44. The temperature above which the gas cannot be liquefied by applying pressure alone, is called:
   (1) Temperature of inversion  (2) Boyle temperature  (3) Boiling temperature  (4) Critical temperature

45. p – V plots for two gases during adiabatic processes are shown in the figure. Plots 1 and 2 should correspond respectively to:
   (1) He and O_2  (2) O_2 and He  (3) He and Ar  (4) O_2 and N_2

Use stop, look and go method in reading the question.
46. Among the following configurations, the element which has the highest electron affinity is:
   (1) [He]2s²2p⁵
   (2) [Ne]3s³3p⁵
   (3) [Ne]⁴s۴
   (4) [Ne]3s³3p⁴3d⁵4s⁰

47. Which of the following is arranged in decreasing order of size?
   (1) Mg²⁺ > Al³⁺ > O²⁻
   (2) O²⁻ > Mg²⁺ > Al³⁺
   (3) Al³⁺ > Mg²⁺ > O²⁻
   (4) Mg²⁺ > Al³⁺ > O²⁻

48. Which is the correct order of Ionisation energies:
   (1) F⁻ > F > Cl⁻ > Cl
   (2) F > Cl > Cl⁻ > F⁻
   (3) F⁻ > Cl⁻ > Cl > F
   (4) F⁻ > Cl > F > Cl

49. The correct value of Ionisation energies (in kJ mol⁻¹) of Si, P, S, Cl respectively are:
   (1) 786, 1012, 999, 1256
   (2) 1012, 786, 999, 1256
   (3) 786, 1012, 1256, 999
   (4) 786, 999, 1012, 1256

50. The order of increasing ionic radius of the following is:
   (1) K⁺ < Li⁺ < Mg²⁺ < Al³⁺
   (2) K⁺ < Mg²⁺ = Li⁺ < Al³⁺
   (3) Li⁺ < K⁺ < Mg²⁺ < Al³⁺
   (4) Al³⁺ < Li⁺ = Mg²⁺ < K⁺

51. In which of the following arrangements the order is not correct according to the property indicated against it?
   (1) Increasing size: Al³⁺ < Al²⁺ < Al⁺ < Al
   (2) Increasing I.E.: B < C < N < O
   (3) Increasing E.A.: I < Br < F < Cl
   (4) Increasing metallic radius: Li < Na < K < Rb

52. Which among the following factors is the most important in making flourine, the strongest oxidising Halogen?
   (1) Bond dissociation energy
   (2) Ionisation enthalpy
   (3) Hydration energy
   (4) Electron affinity
53. What are the hybridisation states starred carbon atom(s) in the following molecules?
(a) CH₃CH₂CH₂CH₃
(b) CH₂\textequiv CH \implies CH₂
(c) CH₃ - CH = CH - CH₃
(d) H - C\equiv C - H
(1) sp³, sp², sp³, sp³ (2) sp³, sp², sp², sp³
(3) sp³, sp³, sp³, sp³ (4) sp², sp², sp², sp²
54. Which of the following is most volatile?
(1) HF (2) HCl (3) HBr (4) HI
55. In which of the following molecules all the bond length are not equal?
(1) AlF₃ (2) NF₃ (3) CIF₃ (4) BF₃
56. Which of the following has highest bond angle?
(1) H₂O (2) H₂S (3) NH₃ (4) PH₃
57. In which mole all atoms are co-planar?
(1) CH₃ (2) BF₃ (3) H₂O (4) NH₃
58. The percentage s-character of the central atom in beryllium fluoride is?
(1) 25% (2) 33.3% (3) 50% (4) 20%
59. Which of the following mole has highest lattice energy?
(1) LiBr (2) LiCl (3) LiI (4) LiF
60. Which of the following has fractional bond order?
(1) O²⁺ (2) O²⁻ (3) F²⁻ (4) H²⁻
61. The bond strength in O₂⁺, O²⁻, O₂⁻ and O²⁻ follows the order?
(1) O²⁻ > O₂ > O₂⁺ > O₂⁻
(2) O⁺ > O₂ > O₂⁻ > O₂⁻
(3) O₂ > O₂⁻ > O₂⁻ > O₂⁺
(4) O₂ > O₂⁻ > O₂⁻ > O₂⁻
62. Which pair represents isostructural species?
(1) CH₃ and CH₃\textsuperscript{3+} (2) NH₄⁺ and NH₃⁻
(3) SO₄²⁻ and BF₄⁻ (4) NH₄⁺ and BeF₂
63. Which of the following statement is correct for CsBr₃:
(1) It is a covalent compound
(2) It contains Cs⁺⁺ and Br⁻ ions
(3) It contains Cs⁺ and Br⁻ ions
(4) It Cs⁺⁺, Br⁻ ion and lattice Br⁻ mol.
64. Highest covalent character is found in which of the following:
(1) CaF₂  (2) CaCl₂  (3) CaI₂  (4) CaBr₂

