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 cannot 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.

Note: In case of any Correction in the test paper, please mail to dlpcorrections@allen.ac.in within 2 days along with Paper code and Your Form No.
1. Two blocks A and B of masses 2m and m, respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in the figure. The magnitudes of acceleration of A and B immediately after the string is cut, are respectively:

(1) \( \frac{g}{2} \), \( g \)

(2) \( g \), \( \frac{g}{2} \)

(3) \( g \), \( \frac{g}{2} \)

(4) \( \frac{g}{2} \), \( \frac{g}{2} \)

2. Two surfaces of same nature and area but of different material are heated to same temperature. They are allowed to cool down in same surroundings. If \( \frac{dQ}{dt} \) represents rate of loss of heat and \( \frac{d\theta}{dt} \) represents rate of fall of temperature, then for both:

(1) \( \frac{dQ}{dt} \) is same but \( \frac{d\theta}{dt} \) is different

(2) \( \frac{dQ}{dt} \) is different but \( \frac{d\theta}{dt} \) is same

(3) \( \frac{d\theta}{dt} \) as well as \( \frac{dQ}{dt} \) is same

(4) \( \frac{d\theta}{dt} \) as well as \( \frac{dQ}{dt} \) is different

3. A projectile has initially the same horizontal velocity as it would acquire if it had moved from rest with uniform acceleration of 3 ms\(^{-2}\) for 0.5 minutes. If the maximum height reached by it is 80 m, then the angle of projection is:

(1) \( \tan^{-1}(3) \)

(2) \( \tan^{-1}\left(\frac{3}{2}\right) \)

(3) \( \tan^{-1}\left(\frac{4}{9}\right) \)

(4) \( \sin^{-1}\left(\frac{4}{9}\right) \)
4. Optic axis of a thin equiconvex lens is the x-axis.
The co-ordinates of a point object and its image
are (–40 cm, 1 cm) and (50 cm, –2 cm)
respectively. Lens is located at :-
(1) x = +20 cm (2) x = –30 cm
(3) x = –10 cm (4) x = 0

5. An ideal gas has initial volume V and pressure P.
In doubling its volume the largest amount of work
will be done in the following process:-
(1) In isobaric process
(2) In isothermal
(3) In adiabatic process
(4) A combination of (1) and (3)

6. A charged particle q is shot towards another
charged particle Q which is fixed with a speed
v. It approaches Q upto a closest distance r and
then returns. If q is shot with speed 2v then the
closest distance of approach would be :-
(1) r/4 (2) r/2
(3) 2r (4) r

7. A tube of length L₁ is open at both ends. A second
tube of length L₂ is closed at one end and open
at the other end. Both tubes have the same
fundamental frequency of vibration of air. What
is the value of L₂?
(1) 4L₁ (2) 2L₁
(3) L₁/2 (4) L₁/4

8. In the given circuit the current through zener diode is:-

\[
\begin{array}{c}
15 \text{ V} \\
500\Omega \\
1500\Omega \\
10 \text{ V}
\end{array}
\]
(1) 10 mA (2) 6.67 mA
(3) 5 mA (4) 3.33 mA
9. If the unit of length and force be increased four times, then the unit of energy is:
   (1) Increased 4 times
   (2) Increased 8 times
   (3) Increased 16 times
   (4) Decreased 16 times

10. Two substances A and B of equal mass m are heated at uniform rate of 6 cal s\(^{-1}\) under similar conditions. A graph between temperature and time is shown in figure. Ratio of heat absorbed \(H_A/H_B\) by them for complete fusion is

\[
\text{Temperature (°C)}
\begin{array}{cccc}
\text{Time} & 0 & 20 & 40 & 60 & 80 & 100 \\
\hline
\text{A} & 0 & 20 & 40 & 60 & 80 & 100 \\
\text{B} & 0 & 20 & 40 & 60 & 80 & 100 \\
\end{array}
\]

(1) 9/4  (2) 4/9  (3) 8/5  (4) 5/8

11. If \(T\) be the surface tension, the amount of work done in blowing a soap bubble from a diameter \(d\) to diameter \(D\) is:

   (1) \(\pi(D^2 - d^2)T\)
   (2) \(2\pi(D^2 - d^2)T\)
   (3) \(4\pi(D^2 - d^2)T\)
   (4) \(8\pi(D^2 - d^2)T\)

12. A rod is fixed between two points at 20°C. The coefficient of linear expansion of material of rod is \(1.1 \times 10^{-5}/°C\) and Young's modulus is \(1.2 \times 10^{11}\) N/m\(^2\). Find the stress developed in the rod if temperature of rod becomes 10°C:

   (1) \(1.32 \times 10^7\) N/m\(^2\)
   (2) \(1.10 \times 10^{15}\) N/m\(^2\)
   (3) \(1.32 \times 10^8\) N/m\(^2\)
   (4) \(1.10 \times 10^6\) N/m\(^2\)

13. The transverse displacement of a string (clamped at its both ends) is given by

\[
y(x, t) = 0.6 \sin \left(\frac{2\pi}{3} x\right) \cos (120\pi t)
\]

where \(x\) and \(y\) are in metre and \(t\) in second. The length of the string is 1.5 m and its mass is \(3 \times 10^{-2}\) kg; the tension in the string will be:

(1) 648 N
(2) 1248 N
(3) 324 N
(4) 162 N
14. The potential energy of a particle oscillating along x-axis is given as \( U = 20 + (x - 2)^2 \) where \( U \) is in joules and \( x \) in meters. Total mechanical energy of the particle is 36 J. Maximum kinetic energy of the particle is :-

(1) 24 J  
(2) 36 J  
(3) 16 J  
(4) 20 J

15. A horizontal force of 10 N is necessary to just hold a block stationary against a wall. The coefficient of friction between the block and wall is 0.2. The weight of the block is:-

(1) 20 N  
(2) 50 N  
(3) 100 N  
(4) 2 N

16. The mean time period of second’s pendulum is 2.00s and mean absolute error in the time period is 0.05s. To express maximum estimate of error, the time period should be written as :

(1) (2.00 \pm 0.01)s  
(2) (2.00 \pm 0.025)s  
(3) (2.00 \pm 0.05)s  
(4) (2.00 \pm 0.10)s

17. Two solenoids have identical geometrical construction and same number of turns but one is made of thick wire and other of thin wire. Which of the following quantities are different for two solenoids –

(a) Self inductance.  
(b) Rate of joule heating if the same current goes through them.  
(c) Magnetic potential energy if the same current goes through them .  
(d) Time constant.

(1) b, d  
(2) a, c  
(3) b, c  
(4) All above
18. In a compound microscope, the focal length of two lenses are 1.5 cm and 6.25 cm. If an object is placed at 2 cm from objective and the final image is formed at 25 cm from eye lens the distance between two lenses is -
(1) 6.00 cm (2) 7.75 cm (3) 9.25 cm (4) 11.0 cm

19. If a thin mica sheet of thickness 't' and refractive index $\mu = \frac{5}{3}$ is placed in the path of one of the interfering beams as shown in figure, then the displacement of the fringe system is -
\[ s = \frac{2D}{d_2} \]
(1) \( \frac{Dt}{3d} \) (2) \( \frac{Dt}{5d} \) (3) \( \frac{5d}{4d} \) (4) \( \frac{2Dt}{5d} \)

20. The half-life period of a radioactive element is 10 days. Then how long does it take for 90% of a given mass of this element to disintegrate?
(1) 19 days (2) 27 days (3) 33 days (4) 47 days

21. In an a.c. LCR circuit a capacitor and an inductor in series are connected with an a.c. voltage source of 90 volts. An ammeter and a voltmeter are connected in the circuit to measure the current in the circuit and the voltage across the capacitor plus the inductor combination. If \( X_L = X_C = 4\Omega \) and \( R = 45\Omega \), the reading of ammeter (I) and the voltmeter (V) are -
(1) I = 2 amp. and V = 0 volt.
(2) I = 2 amp. and V = 8 volt.
(3) I = 3 amp. and V = 2 volt.
(4) I = 3 amp. and V = 1 volt.

