

# Motion

Question Paper [CODE - 27377]

NEET PATTERN TEST Brahmastra Major Test-02

13th NEET - Phase 13

KOTA

Date: 16-Mar-2025

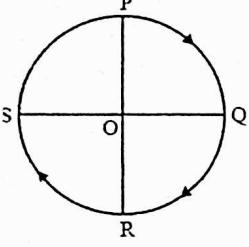
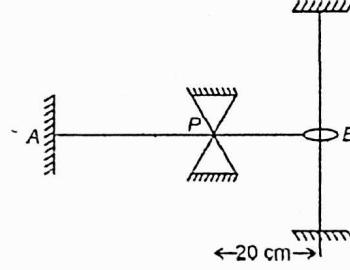
Duration: 3 Hours

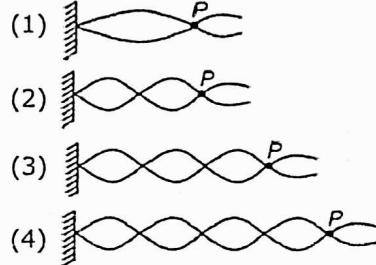
Max Marks: 720

IMPORTANT INSTRUCTIONS	महत्वपूर्ण निर्देश
<ol style="list-style-type: none"> <li>The test is of 3 hours duration and the Test Booklet contains 180 multiple-choice questions (four options with a single correct answer) from Physics (45 Ques.), Chemistry (45 Ques.) and Biology (90 Ques.). [All Questions are compulsory]</li> <li>Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, one mark will be deducted from the total score. The maximum marks are 720.</li> <li>Rough work is to be done in the space provided for this purpose in the Test Booklet only.</li> <li>Blank papers, Clipboards, Log tables, Slide Rule, Calculators, Cellular Phones, Pagers and Electronic Gadgets in any form are not allowed to be carried inside the examination hall.</li> </ol>	<ol style="list-style-type: none"> <li>परीक्षा अवधि 3 घंटा है एवं परीक्षा पुस्तिका में भौतिकी, (45 प्रश्न), रसायनशास्त्र (45 प्रश्न) एवं जीव विज्ञान (45 प्रश्न) विषयों से कुल 180 यहविकल्पीय प्रश्न हैं (4 विकल्पों में से एक सही उत्तर है)। [सभी प्रश्न अनिवार्य हैं]</li> <li>प्रत्येक प्रश्न 4 अंक का है। प्रत्येक सही उत्तर के लिए परीक्षार्थी को 4 अंक दिए जाएंगे। प्रत्येक गलत उत्तर के लिए कुल योग में से एक अंक घटाया जाएगा। अधिकतम अंक 720 हैं।</li> <li>रफ कार्य इस परीक्षा पुस्तिका में केवल निर्धारित स्थान पर ही करें।</li> <li>खाली पेपर, बिलप योर्ड, लॉग टेबल, स्लाइड रूल, कैलकुलेटर, सेल्फ्युलर फोन, पेजर और इलेक्ट्रोनिक गेंजेट्स को किसी भी रूप में परीक्षा डॉल के अंदर ले जाने की अनुमति नहीं है।</li> </ol>
GENERAL INSTRUCTION FOR FILLING THE OMR	OMR भरने के लिए सामान्य निर्देश
<ol style="list-style-type: none"> <li>Use Blue/Black Ball Point Pen only for marking responses on Answer Sheet (OMR sheet).</li> <li>Indicate the correct answer for each question by filling appropriate bubble in your OMR answer sheet.</li> <li>While filling the bubbles please be careful about Question Number</li> </ol>	<ol style="list-style-type: none"> <li>उत्तर पुस्तिका (OMR पुस्तिका) पर निरान लगाने के लिए केवल नीले/काले बॉल पॉइंट पेन का प्रयोग करें।</li> <li>उत्तर अपनी OMR उत्तर पुस्तिका में उपयुक्त गोले भरके प्रत्येक प्रश्न के लिए सही उत्तर अंकित करें।</li> <li>उत्तर गोले भरते समय प्ररन संख्या पर ध्यान दें।</li> </ol>

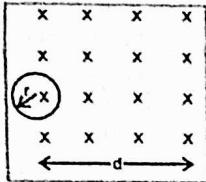
# PHYSICS

## [PHYSICS]

- 1.** In the equation  $y = 4 \cos\left(\frac{2\pi x}{50}\right) \sin(100\pi t)$ . Where x and y are in cm, t in sec. The node appears at x equal to (in cm)
- 12.5
  - 50
  - 20
  - $\frac{100}{2\pi}$
- 2.** A cyclist starts from the point P of a circular ground of radius 2 km and travels along its circumference to the point S. The displacement of a cyclist is –
- 
- 4 km
  - 6 km
  - $\sqrt{8}$  km
  - 8 km
- 3.** A long solenoid has 800 turns per metre length. A current of 1.6 A flows through it. The magnetic induction at the end of the solenoid on its axis is
- $15 \times 10^{-4}$  T
  - $8 \times 10^{-4}$  T
  - $32 \times 10^{-4}$  T
  - $4 \times 10^{-4}$  T
- 4.** An electric dipole, when held at  $30^\circ$  with respect to a uniform electric field of  $10^4$  N/C experiences a torque of  $9 \times 10^{-26}$  Nm. Calculate dipole moment of the dipole.
- $1.8 \times 10^{-27}$  C-m
  - $1.8 \times 10^{-20}$  C-m
  - $1.8 \times 10^{-29}$  C-m
  - $1.8 \times 10^{-31}$  C-m
- 5.** A thin flat circular disc of radius 4.5 cm is placed gently over the surface of water. If surface tension of water is  $0.07 \text{ N m}^{-1}$ , then the excess force required to take it away from the surface is:
- 1.98 mN
  - 99 N
  - 19.8 mN
  - 198 N
- 6.** A black body is at a temperature of 2880 K. The energy of radiation emitted by this object with wavelength between 499 nm and 500 nm is  $U_1$ , between 999 nm and 1000 nm is  $U_2$  and between 1499 nm and 1500 nm is  $U_3$ . The Wien's constant  $b = 2.88 \times 10^6 \text{ nm K}$ . Then :
- $U_1 = 0$
  - $U_3 = 0$
  - $U_1 > U_2$
  - $U_2 > U_1$
- 7.** A 1 meter long wire having tension T is fixed at A and free at B, as shown in figure. Point P is constrained to be stationary. What is the shape of the string for the fundamental mode of vibration?
- 



8. A conducting loop is pulled with a constant velocity towards a region of uniform magnetic field as shown in the figure then the current involved in the loop is ( $d > r$ )



- (1) Clockwise while entering
- (2) Anticlockwise while entering
- (3) Zero when partially outside
- (4) Anticlockwise while leaving.

9. A car is moving on a horizontal curved road with radius 50 m. The approximate maximum speed of car will be, if friction between tyres and road is 0.2. [Take  $g = 10 \text{ ms}^{-2}$ ]

- (1) 3 m/s
- (2) 22 m/s
- (3) 10 m/s
- (4)  $17\text{ms}^{-1}$

10. Electric field in a region is  $E = 3\hat{i} + 4\hat{j}$  V/m. Calculate potential difference between points A(2, 3) and B(5, 7).

- (1) 30 V
- (2) 35 V
- (3) 25 V
- (4) 20 V

11. Two wires are made of the same material and have the same volume. The first wire has cross-sectional area A and the second wire has cross-sectional area 3A. If the length of the first wire is increased by  $\Delta\ell$  on applying a force F, how much force is needed to stretch the second wire by the same amount?

- (1) 9 F
- (2) 6 F
- (3) 4 F
- (4) F

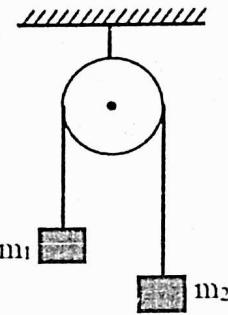
12. Calculate the ratio of the mean free path of the molecules of two gases if the ratio of the number density per  $\text{cm}^3$  of the gases is 5:3 and the ratio of the diameters of the molecules of the gases is 4:5.