65. Which is expected to show paramagnetism?
(1) ClO₂⁻  (2) SO₂  (3) CO₂  (4) SiO₂

66. Select the correct order first ionisation potential:
(1) O₂⁺² > O₂  (2) O₂⁺² < O₂  
(3) O₂ > O₂⁺  (4) None of these

67. Match List–I with List–II and select the correct answer using the codes given below the list

<table>
<thead>
<tr>
<th>List–I</th>
<th>List–II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Heavy water</td>
<td>(a) Bicarbonates of Mg and Ca in water</td>
</tr>
<tr>
<td>(B) Temporary lard water</td>
<td>(b) Produces lather with soap</td>
</tr>
<tr>
<td>(C) Soft water</td>
<td>(c) D₂O</td>
</tr>
<tr>
<td>(D) Permanent hard water</td>
<td>(d) Sulphates and chlorides of Mg and Ca in water</td>
</tr>
</tbody>
</table>

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

68. A deuterium atom:
(1) has the same atomic mass as the hydrogen atom
(2) has the same electronic configuration as the hydrogen atom
(3) has the same composition of the nucleus as the hydrogen atom
(4) contains one proton more than hydrogen atom

69. Hydrogen is?
(1) Electropositive
(2) Electronegative
(3) Both electropositive as well as electronegative
(4) Neither electropositive nor electronegative

70. Permutit is a technical name of:
(1) Aluminates of Ca and Na
(2) Hydrated silicates of Al and Na
(3) Silicates of Ca and Na
(4) Silicates of Ca and Mg

---

64. निम्न में से किसमें निम्न में स्थान में ज्यादा लक्ष्य है:
(1) CaF₂  (2) CaCl₂  (3) CaI₂  (4) CaBr₂

65. निम्न में से कौन सा है निम्न में अनु रुप से बहु दवार तकनी का लक्ष्य है?
(1) ClO₂⁻  (2) SO₂  (3) CO₂  (4) SiO₂

66. प्रथम में ज्यादा कह ज्या है?
(1) O₂⁺² > O₂  (2) O₂⁺² < O₂  
(3) O₂ > O₂⁺  (4) इनमें से कोई नहीं

67. सूची पहले राष्ट्रीय मिलन की जिक्र का सूची पहले में दिये गये के इन में हवा के अनु में गये नहीं है। एकी उत्तर राष्ट्र का नहीं नहीं जिन

<table>
<thead>
<tr>
<th>सूची I</th>
<th>सूची II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) भत। से पॉनी</td>
<td>(a) Mg व च। के भत। बोल रो में उर पर्दा तिर</td>
</tr>
<tr>
<td>(B) अर सूच</td>
<td>(b) H के या शां गुरु प का जाता है</td>
</tr>
<tr>
<td>(C) मू। जा</td>
<td>(c) D₂O</td>
</tr>
<tr>
<td>(D) सूच। बॉक्ट</td>
<td>(d) Mg व च। के सफेद पूरे के रूप है व इंडों के उर पर्दा तिर</td>
</tr>
</tbody>
</table>

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

68. फॉडर्ट यूटीरिक पाम पुर:
(1) का पाम पुर भत। रहा इंडों तो जा पाम पुर के पाम पुर भत। है
(2) का इलेक्ट्रॉट और न चिन त वह इंडों तो जा पाम पुर के भता है
(3) का ना भत। की यथार्थत न हाइड्रों तो जा पाम पुर के सा है
(4) हाइड्रों त जा पाम पुर से फॉडर्ट त न अधिक न है

69. हाइड्रोन मे जा?
(1) विज्ञात भी यू प्र दवार तकता है
(2) विज्ञात भी यू प्र दवार तकता है
(3) विज्ञात भी यू प्र विज्ञात भी दो नों यू प्र दवार तकता है
(4) न है विज्ञात भी यू न है विज्ञात भी यू प्र दवार तकता है

70. पफ्फूटिट निम्न में से किसका तकनी की ना म है?
(1) Ca एवं Na का फ्युं तिमने टे
(2) Al एवं Na का जाते जिन सिलिकेट टे
(3) Ca एवं Na का सिलिकेट टे
(4) Ca एवं Mg का सिलिकेट टे
71. Hard water when passed through ion exchange resin containing RCOOH groups, becomes free from:
   (1) Cl\(^-\) ions  (2) SO\(_4^{2-}\) ions
   (3) H\(_2\)O\(^+\) ions (4) Ca\(^{2+}\) ions