22. Light of wavelength 5000 Å is falling on a sensitive surface. If the surface has received \( 10^{-7} \) J of energy, then the number of photons falling on the surface will be -
(1) \( 5 \times 10^{11} \) (2) \( 2.5 \times 10^{11} \) (3) \( 3 \times 10^{11} \) (4) none of these
23. In a transistor -

- length of emitter is greater than that of collector
- length of collector is greater than that of emitter
- length of base is greater than that of emitter
- length of base is greater than that of collector

24. An α-particle and a deuteron are moving with velocities \( v \) and \( 2v \) respectively. What will be the ratio of their de Broglie wavelengths?

- \( 1 : 1 \)
- \( \sqrt{2} : 1 \)
- \( 1 : \sqrt{2} \)
- \( 2 : 1 \)

25. Output \( W \) is given by -

- \( (X \cdot Y) + Z \)
- \( (X + Y) \cdot Z \)
- \( (\overline{X} \cdot \overline{Y}) \cdot Z \)
- Both (2) and (3)

26. In YDSE experiment, when two light rays make third minima, then they have:

- Phase difference of \( 3\pi \)
- Phase difference of \( \frac{5\pi}{2} \)
- Path difference of \( 3\lambda \)
- Path difference of \( \frac{5\lambda}{2} \)

27. Two forces of 6N and 3N are acting on two blocks of 2 kg and 1 kg kept on frictionless floor. What is the force exerted on 2 kg block by 1 kg block?

- \( 1N \)
- \( 2N \)
- \( 4N \)
- \( 5N \)
28. A ball of mass \( m \) moving with velocity \( (2\hat{i} + 3\hat{j}) \) m/s receives an impulse \( -(3m\hat{m}) \) N-S due to an impact. What is the velocity of the ball just after impact?

(1) \( 2\hat{i} \) m/s
(2) \( -3\hat{j} \) m/s
(3) \( (-\hat{i} + 3\hat{j}) \) m/s
(4) \( (\hat{i} - 3\hat{j}) \) m/s

29. A rod of length 1 m and mass 0.5 kg hinged at one end is initially hanging vertically. The other end is now raised slowly until it makes an angle 60° with the vertical. The required work is:

\( g = 10 \text{ m/s}^2 \)

(1) \( 5 \frac{J}{2} \)
(2) \( 5 \frac{J}{4} \)
(3) \( 17 \frac{J}{8} \)
(4) \( 5 \frac{\sqrt{3}}{4} \)

30. A rectangular loop carrying a current \( I \) is situated near a long straight wire such that the wire is parallel to one of the sides of the loop and is in the plane of the loop. If a steady current \( I \) is established in the wire as shown in the figure, the loop will:

(1) Rotate about an axis parallel to the wire
(2) Move away from the wire
(3) Move towards the wire
(4) remain stationary

31. Two identical coils carrying equal currents have a common centre, and their planes are at right angles to each other. Find the ratio of the magnitudes of the resultant magnetic field at the centre and the field due to one coil alone:

(1) 2 : 1
(2) 1 : 1
(3) 1 : \( \sqrt{2} \)
(4) \( \sqrt{2} : 1 \)

32. A tangent galvanometer has a coil of 25 turns and a radius of 15 cm. The horizontal component of the earth's magnetic field is \( 3 \times 10^{-3} \) T. The current required to produce a deflection of 45° in it is:

(1) 0.29 A
(2) \( 3.6 \times 10^{-5} \) A
(3) 1.2 A
(4) 0.14 A
33. A step-down transformer transforms a supply line voltage of 2200 volt into 220 volt. The primary coil has 5000 turns. The efficiency and power of transformer are 90% and 8 kilowatt respectively. Then the number of turns in the secondary is :-
(1) 5000  (2) 50  
(3) 500  (4) 5

34. At temperature T, the power radiated by a body is Q watts. At the temperature 3T the power radiated by it will be :-
(1) 3Q  (2) 9Q  
(3) 27Q  (4) 81Q

35. Two blocks of equal masses are tied with a light string which passes over a massless pulley as shown in figure. The acceleration of system is : (neglect friction everywhere)

\[ a = \frac{1}{2} g \left( \frac{3}{2} \right) \]

(1) \( \frac{1}{4} \) \( \sqrt{3} - 1 \) g  
(2) \( \frac{3}{4} \) \( \sqrt{3} - 1 \) g  
(3) \( \frac{g}{2} \)  
(4) \( \frac{\sqrt{3} - 1}{\sqrt{2}} \) g

36. The distance of the centre of mass of the T-shaped plate from O is :

(1) 7 m  
(2) 2.7 m  
(3) 4 m  
(4) 1 m
37. The moment of inertia of a uniform rod of length \(2\ell\) and mass \(m\) about an axis \(xx'\) passing through its centre and inclined at an angle \(\alpha\) is:

\[
\begin{align*}
(1) & \quad \frac{ml^2}{3}\sin^2\alpha \\
(2) & \quad \frac{ml^2}{12}\sin^2\alpha \\
(3) & \quad \frac{ml^2}{6}\cos^2\alpha \\
(4) & \quad \frac{ml^2}{2}\cos^2\alpha
\end{align*}
\]

38. Two rings of radius \(R\) and \(nR\) made up of same material have the ratio of moment of inertia about an axis passing through centre as 1 : 8. The value of \(n\) is:

\[
\begin{align*}
(1) & \quad 2 \\
(2) & \quad 2\sqrt{2} \\
(3) & \quad 4 \\
(4) & \quad 1/2
\end{align*}
\]

39. A planet revolves in an elliptical orbit around the sun. The semi-major and semi-minor axes are \(a\) and \(b\), then the time period is given by:

\[
\begin{align*}
(1) & \quad T^2 \propto b^3 \\
(2) & \quad T^2 \propto (a + b/2)^3 \\
(3) & \quad T^2 \propto a^3 \\
(4) & \quad T^2 \propto (a - b/2)^3
\end{align*}
\]

40. Three identical particles are joined together by a thread as shown in figure. All the three particles are moving in a horizontal plane. If the velocity of the outermost particle is \(v_0\), then the ratio of tensions in the three sections of the string is:

\[
\begin{align*}
(1) & \quad 3 : 5 : 7 \\
(2) & \quad 3 : 4 : 5 \\
(3) & \quad 7 : 11 : 6 \\
(4) & \quad 3 : 5 : 6
\end{align*}
\]

41. A man is 180 cm tall and his eyes are 10 cm below the top of his head. In order to see his entire height right from toe to head, he uses a plane mirror kept at a distance of 1 m from him. The minimum length of the plane mirror required is:

\[
\begin{align*}
(1) & \quad 180 \text{ cm} \\
(2) & \quad 90 \text{ cm} \\
(3) & \quad 85 \text{ cm} \\
(4) & \quad 170 \text{ cm}
\end{align*}
\]
42. N identical charged drops are combined to give a big drop then :-

(1) Potential of big drop is \( N^{\frac{1}{3}} \) times potential of small drop
(2) Capacity of small drop is \( \frac{1}{N} \) times capacity of big drop
(3) Charge of big drop is \( N \) times sum of charges of small drops
(4) Electric field on surface of big drop is more than electric field of small drop

43. For a closed surface the flux associated is \( \phi \). On adding 75 \( \mu \text{C} \) to it, it becomes 4\( \phi \). Find out initial charge enclosed by surface

(1) 50 \( \mu \text{C} \)
(2) 25 \( \mu \text{C} \)
(3) 125 \( \mu \text{C} \)
(4) – 50 \( \mu \text{C} \)

44. When a magnet of vibration magnetometer heated, its magnetic moment decreases by 36%. The time period of oscillation :-

(1) Increases by 25%
(2) Decreases by 25%
(3) Increases by 64%
(4) Decreases by 64%

45. Four identical very long solenoids P, Q, R and S are shown in figure. If magnetic field produced at the centre of solenoid 'P' is \( B \) then magnetic fields at the ends of solenoids Q, R and S –

\[
\begin{align*}
\text{(1)} & \quad \frac{B}{6} \\
\text{(2)} & \quad \frac{B}{3} \\
\text{(3)} & \quad 3B \\
\text{(4)} & \quad 6B
\end{align*}
\]
46. Highly pure dilute solution of sodium in liquid ammonia :
(1) Show reducing nature & deep red colour
(2) Show electrical conductance & oxidising nature
(3) Show deep red colour & electrical conductance
(4) Blue colour