- (1) 16:15
- (2) 15:16
- (3) 14:16
- (4) 15:18

13. Two tuning forks of frequency 250 Hz and 256 Hz produce beats. If a maximum is observed just now, after how much time the minimum is observed at the same place?

- (1)  $\frac{1}{18}\text{s}$
- (2)  $\frac{1}{6}\text{s}$
- (3)  $\frac{1}{12}\text{s}$
- (4)  $\frac{1}{24}\text{s}$

14. A light string passing over a smooth light fixed pulley connects two blocks of masses  $m_1$  and  $m_2$  ( $m_1 > m_2$ ). If the acceleration of the system is  $g/8$ , then the ratio of masses is:



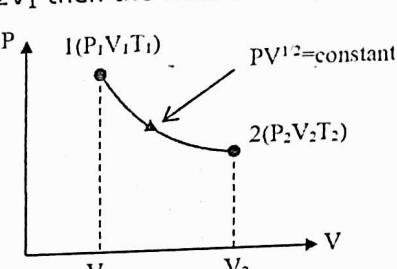
- (1)  $\frac{9}{7}$
- (2)  $\frac{5}{3}$
- (3)  $\frac{8}{1}$
- (4)  $\frac{4}{3}$

15. The current in an inductor is given by  $i = (2 + 3t)$  ampere, where t is in second. The self induced emf in it is 9 mV. The energy stored in the inductor at  $t=1\text{s}$  is

- (1) 10 mJ
- (2) 37.5 mJ
- (3) 75 mJ
- (4) zero

16. Masses and radii of earth and moon are  $M_1$ ,  $M_2$  and  $R_1$ ,  $R_2$  respectively. The distance between their centre is 'd'. The minimum velocity given to mass 'M' from the mid point of the line joining their centre so that it will escape:

- (1)  $\sqrt{\frac{4G(M_1+M_2)}{d}}$
- (2)  $\sqrt{\frac{4GM_1M_2}{d(M_1+M_2)}}$
- (3)  $\sqrt{\frac{2G}{d} \left( \frac{M_1+M_2}{M_1M_2} \right)}$
- (4)  $\sqrt{\frac{2G}{d} (M_1 + M_2)}$

17. Heat energy of 735 J is given to a diatomic gas allowing the gas to expand at constant pressure. Molecules does not oscillate. The increase in the internal energy of the gas will be :  
 (1) 572 J  
 (2) 441 J  
 (3) 525 J  
 (4) 735 J
18. Two sources of sound of the same frequency produce sound intensities  $I$  and  $4I$  at a point P when used individually. If they are used together such that the sounds from them reach P with a phase difference of  $2\pi/3$ , the intensity at P will be -  
 (1)  $2I$   
 (2)  $3I$   
 (3)  $4I$   
 (4)  $5I$
19. The number of turns in primary and secondary coils of an ideal transformer is 50 and 200 respectively. If the current in the primary coil is  $4A$ , then the current in the secondary coil is :  
 (1)  $1A$   
 (2)  $2A$   
 (3)  $4 A$   
 (4)  $5A$
20. Thermodynamic process is shown below on a P-V diagram for one mole of an ideal gas. If  $V_2 = 2V_1$  then the ratio of temperature  $T_2/T_1$  is:  
  
 (1)  $\frac{1}{\sqrt{2}}$   
 (2)  $\frac{1}{2}$   
 (3) 2  
 (4)  $\sqrt{2}$
21. A 2kg brick begins to slide over a surface which is inclined at an angle of  $45^\circ$  with respect to horizontal axis. The co-efficient of static friction between their surfaces is -  
 (1) 1  
 (2) 0.5  
 (3) 1.7  
 (4)  $\frac{1}{\sqrt{3}}$
22. Assertion : Geostationary satellites appear fixed from any point on earth.  
 Reason : The time period of geostationary satellite is 24 hours.  
 (1) Both (Assertion) and (Reason) are correct and (Reason) is not the correct explanation of (Assertion).  
 (2) (Assertion) is correct but (Reason) is not correct.  
 (3) (Assertion) is not correct but (Reason) is correct.  
 (4) Both (Assertion) and (Reason) are correct and (Reason) is the correct explanation of (Assertion).
23. A rocket of mass 5000 kg starts accelerating up from ground with acceleration  $10 \text{ m/s}^2$ . It is ejecting gas backward at rate  $10 \text{ kg/sec}$ . Find velocity (in m/s) of gas with respect to the rocket.  
 (1) 5000  
 (2) 10000  
 (3) 15000  
 (4) 20000
24. The work functions of cesium (Cs) and lithium (Li) metals are  $1.9 \text{ eV}$  and  $2.5 \text{ eV}$  respectively. If we incident a light of wavelength  $550 \text{ nm}$  on these two metal surfaces, then photo-electric effect is possible for the case of  
 (1) Both Cs and Li  
 (2) Neither Cs and Li  
 (3) Cs only  
 (4) Li only
25. The angle of projection for a projectile to have same horizontal range and maximum height is :  
 (1)  $\tan^{-1}(2)$   
 (2)  $\tan^{-1}\left(\frac{1}{2}\right)$   
 (3)  $\tan^{-1}(4)$   
 (4)  $\tan^{-1}\left(\frac{1}{4}\right)$

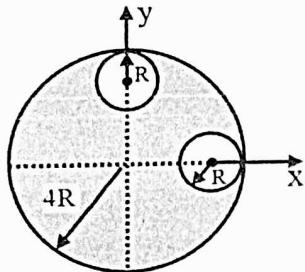
26. If an electron revolves in a circle of radius  $\pi/2$  cm with uniform speed  $6 \times 10^5$  m/s. Find the electric current. (Take,  $\pi^2 = 10$ )

(1)  $9.7 \times 10^{-13}$  A  
 (2)  $9.7 \times 10^{-10}$  A  
 (3)  $9.7 \times 10^{-8}$  A  
 (4)  $9.8 \times 10^{-12}$  A

27. If a rubber ball is taken at the depth of 200 m in a pool its volume decreases by 0.1%. If the density of the water is  $1 \times 10^3$  kg/m<sup>3</sup> and  $g = 10$  m/s<sup>2</sup>, then the volume elasticity in N/m<sup>2</sup> will be :

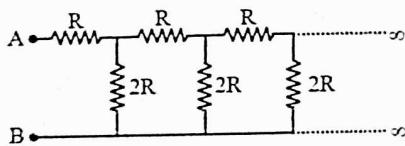
(1)  $10^8$   
 (2)  $2 \times 10^8$   
 (3)  $10^9$   
 (4)  $2 \times 10^9$

28. From the uniform circular disc of radius  $4R$  two small disc of radius  $R$  are cut off. The centre of mass of the new structure will be :



(1)  $i \frac{R}{5} + j \frac{R}{5}$   
 (2)  $-i \frac{R}{5} + j \frac{R}{5}$   
 (3)  $\frac{-3R}{14} (\hat{i} + \hat{j})$   
 (4) None of these

29. Find the equivalent resistance between A and B



(1)  $2R$   
 (2)  $4R$   
 (3)  $3R$   
 (4)  $5R$

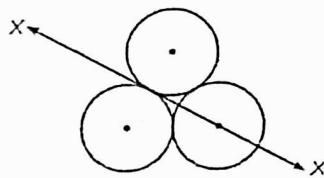
30. An electron moves in a Bohr's orbit. The magnetic field at the centre is proportional to:

(1)  $n^{-4}$   
 (2)  $n^{-5}$   
 (3)  $n^{-3}$   
 (4)  $n^{-2}$

31. An ideal monatomic gas undergoes a process follow the relation  $P \propto V$ . The molar specific heat of the gas is

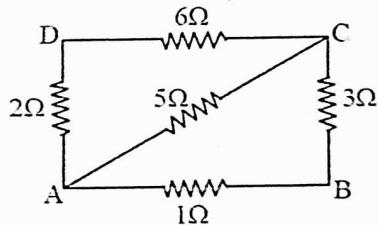
(1)  $\frac{R}{2}$   
 (2)  $R$   
 (3)  $2R$   
 (4)  $\frac{5}{3}R$

32. Three discs each of mass M and radius R are placed in contact with each other as shown in figure. Then, the moment of inertia of the system about an axis XX' is



