

Date: 09-Apr-2025

Duration: 3 Hours

Max Marks: 720

### IMPORTANT INSTRUCTIONS

1. 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]
2. 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.**
3. Rough work is to be done in the space provided for this purpose in the Test Booklet only.
4. 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.

### GENERAL INSTRCUTION FOR FILLING THE OMR

1. Use **Blue/Black Ball Point Pen** only for marking responses on Answer Sheet (OMR sheet).
2. Indicate the correct answer for each question by filling appropriate bubble in your OMR answer sheet.
3. While filling the bubbles please be careful about Question Number

### महत्वपूर्ण निर्देश

1. परीक्षा अवधि **3 घंटा** है एवं परीक्षा पुस्तिका में भौतिकी, (45 प्रश्न), रसायनशास्त्र (45 प्रश्न) एवं जीव विज्ञान (45 प्रश्न) विषयों से कुल **180** बहुविकल्पीय प्रश्न हैं (4 विकल्पों में से एक सही उत्तर है)। [**सभी प्रश्न अनिवार्य हैं**]
2. 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।**
3. रफ कार्य इस परीक्षा पुस्तिका में केवल निर्धारित स्थान पर ही करें।
4. खाली पेपर, किलप बोर्ड, लॉग टेबल, स्लाइड रूल, कैलकुलेटर, सेल्युलर फोन, पेजर और इलेक्ट्रोनिक गैजेट्स को किसी भी रूप में परीक्षा हॉल के अंदर ले जाने की अनुमति **नहीं** है।

### OMR भरने के लिए सामान्य निर्देश

1. उत्तर पुस्तिका (OMR पुस्तिका) पर निशान लगाने के लिए केवल नीले/काले बॉल पॉइंट पेन का प्रयोग करें।
2. उत्तर अपनी OMR उत्तर पुस्तिका में उपयुक्त गोले भरके प्रत्येक प्रश्न के लिए सही उत्तर अंकित करें।
3. उत्तर गोले भरते समय प्रश्न संख्या पर ध्यान दें।

# **SYLLABUS**

## **Physics**

Physical World,Unit dimension,Error and Measurement,WPE,COM,Rotational Motion,Oscillations and Waves,Kinematics,Laws of Motion and Friction,Circular Motion,Gravitation,Electrostatics,Current Electricity,Capacitance,Semiconductor - Electronics: Materials,Devices and Simple Circuits,Thermometry,Calorimetry,Heat transfer,Thermodynamics,Elasticity,Thermal Expansion,KTG Ray Optics and Optical Instruments,Wave Optics,Mechanical properties of Fluids,Mechanical properties of Solids (Surface tension & Capillarity),Magnetic Effects of Current and Magnetism,Electromagnetic Induction and Alternating Currents,Electromagnetic Waves,Dual Nature of Radiation and Matter,Atoms,Nuclei

## **Chemistry**

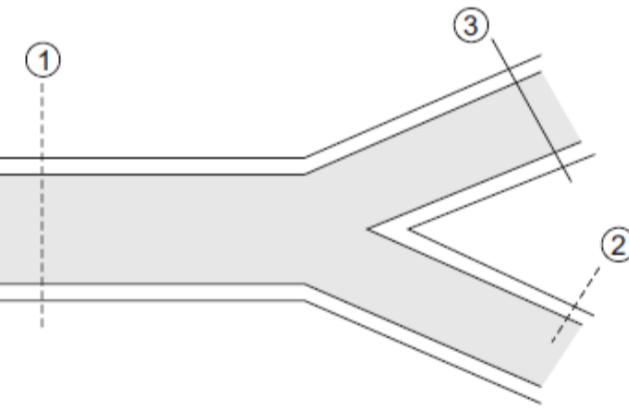
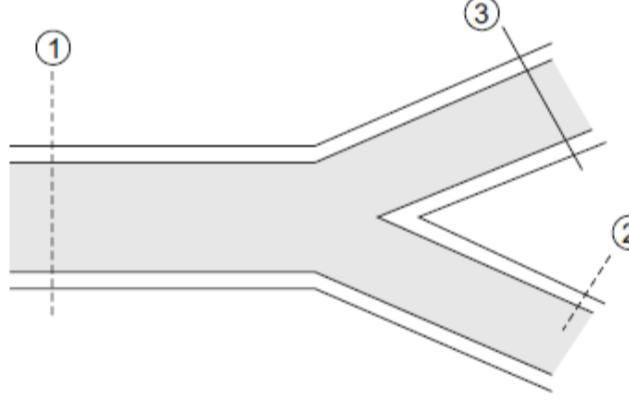
Some Basic Concepts of Chemistry,Atomic Structure,Redox Reaction,Chemical Equilibrium,Ionic equilibrium,Solutions,Electrochemistry,Thermodynamics & thermochemistry,Chemical kinetics,Classification of Elements and Periodicity in Properties,Chemical Bonding,P-Block Elements,Coordination Compounds,d-and f-Block Elements,Salt Analysis,Nomenclature (IUPAC),Goc-I,Isomerism,Hydrocarbons,Halo alkanes and Haloarenes,Alcohols,Phenols and Ethers,Biomolecules,Aldehydes,Ketones and Carboxylic Acids,Amines