47. Which of the following substance can be classified into macro molecules (polymers) :
(1) White phosphorous & 3D silicates
(2) Red phosphorous & white phosphorous
(3) All silicates & black phosphorous
(4) Black phosphorous

48. Which one halide has the highest melting point?
(1) NaCl (2) NaBr (3) NaF (4) NaI

49. Which one halide has the highest melting point?
(1) NaCl (2) NaBr (3) NaF (4) NaI

50. Which of the following compounds does give N₂ on heating?
(1) NH₄NO₂ (2) NH₄NO₃ (3) NaN₃ (4) Both (1) and (3)

51. What are the different kinds of bonds and interactions present in CuSO₄. 5H₂O :
(1) pπ – dπ bond
(2) pπ – pπ bond
(3) Coordinate bond
(IV) Electrostatic force of Attraction
(V) Hydrogen bond
(1) I, II, III, IV and V (2) II, III, IV and V
(3) II, III (4) I, III, IV and V

52. Species have same bond order are :
(1) CO, NO, N₂
(2) NO, NO⁺, NO⁻
(3) C₆H₆, ClO₂⁻, HCOO⁻
(4) BO₃³⁻, ClO₃⁻, CO₃⁻²

53. Choose A, B, C and D :
(i) (A) + H₂SO₄ + K₂Cr₂O₇ → B (green solution)
(ii) (A) + dil H₂SO₄ + (C) → MnSO₄
(iii) (A) + O₂ → (D)
(iv) D + BaCl₂ → white ppt

Pre-Medical : ENTHUSIAST, LEADER & ACHIEVER/NEET-II/26-06-2016

0999DM610515004  11/36
54. The boiling point of CCl₄ is higher than that of CHCl₃ because:
   (1) The dipole moment of CCl₄ is greater than that of CHCl₃
   (2) CCl₄ forms hydrogen bonds
   (3) CCl₄ has higher molecular mass than that of CHCl₃
   (4) CCl₄ is more ionic than CHCl₃
55. Pair of molecules having identical geometry is
   (1) BF₃, NH₃    (2) BF₃, AlCl₃
   (3) BeF₂, H₂O    (4) BCl₃, PCl₃
56. Correct order of covalent character is
   (1) CuCl > AgCl > AuCl
   (2) CuCl > AgCl < AuCl
   (3) CuCl < AgCl < AuCl
   (4) CuCl < AgCl < AuCl
57. The correct order of bond order is
   (1) NO⁺ > NO    (2) CO⁺ < CO
   (3) He₂⁺ < He₂    (4) N₂⁺ > N₂
58. Select incorrect statement.
   (1) o-Nitrophenol and p-nitrophenol can be separated by steam distillation
   (2) HF forms zig-zag structure due to hydrogen bonding
   (3) NH₃ is pyramidal due to hydrogen bonding
   (4) Boiling point of H₂O > HF > NH₃
59. Select correct about PtCl₄, 4NH₃ complex salt:-
   (I) All the chlorides are bonded by primary valency
   (II) All the chlorides are bonded by secondary valency
   (III) All the NH₃ are bonded by secondary valency
   (IV) Half of the chlorides are bonded with secondary valency
   (1) I, III    (2) III, IV    (3) II, III    (4) Only III
60. Select correct matching for (a) and (b) and select your answer from given options :-

<table>
<thead>
<tr>
<th>Column-I</th>
<th>Column-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) [Pt(NH₃)₄]Cl₂</td>
<td>(P) Geometrical Isomerism</td>
</tr>
<tr>
<td>(b) [Co(NH₃)₄]Cl₂Br</td>
<td>(Q) Optical Isomerism</td>
</tr>
<tr>
<td>(c) [Pt(NH₃)₄]Cl⁺</td>
<td>(R) Linkage Isomerism</td>
</tr>
<tr>
<td>(d) [Co(en)₂Cl₂]Br</td>
<td>(S) Ionisation Isomerism</td>
</tr>
</tbody>
</table>

(a) a-P,b-P,S,c-P,d-P,Q,S
(b) a-P,b-P,S,c-P,d-P,Q,S
(c) a-P,S,b-P,S,c-P,d-P,Q,S
(d) a-P,b-P,S,c-P,d-P,Q,S

54. CCl₄ का व व ब लचर मिलीकर न च हल कर के क ये न कर के कि
   (1) CCl₄ का विलिकर में CHCl₃ में अधिक है।
   (2) CCl₄ हाइड्रोजन बना ता है।
   (3) CCl₄ का विलिक्र भ CHCl₃ से अधिक है।
   (4) CCl₄ CHCl₃ से अधिक कितने है।
55. औरंगाबाद को न करना युद्ध मात्र जल्द स्तर सा न जय मिली कल्तन है।
   (1) BF₃, NH₃    (2) BF₃, AlCl₃
   (3) BeF₂, H₂O    (4) BCl₃, PCl₃
56. सर्वेक्षण जा लेखा अर्थव्यवस्था का सही रूप है।
   (1) CuCl > AgCl > AuCl
   (2) CuCl > AgCl < AuCl
   (3) CuCl < AgCl < AuCl
   (4) CuCl < AgCl > AuCl
57. जन न का चमक का सही रूप है।
   (1) NO⁺ > NO    (2) CO⁺ < CO
   (3) He₂⁺ < He₂    (4) N₂⁺ > N₂
58. गतल का न का चमक की चित्रण
   (1) o-नाट्रियम इलेक्ट्रॉन फिल्म चलते हुए निकल पाए जा सकते हैं।
   (2) HF हाइड्रुलॉजेन जा बना हैं था के चेतन आ चल है।
   (3) NH₃ हाइड्रुलॉजन जा बना का स्वभाविक मिलने यहाँ है।
   (4) व बना नात्रियम का स्वभाविक > HF > NH₃ है।
59. PtCl₄, 4NH₃ से कुल के लिये क्रम का का चमक की चित्रण
   (I) सब निकल रहा है. ठाँका तहत से बर्म विद्वान तहत है।
   (II) सब निकल रहा है. ठाँका तहत से बर्म विद्वान तहत है।
   (III) निकल रहा है ठाँका तहत से बर्म विद्वान तहत है।
   (IV) निकल रहा है ठाँका तहत से बर्म विद्वान तहत है।
   (1) I, III    (2) III, IV    (3) II, III    (4) के वल लड़के न का चमक की चित्रण
60. निम्न चमक का चमक की चित्रण

<table>
<thead>
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<td>(P) न ज विलिक्र भ स्वभाविक</td>
</tr>
<tr>
<td>(b) [Co(NH₃)₄]Cl₂Br</td>
<td>(Q) गा चमक स्वभाविक</td>
</tr>
<tr>
<td>(c) [Pt(NH₃)₄]Cl⁺</td>
<td>(R) जन न स्वभाविक</td>
</tr>
<tr>
<td>(d) [Co(en)₂Cl₂]Br</td>
<td>(S) अ जन स्वभाविक</td>
</tr>
</tbody>
</table>

(a) a-P,b-P,S,c-P,d-P,Q,S
(b) a-P,b-P,S,c-P,d-P,Q,S
(c) a-P,S,b-P,S,c-P,d-P,Q,S
(d) a-P,b-P,S,c-P,d-P,Q,S
61. Z is :-

(1) \( \text{NH}_2 \)

(2) \( \text{NH}_2 \)

(3) \( \text{NH}_2 \)

(4) \( \text{NH}_2 \)

62. \( \text{NO}_2 \) \( \text{Fe} + \text{HCl} \) \( P \) \( \text{HNO}_3 \) \( 5^\circ \text{C} \) \( Q \) \( R \) \( \text{yellow dye} \)

R is :-

(1) Aniline

(2) Phenol

(3) \( \beta \)-naphthol

(4) (\( \text{H}_3\text{PO}_4 + \text{H}_2\text{O} \))

63. Most reactive for nucleophilic substitution reaction is :-

(1) O\( \text{N} \)\( \text{O} \)\( \text{C} \)\( \text{Cl} \)

(2) \( \text{O} \)\( \text{C} \)\( \text{Cl} \)

(3) \( \text{Cl} \)\( \text{O} \)\( \text{C} \)\( \text{Cl} \)

(4) \( \text{H}_3\text{C} \)\( \text{O} \)\( \text{C} \)\( \text{Cl} \)