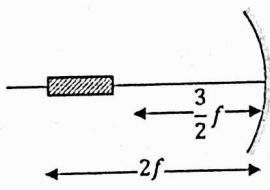
(1)  $\frac{MR^2}{4}$   
 (2)  $\frac{11MR^2}{4}$   
 (3)  $\frac{2MR^2}{3}$   
 (4)  $7MR^2$

33. In the given network of resistors, find the equivalent resistance between the points A and D.



(1)  $\frac{23}{37}\Omega$   
 (2)  $\frac{37}{23}\Omega$   
 (3)  $\frac{25}{37}\Omega$   
 (4)  $\frac{37}{25}\Omega$

34. A linear object is placed along the axis of a mirror as shown in figure. If 'f' is the focal length of the mirror then the length of image is

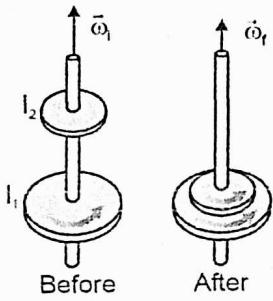


- (1)  $\frac{2f}{3}$
- (2)  $f$
- (3)  $\frac{f}{3}$
- (4) None of these

35. Heavy stable nuclei have more neutrons than protons. This is because of the fact that

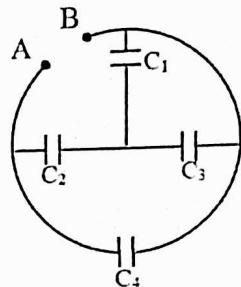
- (1) neutrons are heavier than protons
- (2) electrostatic force between protons are repulsive
- (3) neutrons decay into protons through beta decay
- (4) nuclear forces between neutrons are weaker than that between protons

36. A disk with moment of inertia  $I_1$  rotates about a frictionless, vertical axle with angular speed  $\omega_i$ . A second disk having moment of inertia  $I_2$  and initially not rotating, drops onto the first disk (fig). Because of friction between the surfaces, the two eventually reach the same angular speed  $\omega_f$ . The value of  $\omega_f$  is



- (1)  $\frac{I_1+I_2}{I_1}\omega_i$
- (2)  $\frac{I_1}{I_1+I_2}\omega_i$
- (3)  $\frac{I_1+I_2}{I_2}\omega_i$
- (4)  $\frac{I_1}{I_2}\omega_i$

37. In the arrangement of capacitors shown in figure, each capacitor is of  $9 \mu F$ , then the equivalent capacitance between the points A and B is



- (1)  $9 \mu F$
- (2)  $18 \mu F$
- (3)  $4.5 \mu F$
- (4)  $15 \mu F$

38. The critical angle for a denser-rarer interface is  $45^\circ$ . The speed of light in rarer medium is  $3 \times 10^8$  m/s. The speed of light in the denser medium is :

- (1)  $2.12 \times 10^8$  m/s
- (2)  $5 \times 10^7$  m/s
- (3)  $3.12 \times 10^7$  m/s
- (4)  $\sqrt{2} \times 10^8$  m/s

39. Suppose  $A = B^n C^m$ , where A has dimensions  $LT$ , B has dimensions  $L^2 T^{-1}$ , and C has dimensions  $LT^2$ . Then the exponents n and m have the values

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

40. An LED is constructed from a p-n junction diode using GaAsP. The energy gap is 1.9 eV. The wavelength of the light emitted will be equal to

- (1)  $10.4 \times 10^{-26}$  m
- (2) 654 nm
- (3) 654 Å
- (4)  $654 \times 10^{-11}$  m

41. A beam of light of wavelength  $\lambda = 600 \text{ nm}$  from a distant source falls on a single slit 1mm wide and the resulting diffraction pattern is observed on a screen 2m away. The distance between the first dark fringes on either side of central bright fringe is-

- (1) 1.2 cm
- (2) 1.2 mm
- (3) 2.4 cm
- (4) 2.4 mm

42. In a Vernier calipers the smallest division on the main scale is 0.5 mm, while the Vernier scale have 50 divisions equal to 49 div. of main scale. Find its least count :

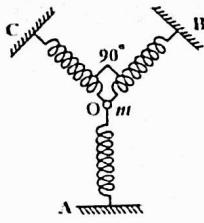
- (1) 0.01 mm
- (2) 1.00 mm
- (3) 0.0001 mm
- (4) 0.001 mm

43. In a P-N Junction diode not connected to any circuit
- (1) potential is the same every where
  - (2) the P - type side is at a higher potential than the n - type side
  - (3) there is an electric field at the junction directed form the n - type side to the P - type side
  - (4) there is an electric field at the junction directed form the P - type side to the n - type side

44. Two wavelengths of light  $\lambda_1$  and  $\lambda_2$  are sent through Young's double slit apparatus simultaneously. What must be true about  $\lambda_1$  and  $\lambda_2$  if the third order bright fringe of  $\lambda_1$  coincides with fifth order dark fringe of  $\lambda_2$  ?

- (1)  $3\lambda_1 = 2\lambda_2$
- (2)  $2\lambda_1 = 3\lambda_2$
- (3)  $3\lambda_1 = 5\lambda_2$
- (4)  $5\lambda_1 = 3\lambda_2$

45. A particle of mass  $m$  is attached to three identical springs A, B and C each of force constant  $k$  as shown in figure. If the particle of mass  $m$  is pushed slightly against the spring A and released then the time period of oscillations is

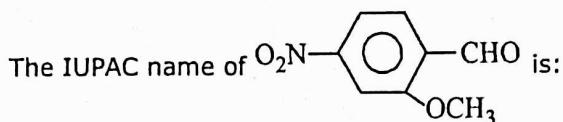


- (1)  $2\pi\sqrt{\frac{2m}{k}}$
- (2)  $2\pi\sqrt{\frac{m}{2k}}$
- (3)  $2\pi\sqrt{\frac{m}{k}}$
- (4)  $2\pi\sqrt{\frac{m}{3k}}$

# CHEMISTRY

## [CHEMISTRY]

46.



- (1) 2-Methoxy-4-nitro benzencarbaldehyde
- (2) 4-Nitro anisaldehyde
- (3) 3-Methoxy-4-formyl nitro benzene
- (4) 2-Formyl-4-nitro anisole

47. Suppose the elements X and Y combine to form two compounds  $XY_2$  and  $X_3Y_2$ . When 0.1 mole of  $XY_2$  weighs 10 g and 0.05 mole of  $X_3Y_2$  weighs 9 g, the atomic weights of X and Y are

- (1) 30 , 20
- (2) 40 , 30
- (3) 60 , 40
- (4) 20 , 30

48. A liquid when kept inside a thermally insulated closed vessel at  $25^\circ\text{C}$  was mechanically stirred from outside. What will be the correct option for the following thermodynamic parameters ?

- (1)  $\Delta U = 0$ ,  $q < 0$ ,  $w > 0$
- (2)  $\Delta U = 0$ ,  $q = 0$ ,  $w = 0$
- (3)  $\Delta U > 0$ ,  $q = 0$ ,  $w > 0$
- (4)  $\Delta U < 0$ ,  $q = 0$ ,  $w > 0$

49. Formation of a solution from two components can be considered as -

- (i) Pure solvent  $\rightarrow$  separated solvent molecules,  $\Delta H_1$
- (ii) Pure solute  $\rightarrow$  separated solute molecules,  $\Delta H_2$
- (iii) Separated solvent and solute molecules  $\rightarrow$  solution,  $\Delta H_3$

Solution so formed will be ideal if -

- (1)  $\Delta H_{\text{soln}} = \Delta H_1 + \Delta H_2 + \Delta H_3$
- (2)  $\Delta H_{\text{soln}} = \Delta H_1 + \Delta H_2 - \Delta H_3$
- (3)  $\Delta H_{\text{soln}} = \Delta H_1 - \Delta H_2 - \Delta H_3$
- (4)  $\Delta H_{\text{soln}} = \Delta H_3 - \Delta H_1 - \Delta H_2$

50.  $\text{PCl}_5$  is well known, but  $\text{NCl}_5$  is not. Because

- (1) nitrogen is less reactive than phosphorous
- (2) nitrogen doesn't have d-orbitals in its valence shell
- (3) catenation tendency is weaker in nitrogen than phosphorous
- (4) size of phosphorous is larger than nitrogen

51. Which one is the wrong statement?

- (a) The uncertainty principle is  $\Delta E \times \Delta t \geq h/4\pi$ .
- (b) Half filled and fully filled orbitals have greater stability due to greater exchange energy, greater symmetry and more balanced arrangement.
- (c) The energy of 2s orbital is less than the energy of 2p orbital in case of hydrogen like atoms.
- (d) de-Broglie's wavelength is given by  $\lambda = h/mv$ , where m = mass of the particle, v = group velocity of the particle.