72. Which of the following is the most soluble in water:
   (1) Mg(OH)_2   (2) LiF
   (3) BaSO\(_4\)    (4) LiClO\(_4\)

73. Which of the following compounds liberate(s) oxygen on heating?
   (1) Li_2CO\(_3\)  (2) LiOH
   (3) LiNO\(_3\)     (4) NaOH

74. Which of the following salt does not impart colour to the flame:
   (1) MgCl\(_2\)   (2) SrCl\(_2\)  (3) BaCl\(_2\) (4) LiCl

75. Select the correct statement(s):
   (1) Be and Al shows diagonal relationship
   (2) Be form tetrahedral complexes [Be(C\(_2\)O\(_4\))]\(^2-\)
   (3) Al forms [AlF\(_6\)]\(^3-\), an octahedral complex
   (4) All are correct

76. Nitrogen dioxide cannot be obtained from:
   (1) Cu(NO\(_3\))\(_2\) (2) Hg(NO\(_3\))\(_2\)
   (3) NaNO\(_3\)      (4) AgNO\(_3\)

77. Boron compounds behave as Lewis acids because of their:
   (1) Acidic nature
   (2) Covalent nature
   (3) Ionic nature
   (4) Vacant orbital

78. Which of the following is not hydrolysed?
   (1) CCl\(_4\)   (2) SiCl\(_4\)  (3) SnCl\(_4\) (4) PbCl\(_4\)

79. Aqueous solution of ammonia consists of?
   (1) H\(^+\)    (2) OH\(^-\)
   (3) NH\(_4^+\)  (4) NH\(_4^+\) and OH\(^-\)

80. The reaction of elemental P\(_4\) in aqueous NaOH gives:
   (1) PH\(_3\), NaH\(_2\)PO\(_2\)  (2) PH\(_3\), Na\(_2\)PO\(_4\)
   (3) NaH\(_2\)PO\(_2\), Na\(_2\)PO\(_4\) (4) Na,P, Na\(_2\)PO\(_4\)

81. Which of the following does not have S–S linkage?
   (1) S\(_2\)O\(_8^{2-}\)  (2) S\(_2\)O\(_6^{2-}\)
   (3) S\(_2\)O\(_5^{2-}\)  (4) S\(_2\)O\(_3^{2-}\)
82. Which of the following statement is not true for B\textsubscript{2}H\textsubscript{6} :-
(1) It is a Lewis acid
(2) It contains four 2 centre–2e\textsuperscript{-} bond and two & 3 centre–2e\textsuperscript{-} bond
(3) All atoms are present in same plane
(4) None of these

83. K\textsubscript{2}Cr\textsubscript{2}O\textsubscript{7} reacts with NH\textsubscript{4}Cl in presence of H\textsubscript{2}SO\textsubscript{4}. The product formed is ?
(1) Chromyl chloride with green vapour
(2) Chromous chloride with white vapour
(3) Chromous chloride with blue vapour
(4) Chromyl chloride with red orange colour

84. Which one of the following forms a colourless solution in aqueous medium :
(1) +1 (2) +4 (3) +3 (4) +2

85. In Cr\textsubscript{2}O\textsubscript{7}\textsuperscript{2-} each Cr is linked to :
(1) two O-atoms (2) three O-atoms (3) Four O-atoms (4) Five O-atoms

86. In dilute alkaline solution MnO\textsubscript{4}\textsuperscript{-2} changes to :
(1) MnO\textsubscript{4}\textsuperscript{2-} (2) MnO\textsubscript{2} (3) Mn\textsubscript{2}O\textsubscript{3} (4) MnO

87. The electronic configuration of Cu\textsuperscript{(II)} is 3d\textsuperscript{9} whereas that of Cu\textsuperscript{(I)} is 3d\textsuperscript{10}. Which of the following is correct :
(1) Cu\textsuperscript{(II)} is more stable
(2) Cu\textsuperscript{(II)} is less stable
(3) Cu\textsuperscript{(I)} and Cu\textsuperscript{(II)} are equally stable
(4) Stability of Cu\textsuperscript{(I)} and Cu\textsuperscript{(II)} depends on nature of copper salts

88. Which of the following metals will not form an amalgam :
(1) Gold (2) Silver (3) Zinc (4) Fe

89. Which one of the following forms a colourless solution in aqueous medium :
(1) Cr\textsuperscript{3+} (2) Ti\textsuperscript{3+} (3) Sc\textsuperscript{3+} (4) V\textsuperscript{3+}