64. Salicylic acid on acetylation gives :-

(1) Salol

(2) Aspirin

(3) Schiff's base

(4) Sulpha drug

65. Which can show tautomerism :-

(1) (\( \text{CH}_3 \))\( _3 \)C–\( \text{NO}_2 \)

(2) \( \text{CH} = \text{CH} = \text{O} \)

(3) \( \text{H} – \text{CN} \)

(4) All

66. Most stable free radical is :-

(1) \( \text{CH} \)

(2) (\( \text{CH}_3 \))\( _3 \)\( \text{C} \)

(3) \( \text{CH} = \text{CH} – \text{CH}_2 \)

(4) \( \text{CH}_3 \)
67. \[ \text{CH}_3\text{-CH}_2\text{-Br} \xrightarrow{\text{NaCN}} \text{CH}_3\text{-CH}_2\text{Br} \xrightarrow{\text{H}_2\text{O}^\circ} \text{Y} \xrightarrow{(1) \text{NH}_3} \xrightarrow{(2) \Delta} \text{Z} \]

Z is:

(1) CH\text{_3}\text{-CH}_2\text{-CN}
(2) CH\text{_3}\text{-CH}_2\text{C}3\text{-NH}_2
(3) H\text{-C}3\text{-NH}_2
(4) CH\text{_3}\text{-CH}_2\text{-CH}_2\text{-NH}_2

68. Which of the following is most acidic:

(1) COOH
(2) COOH
(3) COOH
(4) COOH

69. \[ \text{CH}_3\text{-CH=CH}_2 \xrightarrow{\text{H-Br}_{\text{R},\text{O}_2}} \text{X} \xrightarrow{\text{LiAlH}_4} \text{Y}, \text{Y} \text{ is}:

(1) CH\text{_3}\text{-CH}_2\text{-CH}_3
(2) CH\text{_3}\text{-CH}_2\text{Li}
(3) CH\text{_3}\text{-} (\text{CH}_2)\text{_2}\text{-CH}_3
(4) (\text{CH}_3)\text{2CH}\text{-CH(CH}_3)\text{2}

70. \[ \text{Ph-C}=\text{CH} \xrightarrow{\text{HCl}_{\text{excess}}} \text{X} \xrightarrow{\text{KOH aq.}} \text{Y} \xrightarrow{3\text{H}_2\text{O}} \text{Z}, \text{Z is known as}:

(1) Schiff's reagent
(2) Magenta dye
(3) Schiffs dye
(4) Schiff's base

71. IUPAC name of given compound is:

(1) Deca-1, 6-dien-9-yne
(2) Deca-4, 9-dien-1-yne
(3) Nona-1, 6-dien-8-yne
(4) Nona-3, 8-dien-1-yne

72. \[ \text{C}=\text{CH} \xrightarrow{\text{dil. H}_2\text{SO}} \xrightarrow{\text{Hg}^2} \text{X} \xrightarrow{(1) \text{CH}_3\text{MgBr}} \xrightarrow{(2) \text{H}_2\text{O}} \text{Y}, \text{Y} \text{ is}:

(1) Ph-C-Me
(2) Ph\text{_3C-OH}
(3) Me-C-Ph
(4) Me\text{_3C-OH}
73. Glucose does not react with :-
   (1) Phenyl hydrazine  (2) 2, 4-DNP
   (3) CH$_3$-OH/H$^+$  (4) HCN/ OH

74. CH$_3$-CH=C$\xrightarrow{Ph}$ (1) O$_2$
    $\xrightarrow{Me}$ (2) H$_2$O/Zn X + Y

X and Y can be distinguished by :-
   (1) L$_2$/NaOH  (2) NaHSO$_3$
   (3) 2, 4-DNP  (4) All

75. Which of the following is not true :-
   (1) Nylon-2, Nylon-6 : Biodegradable polymer
   (2) Decron : Polyester
   (3) BuNa-S : Elastomer
   (4) Bakelite : Homopolymer

76. The kinetic energy of an electron in He$^+$ is maximum when it is present in the orbit having:-
   (1) n = 1  (2) n = 2  (3) n = 3  (4) n = ∞

77. The standard enthalpies of formation at 300 K for CCl$_4$(l), H$_2$O(g), CO$_2$(g) and HCl(g) are -107, -242, -394 and - 93 kJ mol$^{-1}$ respectively. The value of $\Delta U_{300K}$ for the reaction CCl$_4$(l) + 2H$_2$O(g) → CO$_2$(g) + 4HCl(g) is :-
   (1) -170 kJ mol$^{-1}$  (2) -175 kJ mol$^{-1}$
   (3) -182.5 kJ mol$^{-1}$  (4) - 282.5 kJ mol$^{-1}$

78. For a reaction A(g) ⇌ B(g) at equilibrium the partial pressure of B is found to be one fourth of the partial pressure of A. The value of $\Delta G^\circ$ of the reaction A → B is :-
   (1) RT ln4  (2) – RT ln4
   (3) RT log4  (4) – RT log4

79. Which of the following expression is true for the reaction N$_2$O$_5$(g) ⇌ 2NO$_2$(g), where $\alpha$ is degree of dissociation of N$_2$O$_4$ and P is equilibrium vapour pressure :-
   (1) $\alpha = \sqrt{(4P+k_p)/k_p}$  (2) $\alpha = \sqrt{k_p/(4P+k_p)}$
   (3) $\alpha = \sqrt{(4P-k_p)/k_p}$  (4) $\alpha = \sqrt{k_p/(4P-k_p)}$

80. The hydrolysis constant of anilinium acetate is (K$_a$ for CH$_3$COOH = 10$^{-5}$ and K$_b$ for C$_6$H$_5$NH$_2$ = 10$^{-4}$) :-
   (1) 10$^{-4}$  (2) 10$^{-9}$  (3) 10$^{-5}$  (4) 10$^5$

81. If nickel oxide has the formula Ni$_{1.08}$O$_{1.00}$. Then fraction of nickel exist as Ni$^{3+}$? 
   (1) 96%  (2) 4%  (3) 98%  (4) 2%

82. The osmotic pressure of 1M UREA solution at 27°C is :-
   (1) 2.46 atm  (2) 24.6 atm
   (3) 1.21 atm  (4) 12.1 atm
83. Which has lowest boiling point at 1 atm pressure?

<table>
<thead>
<tr>
<th>Option</th>
<th>Solvent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>0.1 M KCl</td>
</tr>
<tr>
<td>(2)</td>
<td>0.1 M Urea</td>
</tr>
<tr>
<td>(3)</td>
<td>0.1 M CaCl₂</td>
</tr>
<tr>
<td>(4)</td>
<td>0.1 M AlCl₃</td>
</tr>
</tbody>
</table>

84. The amount of Zinc needed to produce 112 ml of H₂ at STP on reaction with dil H₂SO₄ will be:

<table>
<thead>
<tr>
<th>Option</th>
<th>Amount (gm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>0.65</td>
</tr>
<tr>
<td>(2)</td>
<td>0.325</td>
</tr>
<tr>
<td>(3)</td>
<td>6.5</td>
</tr>
<tr>
<td>(4)</td>
<td>3.25</td>
</tr>
</tbody>
</table>

85. For the imaginary reaction:

\[ 2A + 3B \rightarrow \text{product} \]

\[ \text{rate} = k [A]^2 [B]^2 \]

If the rate is to be increased four times then:

(1) The conc. of A and B must be doubled
(2) The conc. of A should be \( \sqrt{2} \) times while that of B should be doubled
(3) The conc. of A should be doubled while that of B should be \( \sqrt{2} \) times
(4) None

86. For a reaction \( A \rightarrow \text{product} \), the rate law may be expressed as:

\[ \text{rate} = k [A]^n \]

The half-life for the reaction was halved as the initial conc. of A was doubled. The order is:

(1) 0     (2) 1
(3) 2     (4) 3

87. Given that \( E^0 (\text{Zn}^{2+} | \text{Zn}) = -0.763 \text{ V} \) and \( E^0 (\text{Cd}^{2+} | \text{Cd}) = -0.403 \text{ V} \). The emf of the following cell:

\[ \text{Zn} | \text{Zn}^{2+} (a = 0.004) || (a = 0.2) \text{ Cd}^{2+} | \text{Cd} \]