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

52. The heat of neutralization is highest for reaction between

- (1)  $\text{NH}_4\text{OH}-\text{CH}_3\text{COOH}$
- (2)  $\text{HNO}_3-\text{NH}_4\text{OH}$
- (3)  $\text{NaOH}-\text{CH}_3\text{COOH}$
- (4)  $\text{HCl}-\text{NaOH}$

53. 10 gram of non volatile and non electrolyte solute with molecular mass 100  $\text{g mol}^{-1}$  is dissolved in 100 gram solvent to show  $0.3^\circ\text{C}$  elevation in boiling point. The value of molal ebullioscopic constant will be :

- (1) 10
- (2) 3
- (3) 0.3
- (4) unpredictable

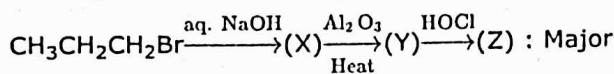
54. Before adding the reagents of group III, the solution is heated with some concentrated  $\text{HNO}_3$  in order to

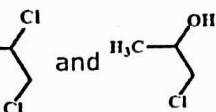
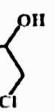
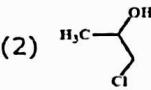
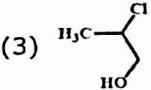
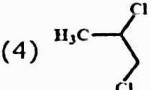
- Increase the  $\text{NO}_3^-$
- Lower than pH
- Oxidize  $\text{Fe}^{2+}$  to  $\text{Fe}^{3+}$
- Oxidize  $\text{Cr}^{3+}$  to  $\text{Cr}_2\text{O}_7^{2-}$

55. How many optically active isomers are possible for :  $\text{OHC}-\text{CH}(\text{OH})-\text{CH}(\text{OH})-\text{CH}_2\text{OH}$

- 0
- 2
- 4
- 6

56. Identify 'Z' in the following reaction series,



- (1) Mixture of  and 
- (2) 
- (3) 
- (4) 

57. Lowest oxidation state of phosphorous is in :

- $\text{H}_3\text{PO}_2$
- $\text{H}_3\text{PO}_4$
- $\text{H}_4\text{P}_2\text{O}_7$
- $\text{H}_3\text{PO}_3$

58. For a reaction  $\text{A} \xrightarrow{k_t=0.6 \text{ M min}^{-1}} \text{B}$

starting with 1 M of 'A' only, concentration of B (in M) after 100 sec. and 200 sec. is respectively?

- 2 and 4
- 1 and 2
- 2 and 3
- None of these

59. Which of the following aqueous solution has highest boiling point? (Assume all electrolytes are 100% ionisable)

- 0.1 m  $\text{KCl}$
- 0.1 m  $\text{K}_2\text{CO}_3$
- 0.01 m  $\text{Na}_3\text{PO}_4$
- 0.01 m  $\text{KCl}$

60. Which of the following is correct value of x in  $\text{Cr}(\text{CO})_x$ ?

- 2
- 4
- 6
- Unpredictable

61. Half life of a chemical reaction at a particular concentration is 75 min. When the concentration of the reactant is doubled, the half life becomes 150 min. what is the order of reaction.

- First order
- Zero order
- Second order
- Third order

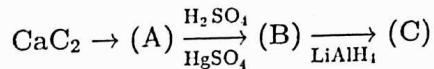
62. Select the correct statement(s).

- In lead-storage battery, galvanic cells are linked in series
- Cathode and anode compartments are not separated in a battery as oxidising agents and reducing agents both are solids
- Recharging of a storage battery is a non-spontaneous process
- All the above are correct statements

63. Which of the following hydrides has the least boiling point ?

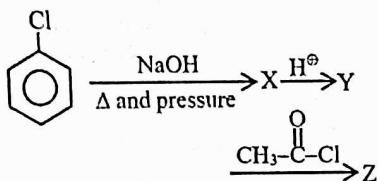
- $\text{H}_2\text{S}$
- $\text{H}_2\text{O}$
- $\text{H}_2\text{Se}$
- $\text{H}_2\text{Te}$

64. The end product of the following sequence of operations is:



- methyl alcohol
- ethyl alcohol
- acetaldehyde
- ethylene

65.



Z is

- (1) (2) (3) (4)

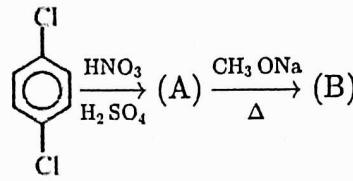
66. The equivalent conductances of  $\text{Ba}^{2+}$  and  $\text{Cl}^\theta$  are  $63.5 \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$  and  $76 \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$ , respectively, at infinite dilution. The equivalent conductance (in  $\text{ohm}^{-1} \text{ cm}^2$ ) of  $\text{BaCl}_2$  at infinite dilution will be

- (1) 139.5  
(2) 203.0  
(3) 279.0  
(4) 101.15

67. Ziegler-Natta catalyst is an organometallic compound containing

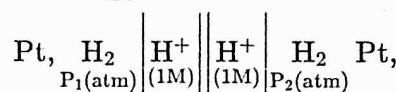
- (1) Iron  
(2) Titanium  
(3) Rhodium  
(4) Manganese

68.



- (1) (2) (3) (4)

69.



The cell reaction will be spontaneous if

- (1)  $\text{P}_1 > \text{P}_2$   
(2)  $\text{P}_1 < \text{P}_2$   
(3)  $\text{P}_1 = \text{P}_2$   
(4)  $\text{P}_1 = 1 \text{ atm}$

70. Assertion : Both  $\text{H}_2\text{O}$  and  $\text{SnCl}_2$  are bent molecules.

Reason : Both  $\text{H}_2\text{O}$  and  $\text{SnCl}_2$  are  $\text{sp}^2$  hybridised.

- (1) If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.  
(2) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.  
(3) If Assertion is True but the Reason is False.  
(4) If both Assertion & Reason are False.

71. A solution has pOH equal to 13 at 298 K. The solution will be  
 (1) highly acidic  
 (2) highly basic  
 (3) moderately basic  
 (4) unpredictable

72. If a molecule  $MX_3$  has zero dipole moment, the sigma bonding orbitals used by M are

- (1) Pure p  
 (2)  $sp$  hybrids  
 (3)  $sp^2$  hybrids  
 (4)  $sp^3$  hybrids

73. Most basic anion is :

- (1)  $HCOO^-$   
 (2)  $CH \equiv C^-$   
 (3)  $NH_2^-$   
 (4)  $CH_3\overset{\ominus}{CH}_2$

74. Which of the following has highest pH value in water -

- (1) NaCl  
 (2)  $Na_2CO_3$   
 (3)  $NaHCO_3$   
 (4) KCl

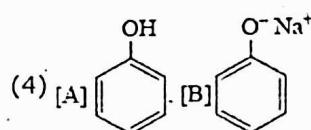
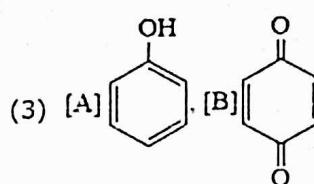
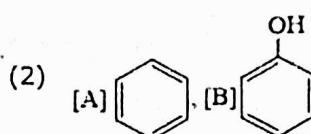
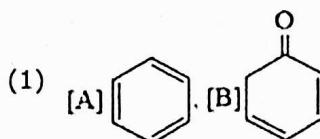
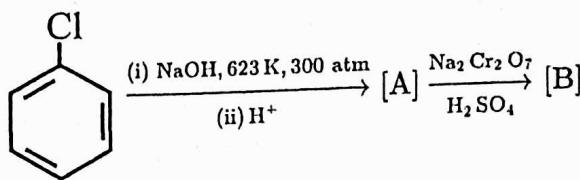
75. The hybrid state of sulphur in  $SO_2$  molecule is :