90. Titanium shows spin only magnetic moment of 1.73 BM ; then ox. st. will be :
(1) +1 (2) +4 (3) +3 (4) +2
91. The conditions which support release of CO₂ from deoxygenated blood at the level of alveoli?
   (1) Higher PCO₂, Lesser PO₂
   (2) Lower PCO₂, Higher PO₂
   (3) Lower PCO₂, Lower PO₂
   (4) Higher PCO₂, Higher PO₂

92. How many of the following substances are absorbed through facilitated diffusion in small intestine?
   Furctose, Dipeptide, Tripeptide, H₂O, H⁺
   (1) One (2) Three (3) Four (4) Five

93. Disorder of respiratory system in which difficulty in breathing causing wheezing due to inflammation of bronchi and bronchioles:
   (1) Bronchitis (2) Asthma (3) Emphysema (4) Pneumonia

94. Which of the following statement is not true regarding anatomy of respiratory system:
   (1) The part starting from external nostrils upto terminal bronchioles constitute the conducting part
   (2) Internal nostrils open into nosopharynx
   (3) Nasopharynx is the common passage for both food and air
   (4) Larynx open into pharynx through glottis

95. Match the following:

<table>
<thead>
<tr>
<th>(i)</th>
<th>(ii)</th>
<th>(iii)</th>
<th>(iv)</th>
</tr>
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<tbody>
<tr>
<td>Hematuria</td>
<td>Albinuria</td>
<td>Oligonuria</td>
<td>Dysuria</td>
</tr>
<tr>
<td>(a) Low urine</td>
<td>(b) Blood</td>
<td>(c) Protein</td>
<td>(d) Painful urination</td>
</tr>
</tbody>
</table>

(i) i-b, ii-c, iii-a, iv-d  (2) i-d, ii-a, iii-c, iv-b
(3) i-c, ii-b, iii-a, iv-d  (4) i-a, ii-c, iii-b, iv-d

96. Identify the habitat of fish in the diagram?
   (1) Pacific ocean (2) Indian ocean (3) Hoogly river (4) Either (1) or (2)

97. Match the following:

<table>
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(3) i-c, ii-b, iii-a, iv-d  (4) i-a, ii-c, iii-b, iv-d
97. Arrange the following in order of decreasing volume.
   A. Tidal volume
   B. Residual volume
   C. Vital capacity
   D. Functional residual capacity
   (1) A, B, C, D (2) C, B, D, A
   (3) C, D, B, A (4) B, A, C

98. How many of the following statements are incorrect?
   (A) Urobilin gives yellow colour to urine
   (B) Oligonuria is production of urine below 500 ml per day
   (C) The kidneys produce hormones like calcitriol and erythropoietin
   (D) Rennin is the only enzyme produced by the kidney
   (1) One (2) Two
   (3) Three (4) Four

99. Which of the following is not a correctly matched pair:
   (A) Inspiratory reserve volume – 2500-3000 ml
   (B) Residual volume – 1500-1600 ml
   (C) Expiratory capacity – 1000-1100 ml
   (D) Functional residual capacity – 2200-2300 ml
   (1) A, D (2) B, C
   (3) A, C (4) B, C, D

100. The osmoregulation in vertebrate is achieved through:
     (1) Ultra filtration and reabsorption
     (2) Secretion
     (3) Excretion
     (4) All of the above

101. Which of the following is primary site of exchange of gases:
     (1) Alveoli
     (2) Blood
     (3) Tissue fluid
     (4) Capillaries

102. Which is an incorrect statement?
     (1) Osmoconformers match their body osmolarity to their environment
     (2) Most marine invertebrates are osmoconformers
     (3) A marine fish has an internal osmotic concentration lower than that of the surrounding sea water
     (4) None of the above
103. Which of the following statement is/are true: -
(A) Each haemoglobin molecule can carry a maximum of 4 molecule of $O_2$
(B) Binding of $O_2$ with haemoglobin is primarily related to $PO_2$
(C) Every 100 ml blood can deliver around 20 ml of $O_2$ to the tissues
(D) Oxygen dissociation curve is hyporbola in shape
(1) A, B and D (2) A, B, C and D (3) C and D (4) A and B

104. Identify the above structure and mention the substances required for its formation: -
(1) Micelle, Bile salts and fatty acids
(2) Hepatic lobule, Bile salts and fatty acids
(3) Micelle, Glucose and proteins
(4) Hepatic lobule, Bile salts and fatty acids