(1) \( E = -0.36 + [0.059/2] \log 0.004/0.2 \)
(2) \( E = +0.36 + [0.059/2] \log 0.004/0.2 \)
(3) \( E = -0.36 + [0.059/2] \log 0.2/0.004 \)
(4) \( E = +0.36 + [0.059/2] \log 0.2/0.004 \)

88. \( 10^{-4} \) gm of gelatin is required to be added to \( 100 \text{ cm}^3 \) of a standard gold solution to just prevent its precipitation by addition of 1 ml of 10% NaCl solution to it hence the gold no. of gelatin is:

(1) 10     (2) 1.0     (3) 0.1     (4) 0.01

89. When 1 Faraday charge is passed in the electrolytes of AgCl, CuCl₂, and AuCl₃ connected in series, then ratio of number of moles of Ag, Cu and Au deposited at cathode is:

(1) 1 : 2 : 3     (2) 3 : 2 : 1
(3) 6 : 3 : 2     (4) 2 : 3 : 6

90. What will be number of moles of electrons transfer when 1 mole HNO₃ converts to NO₂:

(1) 1     (2) 6     (3) 9     (4) 12
91. Identify the following diagram shown below as well as the related right class and name of sex organs and select the right option:

<table>
<thead>
<tr>
<th>Name of Organism</th>
<th>Class</th>
<th>Name of sex organ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetabularia</td>
<td>Rhodophyceae</td>
<td>Anthidia &amp; Archegonia</td>
</tr>
<tr>
<td>Chlamydomonas</td>
<td>Chlorophyceae</td>
<td>Globule &amp; Nucule</td>
</tr>
<tr>
<td>Chara</td>
<td>Chlorophyceae</td>
<td>Globule &amp; Nucule</td>
</tr>
<tr>
<td>Ulothrix</td>
<td>Phaeophyceae</td>
<td>Antheridia &amp; Oogonium</td>
</tr>
</tbody>
</table>

92. The four sketches (A, B, C and D) given below represent four different fungi. Which one of these is correctly identified in the options given along with its correct class and appropriate information?

<table>
<thead>
<tr>
<th>Sketch</th>
<th>Name of organism</th>
<th>Class</th>
<th>Appropriate information</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Aspergillus</td>
<td>Basidiomycetes</td>
<td>Aflatoxins</td>
</tr>
<tr>
<td>B</td>
<td>Rhizopus</td>
<td>Phycomycetes</td>
<td>Rust disease</td>
</tr>
<tr>
<td>C</td>
<td>Agaricus</td>
<td>Ascomycetes</td>
<td>Gill fungi</td>
</tr>
<tr>
<td>D</td>
<td>Penicillium</td>
<td>Ascomycetes</td>
<td>Blue and Green colour</td>
</tr>
</tbody>
</table>

93. Which of the following has the most advanced gametophyte?

(1) Spirogyra
(2) Oryza
(3) Pinus
(4) Funaria
94. Find the correct statements about fungi:­
(A) Most of the fungi are saprophytes
(B) Fungi can also survive as symbionts
(C) Sexual reproduction in fungi involves three steps
(D) Reduction division in fungi occurs in fruiting bodies which forms haploid spores
(1) A, B are correct
(2) C, D are correct
(3) A, B & C are correct
(4) A, B & D are correct

95. Find the incorrect about lichens:­
(1) They are symbiotic organisms
(2) They are made of two different organisms
(3) In lichen the alga is mycobiont and fungus is phycobiont.
(4) In them algae prepare food for itself and to fungal partner also

96. During unfavourable condition slime moulds form:­
(1) Conidia
(2) Pollen grain
(3) Fruiting bodies
(4) Gametes

97. Members of phycycomycetes are found in:­
(A) Aquatic habitats
(B) On decaying wood
(C) Moist and damp places
(D) As obligate parasites on plants
Choose from the following options:
(1) Only (A) and (C)
(2) Only (A) and (D)
(3) Only (B) and (C)
(4) All are correct

98. Which of the following is not the part of cell envelope?
(1) Cell wall
(2) Cell membrane
(3) Glycocalyx
(4) Cytoplasmic organelles

99. Following are the events that occur during meiosis:­
(A) Compaction of chromosomes start
(B) DNA replication
(C) Meiotic spindle assembled
(D) Dissolution of synaptonemal complex
(E) Action of recombinase enzyme
(F) Separation of sister chromatids
(G) Segregation of homologous chromosomes
(H) Formation of tetrad of cells
Which of the following is the correct sequence of events?
(1) B→A→E→D→C→F→G→H
(2) A→B→E→D→C→F→G→H
(3) B→A→C→D→F→E→G→H
(4) B→A→E→D→C→G→F→H
100. In a diploid cell there are 14 chromosomes and the DNA content is 2C after M-phase. What would have been the number of chromosomes and amount of DNA at G₁, after S and G₂ phase respectively?

<table>
<thead>
<tr>
<th>No. of chromosomes</th>
<th>Amount of DNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) 14, 14, 14</td>
<td>2C, 4C, 4C</td>
</tr>
<tr>
<td>(2) 14, 28, 28</td>
<td>2C, 2C, 4C</td>
</tr>
<tr>
<td>(3) 14, 14, 28</td>
<td>4C, 4C, 4C</td>
</tr>
<tr>
<td>(4) 28, 14, 14</td>
<td>4C, 2C, 2C</td>
</tr>
</tbody>
</table>

101. Find out the correct match from the following table.

<table>
<thead>
<tr>
<th>Column-I</th>
<th>Column-II</th>
<th>Column-III</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>Mitochondria</td>
<td>Cristae</td>
</tr>
<tr>
<td>(ii)</td>
<td>Lysosome</td>
<td>Single membrane bound</td>
</tr>
<tr>
<td>(iii)</td>
<td>Chloroplast</td>
<td>Thylakoids</td>
</tr>
</tbody>
</table>

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

102. Tonoplast is the :-
(1) Fluid present in vacuoles
(2) Fluid present in E.R. lumen
(3) Membrane of vacuole
(4) Membrane of E.R.

103. Which of the following statements are not correct?
(1) Schwann concluded that cell wall is a unique character of the plant cells.
(2) The cytoplasm is the main arena of cellular activities in both the plant and animal cells.
(3) The metacentric chromosomes have middle centromere forming two equal arms of chromosome.
(4) Nuclear envelope consists of two parallel membranes with a space between (30-100nm) called perinuclear space.
104. Which one of the following groups of animals is correctly matched with its one characteristic feature without even a single exception?

(1) Reptilia: possess 3-chambered heart with one incompletely divided ventricle
(2) Chordata: possess a mouth provided with an upper and a lower jaw
(3) Chondrichthyes: possess cartilaginous endoskeleton
(4) Mammalia: give birth to young ones

105. In the given table which animal is correctly matched with its taxon group and character.

<table>
<thead>
<tr>
<th>Animal</th>
<th>Taxon</th>
<th>Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balanoglossus</td>
<td>Hemichordata</td>
<td>Circulatory system is absent</td>
</tr>
<tr>
<td>Hippocampus</td>
<td>Chondrichthyes</td>
<td>Air bladder is present</td>
</tr>
<tr>
<td>Chameleon</td>
<td>Amphibia</td>
<td>Epidermal scales</td>
</tr>
<tr>
<td>Canis</td>
<td>Mammalia</td>
<td>Possessing Hair</td>
</tr>
</tbody>
</table>

106. Amphibians are considered to be intermediate between pisces and reptilia because:

a. They possess ventral heart
b. Both gill and pulmonary respiration occur in their life history.

c. Oviparity and viviparity are represented.
d. They are poikilothermal animals

Select the correct answer using the codes given below?

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

107. How many organisms in the list given below respire through gills?

Sponges, Coelenterates, Flatworms, Aquatic arthropods, Molluscs, Fishes, Tadpoles, Reptiles, Aves, Mammals

(1) Three (2) Six (3) Two (4) Four

108. Which of the following is floral formula of Tulip?

(1) \( \oplus P (3)_A (3)_G \)
(2) \( \oplus K (5) C (3) A (2)_G \)
(3) \( \% K (5) C_{1+2+2} A_{9+1} G_1 \)
(4) \( \oplus K_{2+2} G_A A_{2+4} G_2 \)
109. Which of the following match is correct?