- (1)  $sp^2$   
 (2)  $sp^3$   
 (3) sp  
 (4)  $sp^3d$

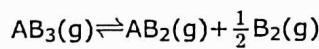
76. 2-Bromobutane on heating with alcoholic alkali forms -

- (1)  $\alpha$  - Butylene only  
 (2)  $\beta$  - Butylene only  
 (3) 20% of  $\beta$  - Butylene + 80% of  $\alpha$  - Butylene  
 (4) 80%  $\beta$  - Butylene + 20%  $\alpha$  - Butylene

77. Identify the products [A] and [B], respectively in the following reaction :



78.  $AB_3(g)$  is dissociates as



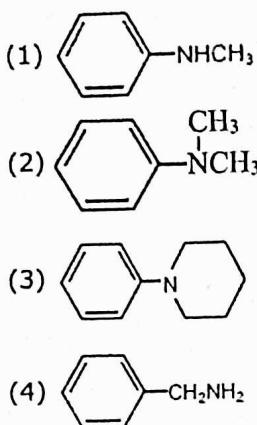
When the initial pressure of  $AB_3$  is 800 torr and the total pressure developed at equilibrium is 900 torr. what fraction of  $AB_3(g)$  is dissociated

- (1) 10%  
 (2) 20%  
 (3) 25%  
 (4) 30%

79. Which is incorrect order of acidic strength?

- (1)  $N_2O < NO < N_2O_3 < NO_2$   
 (2)  $SO_2 < SO_3$   
 (3)  $HOCl < HClO_2 < HClO_3 < HClO_4$   
 (4)  $CO_2 < B_2O_3 < BeO < Li_2O$

80. Which amine yields nitrosoamine after treatment with nitrous acid ( $\text{NaNO}_2, \text{HCl}$ )?

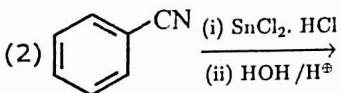


81. Which of the following is metalloid?

- (1) Sb  
(2) Mg  
(3) Zn  
(4) Bi

82. Benzaldehyde can not be synthesized by

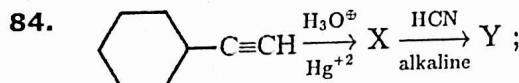
- (1) Rosenmund reduction of Benzoyl chloride



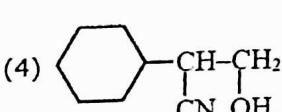
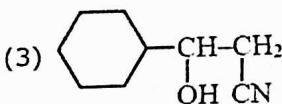
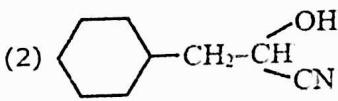
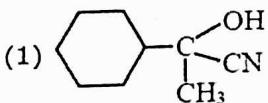
- (3) By Reimer-Tiemann reaction  
(4) Gattermann Koch reaction.

83. Which lanthanoid may exhibit +4 oxidation state?

- (1) Europium (Eu)  
(2) Terbium (Tb)  
(3) Ytterbium (Yb)  
(4) Lutetium (Lu)



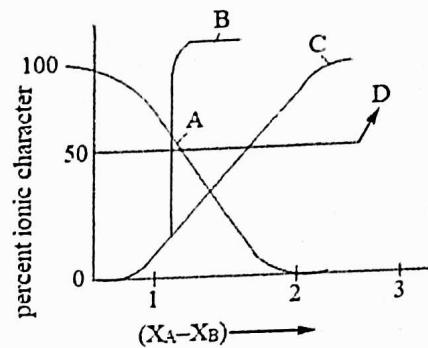
Y is :



85. Which of the following metal ions is precipitated when  $\text{H}_2\text{S}$  gas is passed in presence of  $\text{HCl}$ ?

- (1)  $\text{Co}^{2+}$   
(2)  $\text{Al}^{3+}$   
(3)  $\text{Bi}^{3+}$   
(4)  $\text{Mn}^{2+}$

86. For AB bond if per cent ionic character is plotted against electronegativity difference ( $X_A - X_B$ ), the shape of the curve would look like



The correct curve is

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

87. Steam distillation is applied for the separation of those compounds which are:

- (1) Steam volatile and soluble in water  
(2) Steam volatile and decompose in water  
(3) Steam volatile and insoluble in water  
(4) Capable of chemical reaction with steam

88. Which is correct increasing order of their tendency of the given elements to form  $\text{M}^{3-}$  ion?

- (1)  $\text{Bi} > \text{Sb} > \text{As} > \text{P} > \text{N}$   
(2)  $\text{Bi} < \text{Sb} < \text{As} < \text{P} < \text{N}$   
(3)  $\text{N} < \text{P} < \text{Sb} < \text{Bi} < \text{As}$   
(4)  $\text{Bi} > \text{Sb} > \text{N} > \text{P} > \text{As}$

89. The boiling point of water is exceptionally high because

- (1) Water molecule is linear x  
(2) Water molecule is not linear  
(3) There is covalent bond between H and O  
(4) Water molecules associate due to hydrogen bonding

90. **Assertion :** In  $AB_3L_2$  molecule both lone pairs are present at axial position

**Reason :** Both lone pair on axial position in  $AB_3L_2$  minimize overall valence shell electron pair repulsion

- (1) Both Assertion and Reason are correct and Reason is correct for the Assertion.
- (2) Both Assertion and Reason are correct but Reason is not correct for Assertion
- (3) Assertion is correct but Reason is incorrect.
- (4) Both Assertion and Reason are incorrect

# BIOLOGY

## [BIOLOGY]

**91.** Leaf in silk cotton tree is

- (1) Simple
- (2) Pinnately compound
- (3) Palmately compound
- (4) Ephemeral

**92.** Find out the **correct** match form the following:-

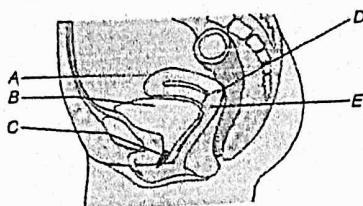
- (i) Larynx - sound box
  - (ii) Trachea- complete cartilaginous rings
  - (iii) Epiglottis - elastic cartilaginous flap
  - (iv) Alveoli - very thin, irregular walled, vascularised bag like structures.
  - (v) Pleural fluid - reduces friction on the lung surface
- (1) (i), (ii), (iii), (iv), (v)
  - (2) (i), (iii), (iv), (v)
  - (3) (i), (iii), (v)
  - (4) (i) and (v)

**93.** Match the phyla listed under column-I with the level of organization given under column-II, Choose the answer which gives the correct combination of the alphabets of the two columns:

Column-I (Phylum)	Column-II (Level of Organization)
A. Porifera	p. Tissue
B. Protozoa	q. Protoplasmic
C. Cnidaria	r. Organ-system
D. Chordata	s. Cellular

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

**94.** The following diagram refers to a female reproductive system of human. Identity A to E:-



- (1) A-Urethra, B-Uterus, C-Urinary bladder, D-Cervix, E-Vagina
- (2) A-Urethra, B-Urinary bladder, C-Uterus, D-Vagina, E-Cervix
- (3) A-Urethra, B-Urinary bladder, C-Uterus, D-Cervix, E-Vagina
- (4) A-Uterus, B-Urinary bladder, C-Urethra, D-Cervix, E-Vagina

**95.** Match the columns.

	Column-I		Column-II
a.	Planaria	(i)	Spores
b.	Protonema of moss	(ii)	Binary fission
c.	Amoeba	(iii)	Fragmentation
d.	Fungi	(iv)	Regeneration

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

**96.** Phenomenon when organisms resembling others for escaping from enemies is-

- (1) Adaptation
- (2) Mimicry
- (3) Homology
- (4) Analogy

**97.** **Assertion :-** Both PS-I and PS-II are located on stroma thylakoid membrane.

**Reason:-** Photolysis of water and reduction of NADP+ takes place in stroma site.

- (1) If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
- (2) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
- (3) If Assertion is True but the Reason is False.
- (4) If both Assertion & Reason are false.