105. Which centre of brain can moderate the functions of the respiratory rhythm centre?
(1) Dorsal respiratory group
(2) Pneumotaxic centre
(3) Ventral respiratory group
(4) Rhythm centre

106. Which organ has the most metabolically active cell: -
(1) Pancreas (2) Liver (3) Stomach (4) Small intestine

107. What will be the $PO_2$ and $PCO_2$ in the alveolar as compared to those in the atmospheric air:
(1) $PO_2$ higher, $PCO_2$ lesser
(2) $PO_2$ higher, $PCO_2$ higher
(3) $PO_2$ lesser, $PCO_2$ higher
(4) $PO_2$ lesser, $PCO_2$ lesser

108. Match the following:

<table>
<thead>
<tr>
<th>(i)</th>
<th>Acinar cells</th>
<th>(A)</th>
<th>Longitudinal muscle</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ii)</td>
<td>Hepatic lobules</td>
<td>(B)</td>
<td>Structural and functional unit</td>
</tr>
<tr>
<td>(iii)</td>
<td>Epiploic appendage</td>
<td>(C)</td>
<td>Pancreas</td>
</tr>
<tr>
<td>(iv)</td>
<td>Teniae coli</td>
<td>(D)</td>
<td>Adipose tissue</td>
</tr>
</tbody>
</table>

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

103. निम्न में से तीनों का नाम करें:
(A) हृदय / क्षान्त / सन्धी / हृदय 
(B) प्रायः यें अल्पकाल आ एवं से जा के लेन जाता है अस्तित्व का नाम जाता है
(B) हृदय में वाले तिमाह में एक बार क्षान्त अक्षान्त विपर्ययकर जेन के संबंध में जाता है?
(C) प्रायः $100$ में हज़ार एवं चार हज़ार $O_2$ ि-ि होता है?
(D) अं : जे से जा चिख जा चक्र अ कृत्ति में अतिस्वयत्त होता है?

(1) A, B और D (2) A, B, C और D (3) C और D (4) A और B
109. In circulatory system of fish, gills receive which type of blood:
   (1) Oxygenated (2) Deoxygenated (3) Mixed (4) Partially mixed

110. Lipids are absorbed into lacteals instead of capillaries because
   (1) Direct absorption into capillaries would cause dangerously high level of blood cholesterol
   (2) Chylomicrons are too large to diffuse across capillary membrane
   (3) Transport proteins for lipids do not exist in capillary epithelia
   (4) All of the above

111. Where the sino atrial node is situated in heart:
   (1) Right upper corner of the right atrium
   (2) Left upper corner of right auricle
   (3) Right lower corner of right auricle
   (4) Left lower corner of right auricle

112. Which of the following best describe the role of esophagus in digestion?
   (1) Mucus is secreted to protect the esophagus from the gastric enzymes
   (2) Digestive enzymes are secreted as food passes from the esophagus to the stomach
   (3) Serve a minor role in the chemical digestion of fats
   (4) Connect the mouth to the stomach and has no function in chemical digestion

113. (A) Heart is ........... derived organ
     (B) Heart is tilted slightly towards ...........
     (C) All vertebrates possess a ........... heart
     (D) ........... have double circulation
   (1) A = Endodermally, A – Left
   (2) B = Left, C – Neurogenic
   (3) C = Myogenic, D – Vertebrates
   (4) D = Mammals, A – Mesodermally

114. Blockage of the pancreatic duct would cause:
   (1) Diabetes mellitus
   (2) Elevated blood glucose
   (3) Nutrient malabsorption
   (4) All of the above

115. Which statement is true regarding joint diastole?
   (1) The tricuspid and bicuspid valves are open
   (2) Blood from left and right atria flows into left and right ventricle
   (3) The semilunar valves are closed at this stage
   (4) All statements are true
116. Streching of duodenum causes : -
   (1) Reduced gastric motility
   (2) Inhibition of intestinal peristalsis
   (3) Secretion of pepsin
   (4) All of the above

117. During ventricular systole :-
   (1) The atrial undergoes relaxation
   (2) The atria undergoes contraction
   (3) Firstly atria undergoes in contraction than in relaxation
   (4) Firstly atria undergoes in relaxation than in contraction

118. Which of the layers of the digestive tube is/are most responsible for peristalsis along the esophagus?
   (1) Mucosa
   (2) Submucosa
   (3) Circular and longitudinal muscles
   (4) All of the above

119. How much amount of blood flow into the ventricle by atrial systole :-
   (1) 70% (2) 30% (3) 50% (4) 75%

120. Which of these the chemical get accumulated in muscles during fatigue?
   (1) ADP
   (2) Acetylcholine esterase
   (3) Phosphocreatin
   (4) Lactic acid