<table>
<thead>
<tr>
<th>Column–I</th>
<th>Column–II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Cyathium</td>
<td>(i) Labiatae</td>
</tr>
<tr>
<td>(B) Verticillaster</td>
<td>(ii) Asteraceae</td>
</tr>
<tr>
<td>(C) Synandrous</td>
<td>(iii) Euphorbiaceae</td>
</tr>
<tr>
<td>(D) Syngenesious</td>
<td>(iv) Cucurbitaceae</td>
</tr>
</tbody>
</table>

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

110. Petiole in some plant expand, become green and synthesise food. This is known as ______ and occurs in ______. A & B is :-

(1) Phyllole, Citrus
(2) Pulvinus, Australian acacia
(3) Phyllole, Australian acacia
(4) Wing petiole, Australian acacia

111. Which is not a bast fibre?

(1) Jute  (2) Hemp  (3) Flax  (4) Cotton

112. Identify the component labelled A, B, C and D in the diagram below, from the list (i) to (viii). Select the their correct combination.

(i) Epidermis   (ii) Resin canal  
(iii) Hypodermis (iv) Pericycle  
(v) Metaxylem   (vi) Protoxylem  
(vii) Pith       (viii) Intra fascicular cambium

The correct components are :-

(A) A – ii, B – iii, C – vi, D – vii
(B) A – iii, B – iv, C – vi, D – vii
(C) A – iii, B – v, C – vi, D – vii
(D) A – iii, B – i, C – v, D – vii
113. Given below is the diagrammatic view of one microsporangium showing wall layers. Identify the parts labelled A, B, C and D, and select the right option about them:

Options:

<table>
<thead>
<tr>
<th>Part- [A]</th>
<th>Part- [B]</th>
<th>Part- [C]</th>
<th>Part- [D]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidermis</td>
<td>Endothecium</td>
<td>Microspore</td>
<td>Middle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mother</td>
<td>layers</td>
</tr>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epidermis</td>
<td>Endothecium</td>
<td>Microspore</td>
<td>Middle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mother</td>
<td>layers</td>
</tr>
<tr>
<td>(2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endothecium</td>
<td>Epidermis</td>
<td>Microspore</td>
<td>Middle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mother</td>
<td>layers</td>
</tr>
<tr>
<td>(3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endothecium</td>
<td>Epidermis</td>
<td>Microspore</td>
<td>Middle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mother</td>
<td>layers</td>
</tr>
<tr>
<td>(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

114. In adventive embryony embryos develop from:
(1) Endosperm
(2) Synergids
(3) Nucellus
(4) Antipodal cells

115. Triple fusion involves fusion of:
(1) Two male gametes and one egg cell
(2) Two egg cell and one male gamete
(3) Two male gametes and secondary nucleus
(4) One male gamete and secondary nucleus

116. Except which connective tissue, the cells of all connective tissue secrete fibres of structural proteins called collagen or elastin?
(1) Loose connective tissue
(2) Dense connective tissue
(3) Blood
(4) Areolar connective tissue
117. Mark correct statements :-
(A) Tight junction facilitate to communicance cells with each other.
(B) Columnar cells are found in the inner lining of stomach.
(C) Ciliated epithelium is present in the inner surface of some hollow organs.
(D) Compound epithelium has limited role in secretion.
(1) A, C, D (2) A, B (3) B, C, D (4) B, D

118. Identify a, b, c and d from given diagram :-

119. Which is a type of secondary protein structure ?
(1) α helix (2) β pleated (3) Collagen helix (4) All of these

120. The monomer unit of fungal cellulose are :-
(1) Mannitol (2) N acetyl glucosamine (3) Galaturonic acid (4) Ascorbic acid

121. Each molecule of lipid has :-
(1) One glycerol molecule (2) One fatty acid molecule (3) One glycerol molecule and three fatty acid molecules (4) Two amino acid

122. Oxidation of glycolytic FADH₂ give rise :-
(1) 2ATP (2) 3ATP (3) 1 ATP (4) Not related
123. Which is an example of C₄ plant?
   (1) Sugarcane  (2) Maize  
   (3) Sorghum  (4) All the above

124. 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

125. 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

126. Value of Km–constant (Michaelis–Menten 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) \( \frac{1}{6} V_{\text{max}} \)

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

128. Match the following pair:
   (A) Nitrogen Metabolism  (a) S
   (B) Death of Root & Shoot apex  (b) Mg
   (C) Specific parts of cystein  (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

129. Primary electron acceptor in z-scheme of photosynthesis is:
   (1) Plastocyanin  (2) fd
   (3) Cytochrome–b  (4) Pheophytin

130. Read the following statements and answer as asked next to them?
   (a) Digestion of protein is accomplished in ileum
   (b) Enterokinase is a intestinal enzyme
   (c) Haustra are enlarged rectal veins
   (d) For its activity carboxypeptidase requires zinc
   (e) Spicy food may cause indigestion
   How many of the above statements are correct?
   (1) Four  (2) One  (3) Two  (4) Three

123. कौन सा C₄ पदार्थ उदाहरण है?
   (1) गर्भावस्था  (2) मैज़े  
   (3) सोर्गम  (4) सबसे आगे दोनों

124. TCA चक्र में, एक लीटर के जेब वे जैसे कि उदाहरण किए जाने के समय में कितने अम्ल प्रदान किए जाते हैं?
   (1) 4  (2) 2  (3) 6  (4) 8

125. Ca-ABA द्वितीय यस्ते जैसे कि दाँत लगने के लिए कल है?
   (1) पौधे में अंदाज में ये भाग बदलता है  
   (2) CAM पौधों में रोशनी का खत्म होना  
   (3) रोशनी का बदला हो गया  
   (4) नाती सथे बंद में रोशनी वर्ष

126. Km–मिश्रक constant (Michaelis–Menten constant) का मान नए जैविक के लिए होगा?
   (1) \( \frac{1}{4} V_{\text{max}} \)  
   (2) \( \frac{1}{3} V_{\text{max}} \)  
   (3) \( \frac{1}{2} V_{\text{max}} \)  
   (4) \( \frac{1}{6} V_{\text{max}} \)

127. क्या आप हाइड्रेस्ट्रस को सफाई नतीजा नतीजा किस खबर में है?
   (1) ग्ल्यूकोज़  (2) फ्रूक्टोज़  
   (3) स्टार्च  (4) सुक्रोज

128. निम्न ने फिंड, ये को निम्न इंक्लोस:
   (A) नाइट्रोजन मेटाबलिंस (a) S
   (B) मृत्तिका और नींद की नींद की (b) Mg
   (C) स्पेशिफिक भाग की नींद की (c) Mo
   (D) पॉरफियरिन रिंग  (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

129. z-राखी में प्राइलिसेट के हिले को नया हो तो है?
   (1) ग्ल्यूकोज़  (2) फ्रूक्टोज़  
   (3) स्टार्च  (4) सुक्रोज

130. निम्न ने क्या ने को पहले कप में उधार करें?
   (a) प्रोटीन का पूरा पैक का इलाज में होता है?
   (b) एंटीज या जाने जैसे छोटे उधार करता है?
   (c) हार्स्ट्रस में में पूरा जा के का रोशनता?
   (d) का व्यवस्था से प्राप्त के संबंध में के बारे में है?
   (e) मसाले दार्जने जा अच्छा कर सकता है?
   (1) चार  (2) फाइबर  (3) दार्जलिंग  (4) तेल न
131. The below diagram represents a section of small intestinal mucosa showing villi. Identify A, B, C and D :-

(1) A - Villi, B - Lacteal, C - Capillaries, D - Crypts
(2) A - Lacteal, B - Crypts, C - Capillaries, D - Villi
(3) B - Villi, A - Lacteal, D - Crypts, C - Capillaries
(4) A - Crypts, B - Lacteal, C - Capillaries, D - Villi

132. Identify the correct labelling for the figure given below :-

(1) a – Dendron b – Synapse c – vesicle
(2) a – Axon b – Synaptic vesicles c – Receptors
(3) a – Axon b – Synaptic cleft c – Neurotransmitter
(4) a – Synapse b – Receptor c – Dendron
133. Find out the correct labelling in the following diagram?