98. Which of following bone is not a flat bone:-

- Vertebrae
- Scapula
- Ribs
- Sternum

99. Onion and garlic both belong to the family :-

- Cucurbitaceae
- Gramineae
- Compositae
- Liliaceae

100. Which of the following statement is **incorrect**-

- Respiratory rhythm centre is primarily responsible for the regulation of respiration
- Pneumotaxic centre can moderate the functions of the respiratory rhythm centre.
- A chemosensitive area is situated adjacent to the rhythm centre.
- The chemosensitive area is highly sensitive to O<sub>2</sub> and Na<sup>+</sup> ions.

101. Find out the **incorrect** statements

- Sponges are generally marine and mostly asymmetrical animals.
  - Sponges are mostly dioecious
  - Sponges have a water vascular system
  - Choanocytes or collar cells line the spongocoel
  - Water enter through the osculum in the body.
- (i) (ii) (iii)
  - (ii) (iv) (v)
  - (ii) (iii) (iv)
  - (ii) (iii) (v)

102. **Assertion** :- In pregnancy the level of the other hormones like estrogen, progestogens, cortisol, prolactin, and thyroxine are increase in maternal blood.

**Reason** :- Increased production of these hormones is essential for supporting the fetal growth, metabolic changes in the mother and maintenance of pregnancy.

- If both Assertion and Reason are True and Reason is a correct explanation of Assertion.
- If both Assertion and Reason are True but Reason is not the correct explanation of Assertion.
- If Assertion is True but the Reason is False.
- If both Assertion and Reason are False.

103. How many of the following do/does **not** belong to Class?

Diptera,	Primates,	Mammalia,	Insecta,
Dicotyledonae,	Arthropoda,	Angiospermae	

- 3
- 4
- 5
- 6

104. The equation which describes Verhulst Pearl Logistic Growth of a population is  
[Here, N = Population density at time t, r = Intrinsic rate of natural increase, K = Carrying capacity]

- $dN/dt = rN \left[ \frac{K-N}{K} \right]$
- $\frac{dt}{dN} = rN \left[ \frac{K}{K-N} \right]$
- $dt/dN = rN \left[ \frac{K-N}{K} \right]$
- $dN/dt = rN \left[ \frac{K}{K-N} \right]$

105. How many ATP are used in reduction phase of Calvin cycle with respect to the fixation of each CO<sub>2</sub> molecule?

- 3 ATP
- 6 ATP
- 12 ATP
- 2 ATP

106. Identify the basic functions of PNS :

- Relays impulses from CNS to skeletal muscles
- Transmits impulses from CNS to involuntary organs
- Transmits impulses from CNS to smooth muscles
- All of these

107. Floral formula of Solanaceae is :-

- $\Theta \text{ } K_{(5)} \text{ } C_{(5)} \text{ } A_5 \text{ } G_{(2)}$
- $\Theta \text{ } K_{(5)} \text{ } C_{(5)} \text{ } A_5 \text{ } G_1$
- $\% \text{ } K_5 \text{ } C_5 \text{ } A_{5+5} \text{ } G_1$
- $\% \text{ } K_{(12)} \text{ } C_{(23)} \text{ } A_{1+2} \text{ } G_{(2)}$

**108.** Person with blood group AB is considered as universal recipient because he has :

- (1) Both A and B antigens on RBC but no antibodies in the plasma.
- (2) Both A and B antibodies in the plasma
- (3) No antigen on RBC and no antibody in the plasma
- (4) Both A and B antigens in the plasma but no antibodies.

**109.** Match List I with List II

List-I		List-II	
A. Pterophyllum	I.	Hag fish	
B. Myxine	II.	Saw fish	
C. Pristis	III.	Angel fish	
D. Exocoetus	IV.	Flying fish	

Choose the correct answer from the options given below :

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

**110.** Spermatogenesis starts at the age of puberty due to significant increase in the secretion of:-

- (1) GnRH from anterior pituitary gland
- (2) GnRH from posterior pituitary gland
- (3) GnRH from hypothalamus
- (4) Somatostatin from hypothalamus

**111.** Which organism is responsible for the red surface of the sea?

- (1) Euglena
- (2) Gonyaulax
- (3) Amoeba
- (4) Paramecium

**112.** Read the following statements and select the correct option.

**Statement 1 :** According to Gause's 'Competitive Exclusion Principle', two closely related species competing for the same resources can co-exist indefinitely.

**Statement 2 :** Majority of parasites reduce the survival, growth and reproduction of the host and reduce its population density.

- (1) Only statement 1 is correct
- (2) Only statement 2 is correct
- (3) Both the statements are correct
- (4) Both the statements are incorrect

**113.** Match the List-I with List-II and select correct answer:-

	List-I (Mitochondrial component)	List-II (Complex)
A	ATP synthase	i Complex-I
B	FMN – NADH <sub>2</sub> dehydrogenase	ii Complex-II
C	CoQ – FADH <sub>2</sub> dehydrogenase	iii Complex-III
D	Cyt.a-cyt.a <sub>3</sub>	iv Complex-IV
E	Cyt.b-cyt.c <sub>1</sub>	v Complex-V

(1)

A	B	C	D	E
v	ii	i	iii	iv

(2)

A	B	C	D	E
v	iii	ii	i	iv

(3)

A	B	C	D	E
v	i	ii	iv	iii

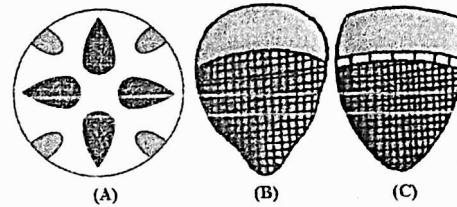
(4)

A	B	C	D	E
v	iv	iii	ii	i

**114.** In dendrites of a neuron are?

- (1) Long unbranched process associated with cell body and axon
- (2) Short fibres which branch repeatedly and project out of cell body
- (3) Long branched process associated with cell body
- (4) Short unbranched processes associated with cell body

**115.** The types of vascular bundles (A, B and C) given below are present in



(1) A-Monocot leaf, B-Dicot stem, C-Monocot stem

(2) A-Root, B-Dicot stem, C-Monocot stem

(3) A-Root, B-Monocot stem, C-Dicot stem

(4) A-Monocot root, B-Monocot leaf, Monocot stem

**116.** In yeast during anaerobic respiration how many glucose molecules are required for production of 38 ATP?

(1) 1

(2) 2

(3) 19

(4) 38

- 117.** Given below are four statements (I to IV) regarding human blood circulatory system.  
 (I). Arteries are thick walled and have narrow lumen as compared to veins.  
 (II). Angina is acute chest pain when the blood circulation to the brain is reduced.  
 (III). Person with blood group AB can donate blood to any person with any blood group ABO system.  
 (IV). Calcium ions play a very important role in blood clotting.

Which of the above two statements are **correct** ?

- (1) I & IV
- (2) I & II
- (3) II & III
- (4) III & IV

- 118.** Match the following -

a. Cnidoblasts	(i)	Help in locomotion
b. Comb plates	(ii)	Rasping organ
c. Proboscis gland	(iii)	Balancing organ
d. Radula	(iv)	Anchorage, defense, capture prey
e. Statocyst	(v)	Help in excretion

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

- 119.** Select the **correct** matching in given column

	<b>Column-I</b>	<b>Column -II</b>
I	Non-Medicated IUDs	A. Lippes loop
II	Hormone releasing IUDs	B. Multiload 375
III	Copper releasing IUDs	C. Cu T
		D. Cu 7
		E. LNG-20
		F. progestasert

- (1) I-B; II-E; F; III-A; C, D
- (2) I-B; II-A; F; III-C; D, E
- (3) I-A; II-B; F; III-C; D, E
- (4) I-A; II-E; F; III-B; C, D

- 120.** In the five kingdom classification, Chlamydomonas and Chlorella are included in:-

- (1) Plantae
- (2) Algae
- (3) Protista
- (4) Monera

- 121.** Drosera, Utricularia, Nepenthes are the example of-

- (1) Secondary consumer
- (2) Producer
- (3) Predator
- (4) All of the above

- 122.** **Assertion :-** Response of steroid hormones are slow but long lasting.

**Reason :-** Steroidal hormones regulate gene expression by interaction of H-R-C with genome.

- (1) If both Assertion and Reason are True and Reason is a correct explanation of Assertion.
- (2) If both Assertion and Reason are True but Reason is not the correct explanation of Assertion.
- (3) If Assertion is True but the Reason is False.
- (4) If both Assertion and Reason are False.