121. How many events are not related with photorespiration :-
   (a) No synthesis of sugars
   (b) No synthesis of ATP and NADPH₂
   (c) Occurs in all cells of C₃ plants
   (d) Out of three one organelle with two membrane
     (1) Two  (2) Three
     (3) Four  (4) None

122. Which of the following match is correct?
   (1) Incus - Quadrate
   (2) Stapes-Hyomandibular
   (3) Malleus-Articular
   (4) All are correct

123. ATP synthase is a complex.............of mitochondrial respiration :-
   (1) III  (2) II  (3) V  (4) IV

124. Uterine contractions can be initiated by : -
   (1) Oxytocin
   (2) Progesterone
   (3) Estrogen
   (4) Relaxin
125. Oxidation of glycolytic FADH$_2$ give rise :-
   (1) 2ATP   (2) 3ATP
   (3) 1 ATP   (4) Not related

126. Phosphate excretion in urine can be enhanced by-
   (1) TCT    (2) PTH
   (3) Calcitriol (4) Cortisol

127. How many molecules of ATP are directly synthesised in TCA cycle by oxidation of one glucose molecule ?-
   (1) 4     (2) 2
   (3) 6      (4) 8

128. Membranous labyrinth remains submerged in a liquid called :
   (1) Endolymph (2) Perilymph
   (3) Haemolymph (4) ECF

129. Which is an example of C$_4$ plant :-
   (1) Sugarcane    (2) Maize
   (3) Sorghum      (4) All the above

130. Central pit in macula lutea of eye is called :
   (1) Blind spot (2) yellow spot
   (3) limbus      (4) Fovea

131. Which of the following is aerobic fermentation :
   (1) Lactic acid fermentation
   (2) Butyric acid fermentation
   (3) Acetic acid fermentation
   (4) Alcoholic fermentation

133. Triple response hormone on stem is :
   (1) Abscisic acid    (2) Ethylene
   (3) Cytokinlin       (4) Auxin

In this figure, x and y are respectively :
   (1) basilar membrane and tectorial membrane
   (2) Tectorial membrane and Reissner's membrane
   (3) Reissner's membrane and basilar membrane
   (4) Tectorial membrane and basilar membrane
134. Which is not the function of glucocorticoids?
   (1) Lipolysis
   (2) Gluconeogenesis
   (3) Proteolysis
   (4) Increases immune response

135. Ca-ABA second messenger model explain that :-
   (1) Food conduction in plants
   (2) Stomatal opening in CAM plants
   (3) Stomatal closing
   (4) Ascent of sap in gymnosperms

136. Corticoids are :-
   (1) All hormones which are steroids
   (2) All hormones of adrenal gland
   (3) All hormones of adrenal cortex
   (4) All hormones of adrenal cortex except sex hormones

137. Observe the following diagram and match correct answer :-

   ![Diagram of photosynthesis process]

   (1) Stroma Grana Photosystem-I
   (2) Photosystem-I Photosystem-II cytochromes b&f
   (3) Photosystem-II Photosystem-I NADP
   (4) Photosystem-II cytochromes b&f Photosystem-I

138. किसी गर्म वस्तु के छूट खाने पहले के खिलाफ किं ड दा है?
   (1) गा से बिस्तर कित्ते किस तिक्ते बस सा
   (2) रे ली बिस्तर कित्ते किस तिक्ते बस सा
   (3) कंडी रेड फिल्टर बस सा
   (4) के निष्क मिल्के बस सा

139. कौन सा एक स वनानों है?
   (1) ना इल गा जिस्विंग बस पड़ने दा काम यह बिक चार जो नाम से विक्स तिक्ते हां त है।
   (2) बिकार ना इल गा। दोजाचे के दिव बस, का। लेग हो मे र ले बिक चार से विक्स तिक्ते हां त है।
   (3) प्र ला यह NH₄⁺ उपर फ्ल न करने के लिए एल्ट आ वघ व हो त है।
   (4) बिकार ना इल गा जिस के जल द नहीं है।
140. Anaerobic break down of glycogen in muscles cause : -
(1) Tetany (2) Fatigue (3) Rapid contraction (4) Complete relaxation state

141. During photosynthetic chemiosmosis process hydrogen ions accumulated in :-
(1) Intermembrane space (2) Matrix (3) Lumen (4) Stroma