## **Biology**

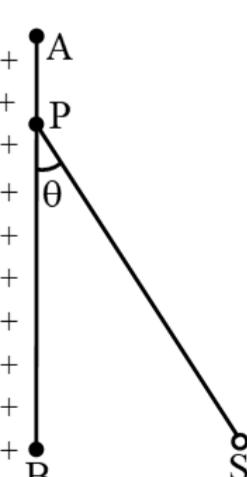
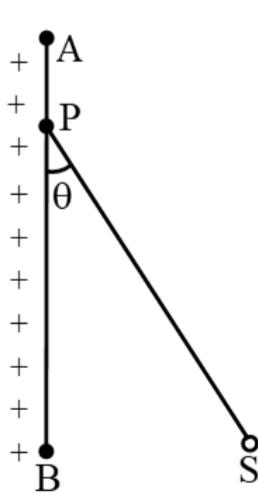
The Living World,Biological Classification,Plant Kingdom,Microbes in human welfare,Morphology of Flowering Plants,Anatomy of flowering Plants,Principles of inheritance and Variation,Molecular Basis Of inheritance,Photosynthesis in Higher Plants,Respiration in Plants,Plant - Growth and Development,Sexual Reproduction in Flowering Plants,Organisms and populations,Ecosystem,Biodiversity and Conservation,Cell-The Unit of Life,Cell Cycle and Cell Division,Animal Kingdom,Structural Organization in Animals (FROG,COCKOACH),Biomolecule,Human Health and disease,Biotechnology Principles and Processes,Biotechnology and its Applications,Breathing and Exchange of Gases,Body Fluids and Circulation,Excretory Products and their Elimination,Locomotion and Movement,Neural Control and Coordination,Chemical Coordination and Integration,Human Reproduction,Reproductive Health,Evolution

## [PHYSICS]

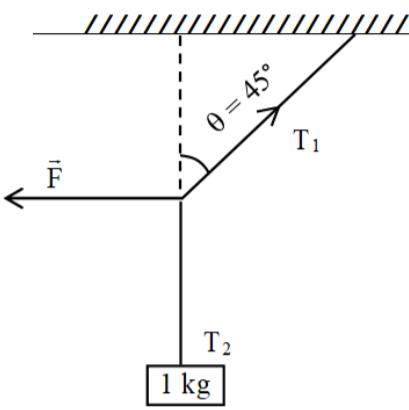
- 1.** A gas is compressed at a constant pressure of  $50\text{N/m}^2$  from a volume of  $10\text{m}^3$  to a volume of  $4\text{ m}^3$ . Energy of  $100\text{J}$  is then added to the gas by heating. Its internal energy is –
- Increased by  $400\text{J}$
  - Increased by  $200\text{J}$
  - Increased by  $100\text{J}$
  - Decreased by  $200\text{J}$
- 2.** Which of the following is NOT a fundamental quantity?
- Temperature
  - Electric charge
  - Mass
  - Electric current
- 3.** What is the smallest electric force between two charges placed at a distance  $1.0\text{ m}$ ?
- $3.204 \times 10^{-24}\text{ N}$
  - $2.304 \times 10^{-28}\text{ N}$
  - $4.204 \times 10^{-22}\text{ N}$
  - $5.204 \times 10^{-20}\text{ N}$
- 4.** The co-ordinates of a particle moving in  $x-y$  plane are given by ;  $x = 2 + 4t$ ,  $y = 3t + 8t^2$  .The motion of the particle is -
- uniform motion along a straight line
  - uniformly accelerated having motion along a parabolic path
  - non-uniformly accelerated
  - uniformly accelerated having motion along a straight line
- 5.** A  $2\text{ MeV}$  proton is moving perpendicular to a uniform magnetic field of  $2.5\text{T}$  . The force on proton is –
- $2.5 \times 10^{-10}\text{ N}$
  - $8 \times 10^{11}\text{ N}$
  - $2.5 \times 10^{-11}\text{ N}$
  - $8 \times 10^{-12}\text{ N}$
- 1.** एक गैस  $50\text{N/m}^2$  के नियत दाब पर  $10\text{m}^3$  के आयतन से  $4\text{ m}^3$  के आयतन तक संपीड़ित की जाती है। फिर  $100\text{J}$  की ऊर्जा गर्म करके (by heating) गैस में जोड़ी जाती है। इसकी आंतरिक ऊर्जा-
- $400\text{J}$  से बढ़ती है
  - $200\text{J}$  से बढ़ती है
  - $100\text{J}$  से बढ़ती है
  - $200\text{J}$  से घटती है
- 2.** निम्नलिखित में से कौनसी मूल राशि नहीं है?
- तापमान
  - विद्युत आवेश
  - द्रव्यमान
  - विद्युत धारा
- 3.**  $1.0\text{ मीटर दूरी$  पर रखे दो आवेशों के बीच लघुत्तम विद्युत बल क्या है?
- $3.204 \times 10^{-24}\text{ N}$
  - $2.304 \times 10^{-28}\text{ N}$
  - $4.204 \times 10^{-22}\text{ N}$
  - $5.204 \times 10^{-20}\text{ N}$
- 4.**  $x-y$  तल में गतिमान एक कण के निर्देशांक निम्न प्रकार दिये गये हैं  $x = 2 + 4t$ ,  $y = 3t + 8t^2$  कण की गति है।
- एक सरलरेखा के अनुदिश एकसमान गति
  - परवलयिक पथ के अनुदिश एकसमान त्वरित गति
  - असमान त्वरित
  - सीधी रेखा के अनुदिश एकसमान त्वरित गति
- 5.** एक  $2\text{ MeV}$  प्रोटॉन  $2.5\text{T}$  के एकसमान चुंबकीय क्षेत्र के लंबवत धूम रहा है। प्रोटॉन पर बल है –
- $2.5 \times 10^{-10}\text{ N}$
  - $8 \times 10^{11}\text{ N}$
  - $2.5 \times 10^{-11}\text{ N}$
  - $8 \times 10^{-12}\text{ N}$