Hormone (e.g., D)

- 133. निम्न चित्र में किस नाम का क्या चुनिये?

(1) A = Glucose, B = Genome, C = Receptor, D = Adrenaline
(2) A = Fats, B = DNA, C = Hormone Receptor complex, D = Thyroxine
(3) A = Proteins, B = DNA, C = Hormone Receptor complex, D = Adrenaline
(4) A = Proteins, B = Genome, C = Hormone Receptor complex, D = Oestrogen

134. Which brain structure converts short term memory to long term memory?

(1) Septal nuclei (2) Amygdala (3) Thalamus (4) Hippocampus

135. In the given figure identify the part of ear which is responsible for hearing and contains organ of corti.

(1) c, d and e (2) only g (3) only f (4) all of the above

136. In old age, immune response becomes low due to degeneration of:

(1) Pituitary gland (2) Parathyroid gland (3) Thymus gland (4) Pineal gland
137. The characteristics and an example of a synovial joint in humans is :-

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) lymph filled between two bones, limited movement</td>
<td>gliding joint between carpals</td>
</tr>
<tr>
<td>(2) fluid cartilage between two bones, limited movements</td>
<td>Knee joint</td>
</tr>
<tr>
<td>(3) fluid filled between two joints, provides cushion</td>
<td>skull bones</td>
</tr>
<tr>
<td>(4) fluid filled synovial cavity between two bones</td>
<td>joint between atlas and axis</td>
</tr>
</tbody>
</table>

138. Listed below are four respiratory capacities (a – d) and four jumbled respiratory volumes of a normal human adult :

<table>
<thead>
<tr>
<th>Respiratory capacities</th>
<th>Respiratory volumes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Residual volume</td>
<td>2500 mL</td>
</tr>
<tr>
<td>(b) Vital capacity</td>
<td>3500 mL</td>
</tr>
<tr>
<td>(c) Inspiratory reserve volume</td>
<td>1200 mL</td>
</tr>
<tr>
<td>(d) Inspiratory capacity</td>
<td>4500 mL</td>
</tr>
</tbody>
</table>

Which one of the following is the correct matching of two capacities and volumes?

1. (a) 4500 mL (b) 3500 mL
2. (b) 2500 mL (c) 4500 mL
3. (c) 1200 mL (d) 2500 mL
4. (d) 3500 mL (a) 1200 mL

139. What is the value of pO₂ in alveoli and tissues respectively?

(1) 104 mm Hg and 150 mm Hg
(2) 45 mm Hg and 0.3 mm Hg
(3) 104 mm Hg and 40 mm Hg
(4) 95 mm Hg and 159 mm Hg

140. Atrio-ventricular node (AVN) is situated in -

1. Lower left corner of left auricle, close to AV- septum
2. Lower left corner of right auricle, close to AV- septum
3. Upper left corner of right auricle, close to AV- septum
4. Upper left corner of left auricle, close to AV- septum
141. How do parasympathetic neural signals affect the working of the heart?
(1) Reduce both heart rate and cardiac output.
(2) Heart rate is increased without affecting the cardiac output.
(3) Both heart rate and cardiac output increase.
(4) Heart rate decreases but cardiac output increases.

142. Select the correct statement regarding the specific disorder of muscular or skeletal system:
(1) Myasthenia gravis - Autoimmune disorder which inhibits sliding of myosin filaments
(2) Gout - Inflammation of joints due to extra deposition of calcium
(3) Muscular dystrophy - Age related shortening of muscles
(4) Osteoporosis - Decrease in bone mass and higher chances of fractures with advancing age

143. The maximum amount of electrolytes and water (70 – 80 percent) from the glomerular filtrate is reabsorbed in which part of the nephron?
(1) Proximal convoluted tubule
(2) Descending limb of loop of Henle
(3) Ascending limb of loop of Henle
(4) Distal convoluted tubule

144. Which ion is reabsorbed in PCT and actively secreted into filtrate by DCT?
(1) Na	extsuperscript{+}
(2) HCO	extsubscript{3}
(3) K	extsuperscript{+}
(4) Glucose

145. Given Pedigree shows inheritance of autosomal dominant trait then. Find out genotype of A, B and C:
(1) A – Gg, B – Gg, C – gg
(2) A – GG, B – Gg, C – gg
(3) A – GG, B – GG, C – gg
(4) A – Gg, B – GG, C – gg
147. Which of the following cross produce four types of progenies in ratio of 1 : 1 : 1 : 1 →
A = AABB × aaBB  B = AaBb × aabb
C = AaBB × aabb  D = Aabb × aaBb
(1) A, B and C  (2) B and D
(3) B, C and D  (4) A, B, C and D

148. Select the correct statement with respect to linkage and recombination :-
(1) Tightly linked genes shows very low recombination
(2) Loosely linked genes shows higher linkage
(3) The non-parental combinations are due to linkage
(4) Tightly linked genes shows very high recombination

149. Given the diagram of the lac operon showing an operon of inducible enzymes. Identify components and enzymes (A, B, C, D and E).

(1) A-Galactosidase, B-Permease, C-Transacetylase, D-Repressor protein, E-Inducer (lactose)
(2) A-Galactosidase, B-Permease, C-Transacetylase, D-Inducer (lactose), E-Repressor protein
(3) A-Galactosidase, B-Transacetylase, C-Permease, D-Repressor protein, E-Inducer (lactose)
(4) A-Permease, B-Transacetylase, C-Galactosidase, D-Repressor protein, E-Inducer (Lactose)

150. A molecule that can act as genetic material must not have following properties :-
(1) It should be chemically and structurally highly active.
(2) It should be able to generate its replica.
(3) It should provide the scope for slow charges.
(4) It should be structurally more stable.
151. In DNA-replication leading strand replicates in :-
(1) 5’–3’ direction, continuously
(2) 3’–5’ direction, continuously
(3) 5’–3’ direction, discontinuously
(4) 3’–5’ direction, discontinuously

152. Consider the following four statements (a-d) and select the option which includes all the correct:-
(a) The codon is read in mRNA in a contiguous fashion.
(b) UAG codon has dual function in protein synthesis.
(c) In actual structure, the tRNA is a compact molecule which looks like inverted 'L'.
(d) 28's rRNA in bacteria also behave as ribozyme.
(1) b, c and d (2) a, b and d
(3) a, c and d (4) a and c

153. Biolistics procedure involves :
(1) Making transient pores in the cell membrane to introduce desired gene
(2) Purification of saline water with the help of a membrane system
(3) Opening of stomatal pore during night by artificial light
(4) Plant cells are bombarded with high velocity microparticle of gold tungsten coated with DNA

154. Given below in the figure of one of the most commonly used bioreactor.

In this flat bladed impeller helps in :-
(1) Maintaining the pH of medium
(2) Stirring the liquid medium
(3) Regulating temperature of medium
(4) Both (1) & (3)

155. Bacillus thuringiensis used in agriculture for :-
(1) Insect resistant plant
(2) Nematode resistant plant
(3) Herbicide resistant plant
(4) Antibiotic resistant plant
156. Ethanol is commercially produced through a particular species of: -
(1) Saccharomyces  (2) Clostridium  (3) Trichoderma  (4) Aspergillus

157. In England, the effect of industrialisation on moth is an example of: -
(1) Adaptive radiation  (2) Use and disuse of organs  (3) Natural selection  (4) Artificial selection

158. Hugo de Vries brought forth the idea of mutations by doing his work on organism:-
(1) Drosophila  (2) Neurospora  (3) Evening primrose  (4) Sheep

159. The most important role of mutation in evolution is:-
(1) Genetic drift  (2) Reproductive isolation  (3) Variation  (4) Natural selection

160. During Oogenesis in human, first maturation division starts ___A___ and completes ____B___.
(1) A-Before birth, B-Just prior to ovulation  (2) A-After birth, B-Before menopause
(3) A-Before ovulation, B-After entry of sperm  (4) A-Before ovulation, B-After fertilisation

161. What is correct regarding major features of embryonic development at various months of pregnancy?
(1) Brain become first functional organ at the end of 1st month of pregnancy
(2) Eye lashes separate at the end of second month of pregnancy
(3) Major organ are formed by the end of 12th week of pregnancy
(4) Isth movement of foetus is noticed in 3rd month of pregnancy

162. Why the chances of pregnancy are very low in a lactating women till six months after delivery?
(1) High levels of HCG in women kill sperms.
(2) High levels of estrogen and progesterone, secreted by the corpus luteum, that inhibit the secretion of gonadotropins.
(3) High levels of prolactin, inhibit the secretion of gonadotropins.
(4) All of these
163. For the given graph identify X, Y and Z:

- (1) X = Area, Y = Slope of curve, Z = Species richness
- (2) X = Area, Y = Species richness, Z = Intercept
- (3) X = Species richness, Y = Slope of curve, Z = Area
- (4) X = Species richness, Y = Area, Z = Slope of curve

164. Which of the following uses of biodiversity are related to the narrow utilitarian arguments for conserving biodiversity?