142. Low Ca²⁺ level in blood leads to : -
(1) Myasteria gravis (2) Rickets (3) Tetany (4) All these

143. Which statement is wrong :-
(1) OEC or water splitting complex located inside of thylakoid membrane
(2) Electrons for photosystem I are provided by photosystem II in Z-scheme
(3) Cyclic ETS produces only NADPH₂ and ATP not oxygen
(4) All the above

144. Which of these contains fibre tracts that interconnect different regions of brain?
(1) MO (2) Pons (3) Epithalamus (4) Hypothalamus

145. Which enzyme inhibitor, increases km but no effect on velocity maximum :-
(1) Non-competitive (2) Competitive (3) Irreversible inhibitor (4) All the above

146. Amacrine cells represents : -
(1) Bipolar neurons (2) Apolar neurons (3) Unipolar neurons (4) Multipolar neurons

147. All enzymes of TCA cycle are located in the mitochondrial matrix except one which is located in inner mitochondrial membrane in eukaryotes and in cytosol in prokaryotes, this enzyme is :-
(1) Lactate dehydrogenase (2) Malate dehydrogenase (3) Isocitrate dehydrogenase (4) Succinate dehydrogenase
148. लातिक लातिक के लिए दो के मध्य से संबंध जाता क्या है?
   (1) पृथ्वी उसे टिके कल
   (2) कार्बन से सके ले सादी
   (3) मो नब्बे छिड़ा
   (4) मध्यमाण्य

149. सिर में इस विषय जो डूर गलत है?
   (a) Zymase → Fermentation
   (b) C₃ प्लेन के वाले वि संक्रमण किस्मिक
   (c) C₄ प्लेन के वाले वि संक्रमण किस्म
   PEPcase, RubisCo
   (d) CO₂ संक्रमण किस्मिक C₄ प्लेन
   (e) डिमिस्फिक लिस्व कल C₃ प्लेन
   (1) फ़ुल (2) चौरा (3) तीन (4) पैंटी

150. क्या आयुक्त और चिकित्सक?
   (1) Testis and ovaries
   (2) Testis and Adrenal gland
   (3) Pituitary and testis
   (4) Only testis

151. कई दायमीय है?
   (a) जूंधाण तथा अक्षय ये
   (b) सूर्य त्रिकोण की चित्त में हांड्यो जा के अंत में हां जा रहे हैं
   (c) तो लाक्षकीय लिस्ववाला श्रेय वाला या श्रेय वाला यदि ने जूंधाण तैयार प्रपंच है
   (d) तौँ कहा कहा PPP के बल प्रतिरोध के चित्ती वे ये मन प्रक मूंजा है
   (e) या वर्ष टूं वाला या वे मूंजा मण प्रक मूंजा है
   (1) पृथ्वी (2) दो चौरा (3) चौरा (4) फ़ुल

152. क्रियाशीलता आयुक्त का संक्रमण किस्मिक में न कर सकता है?
   (1) अंकी वे सेट दे किस (2) FSH
   (3) केवल दे लेख (4) नेशनी

153. नियमित है विस्फोटक परंपरा प्यारा जो में न हुए लगता है?
   (1) a-पृथ्वी का संक्रमण करता है
   (2) पृथ्वी नां अलोक मुं दुर्घटना तस फर
tहुए सफ़र के लिए
   (3) या की तब अलोक या की नहीं सहित जाता
   (4) बकरी किया में
   (1) इम्यां होता
   (2) इम्यां होता
   (3) इम्यां होता
   (4) इम्यां होता
154. Growth of mammary glands and milk formation is promoted by:
   (1) Oxytocin (2) PRL
   (3) FSH (4) LH

155. The opening of flower is a movement of:
   (1) Thigmonasty (2) Epinasty
   (3) Hyponasty (4) Seismonasty

156. Which of these are gonadotrophins?
   (1) PRL, ACTH (2) FSH, LH
   (3) TSH, FSH (4) LH, TCT

157. The conduction of organic food in plant body is:
   (1) Unidirectional (2) Bidirectional
   (3) Lateral (4) Multidirectional

158. When K\(^+\) VGC get closed in an axon, the axolemma is at which state?
   (1) Depolarised (2) Polarised
   (3) Apolarised (4) Hyperpolarised

159. How many ATP generates, when C\(_{16}\) fatty acid oxidised completely (via \(\beta\)-oxidation)
   (1) 146 ATP (2) 137 ATP
   (3) 129 ATP (4) 96 ATP

160. TCT is antagonistic to:
   (1) PTH (2) GH
   (3) Thyroxine (4) Calcitriol

161. Value of Km-constant (Michaelis–Menton constant) for an enzyme will be:
   (1) \(\frac{1}{4} V_{\text{max.}}\) (2) \(\frac{1}{3} V_{\text{max.}}\)
   (3) \(\frac{1}{2} V_{\text{max.}}\) (4) \(\frac{1}{6} V_{\text{max.}}\)