- 6.** A wire of length ' $L$ ' and radius ' $r$ ' is clamped rigidly at one end. When the other end of the wire is pulled by a force  $f$ , its length increases by ' $l$ '. Another wire of same material of length ' $2L$ ' and radius ' $2r$ ' is pulled by a force ' $2f$ '. Then the increase in its length will be :
- $l/2$
  - $4l$
  - $l$
  - $2l$
- 7.** A body cools from a temperature  $3T$  to  $2T$  in 10 minutes. The room temperature is  $T$ . Assume that Newton's law of cooling is applicable. The temperature of the body at the end of next 10 minutes will be
- $T$
  - $\frac{7}{4}T$
  - $\frac{3}{2}T$
  - $\frac{4}{3}T$
- 8.** A broad pipe having a radius 10 cm branches into two pipes of radii, 5 cm and 3 cm. If the velocity of flowing water in the pipe of radius 3 cm be 5 cm/s, determine the velocities of water in the remaining two pipes. Given that the rate of discharge through the main branch, is  $600\pi \text{ cm}^3/\text{s}$ .
- 
- (1)  $v_1 = 6 \text{ cm/s}$  and  $v_2 = 22.2 \text{ cm/s}$   
(2)  $v_1 = 4 \text{ cm/s}$  and  $v_2 = 12.2 \text{ cm/s}$   
(3)  $v_1 = 3 \text{ cm/s}$  and  $v_2 = 12.2 \text{ cm/s}$   
(4) None
- 6.** ' $L$ ' लम्बाई एवं ' $r$ ' त्रिज्या वाला कोई तार अपने एक सिरे से हृदय पूर्वक बँधा हुआ है। जब तार का दूसरा सिरा बल  $f$  द्वारा खींचा जाता है, तो इसकी लम्बाई में ' $l$ ' वृद्धि हो जाती है। समान पदार्थ से बना ' $2L$ ' लम्बाई एवं ' $2r$ ' त्रिज्या वाला तार इसी प्रकार से ' $2l$ ' बल द्वारा खींचा जाता है। अब लम्बाई में वृद्धि होगी:
- $l/2$
  - $4l$
  - $l$
  - $2l$
- 7.** किसी वस्तु का ताप  $3T$  से  $2T$  तक गिरने में 10 मिनट का समय लगता है। कमरे का ताप  $T$  है। यदि इसमें न्यूटन के शीतलन नियम का अनुपालन होता है, तो अगले 10 मिनट के अन्त में वस्तु का ताप होगा
- $T$
  - $\frac{7}{4}T$
  - $\frac{3}{2}T$
  - $\frac{4}{3}T$
- 8.**  $10 \text{ cm}$  त्रिज्या वाला एक चौड़ा पाइप  $5 \text{ cm}$  और  $3 \text{ cm}$  त्रिज्या वाले दो पाइपों में विभाजित होता है। यदि  $3 \text{ cm}$  त्रिज्या वाले पाइप में बहते पानी का वेग  $5 \text{ cm/s}$  है, तो शेष दो पाइपों में पानी का वेग ज्ञात करें। दिया गया है कि मुख्य शाखा के माध्यम से निर्वहन की दर  $600\pi \text{ cm}^3/\text{s}$  है।
- 
- (1)  $v_1 = 6 \text{ cm/s}$  और  $v_2 = 22.2 \text{ cm/s}$   
(2)  $v_1 = 4 \text{ cm/s}$  और  $v_2 = 12.2 \text{ cm/s}$   
(3)  $v_1 = 3 \text{ cm/s}$  और  $v_2 = 12.2 \text{ cm/s}$   
(4) कोई नहीं
- 9.** निम्नलिखित में से कौन फैराड की विमाओं को दर्शाता है
- $M^{-1}L^{-2}T^4A^2$
  - $ML^2T^2A^{-2}$
  - $ML^2T^2A^{-1}$
  - $MT^{-2}A^{-1}$