- (1) It is source of food.
- (2) It is source of industrial products.
- (3) It is source of medicines.
- (4) All of the above

165. A population has certain attributes that an individual organism does not, like:

- (a) birth
- (b) birth rate
- (c) death rate
- (d) sex ratio
- (1) a and d
- (2) a and b
- (3) b, c and d
- (4) c and d

166. Identify the correct match regarding plant diversity:

- (1) Angiosperms Fungi Mosses Algae Ferns Lichens
- (2) Fungi Angiosperms Mosses Algae Lichens Ferns
- (3) Angiosperms Algae Fungi Mosses Lichens Ferns
- (4) Angiosperms Fungi Algae Mosses Ferns Lichens
167. Mycorrhizae a relationship between fungi and roots of higher plants is:
(1) Parasitic relationship
(2) Saprophytic relationship
(3) Symbiotic relationship
(4) Epiphytic relationship

168. Climax vegetation of a region is generally:
(1) Xerophytic
(2) Hydrophytic
(3) Mesophytic
(4) Halophytic

169. Ecology at the level of organism tries to understand how different organisms are adapted to their environment in terms of not only survival but also reproduction. Thus referred as:
(1) synecology
(2) Physiological ecology
(3) behavioural ecology
(4) developmental ecology

170. Two closely related species competing for the same resources cannot co-exist indefinitely and the competitively inferior one will be eliminated eventually. This is explained by:
(1) resource partitioning
(2) competitive exclusion principle
(3) competitive release
(4) all of the above

171. When an important predator starfish Pisaster was experimentally removed from an enclosed intertidal area of communities of the American pacific coast, it resulted in extinction of more than 10 species of invertebrates with in a year. It demonstrates role of a predator as a factor for:
(1) preventing mutualism among prey species
(2) reducing the intensity of competition among competing prey species
(3) Over-exploitation of prey species
(4) reducing reproductive success in prey species
172. How many statements are correct?
(a) Net primary productivity is available biomass for consumption to heterotrophs
(b) Secondary productivity is defined as rate of formation of new organic matter by heterotrophs
(c) The annual net primary productivity of ocean is greater than land
(d) Warm and moist environment favours decomposition
(1) abcd (2) abc (3) abd (4) ac

173. How many statements are correct?
(a) In an aquatic ecosystem, grazing food chain is major conduits for energy flow
(b) Detritus food chain may be connected with grazing food chain at some level
(c) Each tropic level has a certain mass of living materials at a particular time called as standing crop
(d) Species composition and stratification are two main structural features of an ecosystem
(1) Two (2) Three (3) One (4) All

174. Response B

Main antibody produced in response B is :-
(1) IgM (2) IgG (3) IgD (4) IgA

175. Which one of the following options gives the correct matching of a disease with its causative organism and mode of infection?

<table>
<thead>
<tr>
<th>Disease</th>
<th>Causative Organisms</th>
<th>Mode of Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria</td>
<td>Plasmodium vivax</td>
<td>Bite of male Anopheles Mosquito</td>
</tr>
<tr>
<td>Typhoid</td>
<td>Salmonella typhi</td>
<td>With inspired air</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>Streptococcus pneumoniae</td>
<td>Droplet infection</td>
</tr>
<tr>
<td>Elephantiasis</td>
<td>Wuchereria bancrofti</td>
<td>With infected water and food</td>
</tr>
</tbody>
</table>

172. निम्न में से किने कथायें?
(a) वाचन प्रारंभ विकतर व दक्ष विवाह में विवाह उपलब्ध फल जैव चरण तक है।
(b) द्वितीय विकतर पक्ष विधि के अंतर्गत है।
(c) खुद विस्मय के लाभ विकतर विबंध के संस्करण की दर है।
(d) सूक्ष्म और गुणधर्म विभिन्न विनियम से अधिक कहाँ है।
(1) abcd (2) abc (3) abd (4) ac

173. निम्न में से किने कथायें?
(a) जीव पर्वत त्रमें चार रंग खाने खाने प्रचार या महार व्यू प्रशासन है।
(b) चार रंग त्रमें प्राचीन खाने खाने से दो प्रशासन है।
(c) फाइबर तस्वीर साधन प्रयोग के क्षुद्रता विविधता वाले को चार खाने खाने है।
(d) फाइबर तस्वीर को दो महत्व व्यू प्रशासन में विनियम तस्वीर वाले को चार रंग बनाए है।
(1) दो (2) तीन (3) चार (4) सभी

174. अनु. क्रिया A

प्रतिज्ञा का महान साथ । उ से प्रतिज्ञा का विधि कसर फाइल करने है।
(1) IgM (2) IgG (3) IgD (4) IgA

175. निम्न में से किसका तिथि प्रारंभ विवाह में कृत्तिका विवाह अनु. क्रिया B में उ रंग न मुख्य विकर्ता है?
(1) महार रंग (2) ग्राहिका रंग (3) ग्राहिका रंग (4) ग्राहिका रंग

<table>
<thead>
<tr>
<th>श्रेणी</th>
<th>वें फा या विवाह</th>
<th>वें सथाय का</th>
<th>संप्रभुता का</th>
<th>संप्रभुता का</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>महार रंग</td>
<td>वें फा या विवाह</td>
<td>संप्रभुता का</td>
<td>संप्रभुता का</td>
</tr>
<tr>
<td>(2)</td>
<td>दो फा या विवाह</td>
<td>वें सथाय का</td>
<td>संप्रभुता का</td>
<td>संप्रभुता का</td>
</tr>
<tr>
<td>(3)</td>
<td>निम्न में नाप</td>
<td>वें फा या विवाह</td>
<td>संप्रभुता का</td>
<td>संप्रभुता का</td>
</tr>
<tr>
<td>(4)</td>
<td>दो फा या विवाह</td>
<td>वें सथाय का</td>
<td>संप्रभुता का</td>
<td>संप्रभुता का</td>
</tr>
</tbody>
</table>
176. Identify the molecule A and B and choose the correct option from given below.

(A) \[
\begin{align*}
\text{A} & : \text{CH}_3 \quad \text{O} \\
& \quad \text{H}
\end{align*}
\]

(B) \[
\begin{align*}
\text{B} & : \text{O} \\
& \quad \text{H}
\end{align*}
\]

(1) A is obtained from Cannabis
(2) B has effect on CVS
(3) A is a stimulant
(4) B is obtained from opium

177. In malignant tumors the cells proliferate, grow rapidly and move to other parts of the body to form new tumors, this stage of disease is called as ?
(1) Metastasis
(2) Metachrosis
(3) Most feared property of malignant tumor
(4) 1 & 3 both

178. Wheat variety having a high protein content is :-
(1) Himigiri
(2) Pusa Gaurav
(3) Pusa Sawani
(4) Atlas 66

179. Match the following :-

<table>
<thead>
<tr>
<th>(A)</th>
<th>Totipotency</th>
<th>(i)</th>
<th>Virus free culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>(B)</td>
<td>Explant</td>
<td>(ii)</td>
<td>Capacity to generate a whole plant</td>
</tr>
<tr>
<td>(C)</td>
<td>Single cell protein (S.C.P.)</td>
<td>(iii)</td>
<td>Methylphilus</td>
</tr>
<tr>
<td>(D)</td>
<td>Meristem culture</td>
<td>(iv)</td>
<td>Part of plant use in tissue culture</td>
</tr>
</tbody>
</table>

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

180. The best breeding method for animals that are below average in productivity ?
(1) Cross breeding
(2) Out Crossing
(3) Inbreeding
(4) All the above