- 123.** (A) All stomata have two bean shape guard cell.

- (B) In roots radial vascular bundle is present.
- (C) Casperian strip is found in endodermis of stem.

Find true and false:-

- (1) All are true
- (2) Only B is true
- (3) Both A & C are true
- (4) All are false

- 124.** Which one of the following blood vessel in mammals contains maximum amount of urea-

- (1) Hepatic portal vein
- (2) Hepatic vein
- (3) Dorsal aorta
- (4) Renal vein

- 125.** Which of the following tissue covers moist surface of buccal cavity and pharynx-

- (1) Cuboidal epithelium
- (2) Columnar epithelium
- (3) Transitional epithelium
- (4) Stratified epithelium

**126.** Embryological support for evolution was proposed by \_\_\_\_\_ based upon the observation of certain features during embryonic stage common to all vertebrates that are absent in adult.

- (1) Ernst Mayr
- (2) JBS Haldane
- (3) Ernst Haeckel
- (4) Charles Lyell

**127.** Match the following columns and choose the correct option.

Column-I	Column-II
1. Ascomycetes	a. Neurospora
2. Deuteromycetes	b. Ustilago
3. Phycomycetes	c. Colletotrichum
4. Basidiomycetes	d. Albugo

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

**128.** State true (T) or false (F) for the following statements and choose the correct option.

- a. Detritus is the raw material for decomposition.
- b. Pyramid of biomass of an aquatic ecosystem is inverted.
- c. Least productive ecosystem is desert and deep sea.

- (1) a-F, b-F, c-F
- (2) a-F, b-T, c-T
- (3) a-T, b-T, c-T
- (4) a-T, b-F, c-T

**129.** Identify the correct set of statements:

- (a) The compounds that are oxidised during respiration are known as respiratory substrates.
- (b) In fermentation, say by yeast, the incomplete oxidation of glucose is achieved under anaerobic conditions by sets of reactions where pyruvic acid is converted to ethanol & CO<sub>2</sub>.
- (c) During the conversion of succinyl CoA to succinic acid, molecule of GTP is synthesised.
- (d) Citric acid is the last stable product of TCA cycle.

Choose the **correct** answer from options given below:

- (1) a, c and d only
- (2) a, b and c only
- (3) b, c and d only
- (4) c and d only

**130.** How many pair of statements are **true** about thyroid gland?

- (a) Hyperthyroidism during pregnancy causes defective development and maturation of the growing baby leading to stunted growth.
- (b) In adult women hypothyroidism cause menstrual cycle to become irregular.
- (c) Exophthalmic goiter is a form of hypothyroidism
- (d) Iodine is essential for the normal rate of hormone synthesis in the thyroid.

- (1) Pair a and b

- (2) Pair of a and c

- (3) Pair of b and d

- (4) Pair of b and c

**131.** Industrial melanism is an example of :

- (1) Neo Lamarckism
- (2) Neo Darwinism
- (3) Natural selection
- (4) Mutation

**132.** A character which is expressed in a hybrid is called

- (1) Dominant
- (2) Recessive
- (3) Co-dominant
- (4) Epistatic

**133.** An adult human excretes, on an average \_\_\_\_\_ litre of urine per day-

- (1) 1 to 1.5 litre
- (2) 2 to 2.5 litre
- (3) 2.5 to 3 litre
- (4) 3 to 3.5 litre

**134.** **Statement-I :** Head of cockroach is triangular in shape and lies posteriorly at right angles to longitudinal body axis.

**Statement-II :** Thorax of cockroach is made up of 3 segments and each segment has 3 pair of legs

- (1) Both statements I and II are correct.
- (2) Both statements I and II are incorrect.
- (3) Only statement I is correct.
- (4) Only statement II is correct.

**135.** In the moss life cycle, the sporophyte.

- (1) consists of leafy green shoots
- (2) is the heart shaped prothallus
- (3) consists of a foot, a stalk seta and a capsule
- (4) is the dominant generation

- 136.** In most ecosystems, all the pyramids of number, energy and biomass are upright. It indicates that:-  
 (a) Producers are more in number and biomass than the herbivores.  
 (b) Herbivores are less in number and biomass than the carnivores.  
 (c) Energy at a lower trophic level is always more than at a higher level.  
 Choose the correct option.  
 (1) Only (a) is correct  
 (2) Only (b) is correct  
 (3) Both (a) and (c) are correct  
 (4) Both (b) and (c) are correct
- 137.** When electron flow along the electron transport chain of mitochondria which of the following changes occur:-  
 (a) pH of the matrix increase  
 (b) ATP synthase pumps proton by active transport  
 (c) NAD<sup>+</sup> is oxidized  
 (1) Only (a)  
 (2) (a) and (b)  
 (3) (b) and (c)  
 (4) (a), (b) and (c)
- 138.** Hormone secreted during child birth is:  
 (1) Thyroxine  
 (2) Relaxin  
 (3) Progesterone  
 (4) Glucocorticoid
- 139.** Mendel conducted artificial-pollination/cross-pollination experiments using several:-  
 (1) true-breeding garden pea lines  
 (2) true-breeding sweet pea lines  
 (3) hybrid garden pea lines  
 (4) hybrid sweet pea lines
- 140.** Which one of the following statement is incorrect?  
 (1) The medullary zone of kidney is divided into a few conical masses called medullary pyramids projecting into the calyces.  
 (2) Inside the kidney, the cortical region extends in between the medullary pyramids as renal pelvis.  
 (3) Glomerulus along with Bowman's capsule is called the renal corpuscle  
 (4) Renal corpuscle, proximal convoluted tubule (PCT) and distal convoluted tubule (DCT) of the nephron are situated in the cortical region of kidney
- 141. Assertion (A):** In severe cases of pneumonia, the lips and finger nails may turn gray to bluish in colour.  
**Reason (R):** Bacteria like *Streptococcus pneumoniae* and *Haemophilus influenzae* are responsible for pneumonia disease.  
 (1) Both (A) and (R) are true and (R) is the correct explanation of (A).  
 (2) Both (A) and (R) are true but (R) is not the correct explanation of (A).  
 (3) (A) is true statement but (R) is false.  
 (4) Both (A) and (R) are false.
- 142.** sexual reproduction is oogamous in.  
 (1) green algae  
 (2) brown algae  
 (3) red algae  
 (4) all of these
- 143.** Choose the incorrect statement regarding decomposer:-  
 (1) They may be prokaryotes or eukaryotes  
 (2) They may be unicellular or multicellular  
 (3) They convert inorganic into organic compounds  
 (4) They play a great role in ecology
- 144.** Read the following statements regarding arithmetic growth and select the correct answer :  
 (i) Rate of growth is constant  
 (ii) One daughter cell remains meristematic while the other one differentiates and matures.  
 (iii) Mathematical expression is  $L_t = L_0 + rt$   
 (1) Statements (i) and (ii) are correct  
 (2) Statements (ii) and (iii) are correct  
 (3) Statements (i) and (iii) are correct  
 (4) All statements are correct
- 145.** The person with turner's syndrome has -  
 (1) 45 autosomes and x chromosome  
 (2) 44 autosomes and xxy chromosome  
 (3) 45 autosomes and xxy chromosome  
 (4) 44 autosomes and x chromosome

- 146.** Select the correct statements from options given below :-

(A) Production of IgE antibody increase during allergy  
 (B) Innate immunity is specific type of defence.  
 (C) T lymphocytes mediate cell mediated immunity  
 (D) IgG antibody is present in colostrum.  
 (E) Rheumatoid arthritis is an example of auto immune disorder.

- (1) A, B, C  
 (2) B, C, D  
 (3) A, C, E  
 (4) B, D, E

- 147.** In some pteridophytes sporophylls may form distinct compact structures called strobili or cones like in-

- (1) Selaginella  
 (2) Equisetum  
 (3) Funaria  
 (4) Both (1) and (2)

- 148.** If decomposers are removed from ecosystem then:

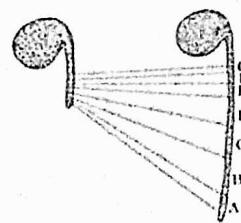
- (1) Mineral recycling will be stopped.  
 (2) Energy flow is blocked.  
 (3) Rate of decomposition will be high.  
 (4) Herbivores receive more solar radiation.