162. Opening of Cl\(^-\) LGC in post synaptic membrane leads to:
   (1) Polarisation of membrane
   (2) Depolarisation of membrane
   (3) Repolarisation of Membrane
   (4) Hyperpolarisation Membrane

163. Match the following pairs:

<table>
<thead>
<tr>
<th>Hormones</th>
<th>Discoverer</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Auxins</td>
<td>(a) Yabuta &amp; Sumiki</td>
</tr>
<tr>
<td>(B) Gibberellins</td>
<td>(b) Addicott</td>
</tr>
<tr>
<td>(C) Cytokin</td>
<td>(c) Went</td>
</tr>
<tr>
<td>(D) ABA</td>
<td>(d) Miller</td>
</tr>
</tbody>
</table>

(1) A–a, B–b, C–d, D–c
(2) A–c, B–a, C–b, D–d
(3) A–c, B–a, C–d, B–b
(4) A–c, B–d, C–b, D–a
164. If \( a = \) midbrain, \( x = \) pons, \( y = \) MO, \( Z = \) cerebellum, then which option can be correct for brain stem?
   (1) \((x + y + z) - a\)  
   (2) \((x - y) + z + a\)  
   (3) \(a + (x + y) - z\)  
   (4) \((x + y) - (a + z)\)  

165. Hormone related with \(\alpha\)-amylase induction–
   (1) Cytokinin  
   (2) ABA  
   (3) Ethylene  
   (4) GA  

166. Which of these is not the part of limbic system?
   (1) Cerebral aqueduct  
   (2) Fornix  
   (3) Amygdala  
   (4) Hypothalamus  

167. Which one pair is wrong :
   (1) Hormones Bio–assay
   (1) Auxin Avena curvature test  
   (2) Gibberellin Dwarf pea & maize test  
   (3) Cytokinin Chlorophyll preservation test  
   (4) Ethylene Delay in senescence test  

168. Four round swellings in the mid brain are called :
   (1) Olfactory lobes  
   (2) Corpora allota  
   (3) Corpora quadrigemina  
   (4) Corpora cardiaea  

169. Velamen tissue can absorbed :
   (1) Capillary water  
   (2) Humidity of Atmosphere  
   (3) Gravitational water  
   (4) All  

170. Translocation of carbohydrates is occurs in the form of :
   (1) Glucose  
   (2) Fructose  
   (3) Starch  
   (4) Sucrose  

171. Guttated fluid is :
   (1) Pure water  
   (2) Water with Inorganic salts  
   (3) Water with Inorganic & organic salts  
   (4) None  

172. Which of the following plants have adapted to overcome the photorespiratory loss :
   (1) CAM–Plants  
   (2) \(C_4\)–Plants  
   (3) \(C_3\)–Plants  
   (4) \(C_5\)–Plants  

Time Management is Life Management
173. Swelling of wooden doors during rainy season is

(1) Endosmosis  (2) Imbibition
(3) Osmosis   (4) Transpiration

174. Latex of poppy (Aphim) fruits is obtained by process

(1) Transpiration  (2) Bleeding
(3) Guttation  (4) Imbibition

175. A cell is plasmolysed after being kept in hypertonic solution. What will be present between cell wall & plasmalemma :-

(1) Isotonic solution  (2) Hypertonic solution
(3) Air  (4) Hypotonic solution

176. Match the following pair :-

(A) Nitrogen Metabolism   (a) S
(B) Death of Root & Shoot apex   (b) Mg
(C) Specific parts of cystein Amino Acid   (c) Mo
(D) Porphyrin Ring   (d) Ca

(1) A–c, B–b, C–a, D–d
(2) A–c, B–d, C–b, D–a
(3) A–c, B–d, C–a, D–b
(4) None of the above

177. Abzymes are :-

(1) Virus-protein  (2) Monoclonal Antibody
(3) Ribozyme  (4) Cellulose

178. Which pair is wrong :-

(1) ABA → Stomatal closing.
(2) Potometer → Transpiration measuring.
(3) COCl₂ Method → Comparative study of transpiration
(4) Crescograph → Miller, Skoog

179. Which wavelength of light is required for flowering in SDP.

(1) Red  (2) Far red
(3) Green   (4) Yellow

180. Primary electron acceptor in z-scheme of photosynthesis is :-

(1) Quinone (2) fd
(3) NADP (4) Pheophytin

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