- 149.** Match column-I with column-II and choose the correct combination from the options given below.

Column-I	Column-II
(a) Natural auxin	(i) ABA
(b) Synthetic auxin	(ii) IBA
(c) Stress hormone	(iii) NAA
(d) Zeatin	(iv) Cytokinin

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

- 150.** Below diagram shows the parallel line technique which is used:-



- (1) to ensure the germination of seeds.  
 (2) to detect the zone of elongation.  
 (3) to measure the growth rate  
 (4) to measure the length of plant

- 151.** Which of the following character show quantitative inheritance:-

- (1) Blood group inheritance  
 (2) Plant height in Pisum sativum  
 (3) Skin colour in human  
 (4) Flower colour in pea

- 152.** (i) A are obtained from the inflorescences of the hemp plant.

(ii) B is a white, odourless, bitter crystalline compound.

Choose the option that correctly fills the blanks **A** and **B** respectively.

- (1) A→Cocaine, B→Morphine  
 (2) A→Cannabinoids, B→Heroine  
 (3) A→Heroin, B→Morphine  
 (4) A→Atropine, B→Hashish

- 153.** Match the following list of bacteria and their commercially important products-

Bacterium	Product
(a) Aspergillus niger	(i) Acetic acid
(b) Acetobacter aceti	(ii) Lactic acid
(c) Clostridium butylicum	(iii) Citric acid
(d) Lactobacillus	(iv) Butyric acid

Choose the correct match-

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

- 154.** Which one of the following is not included under in situ conservation?

- (1) National Park  
 (2) Wildlife sanctuary  
 (3) Zoological Garden  
 (4) Biosphere Reserve

**155.** The symbol of empty circles used in pedigree analysis represents

- (1) Normal female
- (2) Normal male
- (3) Affected female
- (4) Affected male

**156.** Nicotinamide adenine dinucleotide (NAD) and NADP contain the vitamin niacin are example of

- (1) Prosthetic groups
- (2) Co-enzymes
- (3) Metal ions
- (4) All of these

**157.** According to Robert May global species diversity at about -

- (1) 5 million
- (2) 7 million
- (3) 30 million
- (4) 50 million

**158.** Match the column A and Column B :-

Column I	Column II
a. Vegetative cell	i. Small nucleus
b. Generative cell	ii. Irregular shape of nucleus
c. Embryo sac	iii. More than two nucleus

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

**159.** In Lac operon the regulatory sequence is present \_\_\_\_\_ to the promoter of structural gene

- (1) Down stream
- (2) Up stream
- (3) Both (1) and (2)
- (4) In between structure gene of operon

**160.** First discovered restriction endonucleases that always cut DNA molecule at a particular point by recognising a specific sequence of six base pairs is

- (1) Hind II
- (2) EcoR I
- (3) Adenosine deaminase
- (4) Thermostable DNA polymerase

**161.** Which of the following statements about plastids is incorrect?

- (1) Plastids are pigment containing organelles found in all plant cells and in Euglenoids
- (2) Chloroplast is double membrane bound, with the inner chloroplast membrane being more permeable
- (3) Chromoplast is responsible for giving colour to fruits and flowers
- (4) The number and shape of chloroplasts is variable

**162. Assertion:** All aquatic plants use water for pollination.

**Reason:** In aquatic habitat water is the only medium for transfer of gametes.

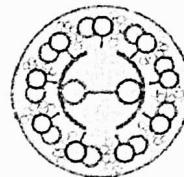
(1) If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) If Assertion is True but the Reason is False.

(4) If both Assertion & Reason are false.

**163.**



Given figure is not concerned with

- (1) Flagella
- (2) Movement of body or movement of surrounding fluid.
- (3) Axoneme of microtubules.
- (4) Gene transfer by conjugation tube.

**164.** Mark incorrect w.r.t. lac operon

- (1) Is under positive as well as negative control.
- (2) Is a inducible operon
- (3) show feedback repression
- (4) Control catabolic pathway

**165.** The technique in which a foreign DNA is precipitated on the surface of the tungsten or gold particles and shot into the target cells is known as:

- (1) Microinjection
- (2) Chemical-mediate genetic transformation
- (3) Electroporation
- (4) Biolistics

- 166.** What does the filiform apparatus do at the entrance into ovule?
- It guides pollen tube from a synergid to egg
  - It helps in the entry of pollen tube into a synergid
  - It prevents entry of more than one pollen tube into the embryo sac
  - It brings about opening of the pollen tube
- 167.** Which one of the following statements about the particular entity is true.
- All DNA consists of a core of eight histones
  - Centromere is found in animal cells, which produces aster during cell division
  - The gene for producing insulin is present in every body cell
  - Nucleosome is formed of nucleotides only
- 168.** In the name of EcoRI, the 'R' indicates:-
- Genus
  - Species
  - Name of the scientist
  - Strain
- 169.** Cilia and flagella are covered by -
- ciliary membrane
  - Nuclear membrane
  - Plasma membrane
  - None of the above
- 170.** Which one of the following is wrongly matched?
- Transcription - Writing information from DNA to DNA
  - Translation- Using information in mRNA to make protein
  - Repressor protein - Binds to operator to stop enzyme synthesis
  - Operon - Structural genes, regulatory gene, operator and promoter
- 171.** The most commonly used bioreactor is of stirring type. The stirrer facilitates:-
- Temperature control
  - pH control
  - Oxygen availability
  - Product removal
- 172.** Equational division refer to -
- Meiosis
  - Mitosis
  - Number of cell chromosome in parent & progeny cell is same
  - (2) & (3)
- 173.** Maximum formation of r-RNA occurs in
- Cytoplasm
  - Nucleoplasm
  - Nucleolus
  - Ribosome
- 174.** **Assertion :-** Transgenic mice are being used to test the safety of the polio vaccine.  
**Reason :-** They could not replace the use of monkeys to test the safety of batches of the vaccine.
- If both assertion and reason are true and reason is the correct explanation of assertion.
  - If both assertion and reason are true but reason is not the correct explanation of assertion.
  - If assertion is true but reason is false.
  - If both assertion and reason are false.
- 175.** In animal cell, cytokinesis is achieved by
- Furrow formation with the help of microfilaments
  - Cell plate formation with the help of microtubules
  - Appearance of furrow with the help of microtubules
  - Cell plate formation with the help of myosin protein
- 176.** The genetic defect-adenosine deaminase (ADA) deficiency may be cured permanently by:-
- Introducing bone marrow cells producing ADA into cells at early embryonic stages
  - Enzyme replacement therapy
  - Periodic infusion of genetically engineered lymphocytes having functional ADA cDNA
  - Administering adenosine deaminase activators
- 177.** Diakinesis marked by:-
- Terminalisation of chiasmata
  - Chromosomes are fully condensed
  - Meiotic spindle assembled
  - All of these

**178.** Match the following columns-

	<b>Column-I</b>	<b>Column-II</b>
(a)	First transgenic cow	(I) mRNA silencing
(b)	Safety test of polio vaccine	(II) Rice
(c)	Resistance from nematode	(III) Rosie
(d)	Vitamin 'A' enriched crop	(IV) Transgenic mice

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

**179.** Which of the following is **not true** for anaphase ?

- (1) Golgi body and ER are reformed
- (2) Spindle poles move farther apart
- (3) Chromosomes move to opposite poles
- (4) Centromeres split and chromatids separate

**180.** Match the columns :

	<b>Column-I</b>	<b>Column-II</b>
(A)	Emphysema	(i) Test to detect antigen or antibody
(B)	Rosie	(ii) $\alpha - 1$ antitrypsin
(C)	ELISA	(iii) Protein enriched milk
(D)	ROP	(iv) Codes for proteins involved in plasmid replication.

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

$$m_2g - m_1g = m(m_1 + m_2)a$$

$$m_2g - m_1g = m(m_1 - m_2)a$$

$$\frac{m_2g - m_1g}{(m_2 - m_1)g} = \frac{(m_1 + m_2)}{2m_1}$$

$$m_2 - m_1 = \frac{m_1 + m_2}{2}$$