- 10.** A particle is projected upward from the surface of earth (radius=R) with a speed equal to the orbital speed of a satellite near the earth's surface. The height to which it would rise is
- $\sqrt{2}R$
  - $\frac{R}{\sqrt{2}}$
  - R
  - 2R
- 11.** Two projectiles A and B are thrown with initial velocities of 40 m/s and 60 m/s at angles  $30^\circ$  and  $60^\circ$  with the horizontal respectively. The ratio of their ranges respectively is ( $g = 10 \text{ m/s}^2$ ) :-
- $2 : \sqrt{3}$
  - $\sqrt{3} : 2$
  - $4 : 9$
  - $1 : 1$
- 12.** If the radius of a coil is changing at the rate  $10^{-2}$  SI units in a normal magnetic field  $10^{-3}$  SI units, the induced emf is  $1\mu\text{V}$ . What is the final radius of the coil ?
- 1.6 cm
  - 16 cm
  - 12 cm
  - 1.2 cm
- 13.** Air outside a water lake is blowing at  $-40^\circ\text{C}$ . It takes 10 hours for first two centimeter of ice layer to form over the lake. Time taken to form next four centimeter of ice layer formation will be
- 20 hours
  - 40 hours
  - 60 hours
  - 80 hours
- 14.** In the formula  $X = 3YZ^2$ , X and Z have dimensions of capacitance and magnetic induction respectively. The dimensions of Y in MKSA system are -
- $M^{-3}L^{-2}T^{-2}A^{-4}$
  - $ML^{-2}$
  - $M^{-3}L^{-2}A^4T^8$
  - $M^{-3}L^{-2}A^4T^4$
- 10.** एक कण को पृथ्वी की सतह ( $\text{त्रिज्या} = R$ ) से ऊपर की ओर प्रक्षेपित किया जाता है, जिसकी चाल पृथ्वी की सतह के पास एक उपग्रह की कक्षीय चाल के बराबर होती है। वह जिस ऊँचाई तक उठेगा वह है
- $\sqrt{2}R$
  - $\frac{R}{\sqrt{2}}$
  - R
  - 2R
- 11.** दो प्रक्षेप्य A व B को क्षेत्रिज से  $30^\circ$  व  $60^\circ$  के कोण पर क्रमशः 40 m/s व 60 m/s के प्रारंभिक वेग से प्रक्षेपित किया जाता है। इनकी परासों का अनुपात क्रमशः है ( $g = 10 \text{ m/s}^2$ ) :-
- $2 : \sqrt{3}$
  - $\sqrt{3} : 2$
  - $4 : 9$
  - $1 : 1$
- 12.** यदि किसी कुंडली की त्रिज्या,  $10^{-3}$  SI मात्रक के लम्बवत् चुंबकीय क्षेत्र में,  $10^{-2}$  SI मात्रक की दर से बदल रही है, तो प्रेरित विद्युत वाहक बल  $1\mu\text{V}$  है। कुंडली की अंतिम त्रिज्या क्या है?
- 1.6 cm
  - 16 cm
  - 12 cm
  - 1.2 cm
- 13.** एक जल झील के बाहर हवा  $-40^\circ\text{C}$  पर चल रही है। झील के ऊपर बर्फ की पहली दो सेंटीमीटर परत बनने में 10 घंटे लगते हैं। अगले चार सेंटीमीटर बर्फ की परत बनने में लगने वाला समय होगा
- 20 घंटे
  - 40 घंटे
  - 60 घंटे
  - 80 घंटे
- 14.** सूत्र  $X = 3YZ^2$  में, X और Z में क्रमशः धारिता और चुंबकीय प्रेरण की विमायें हैं। MKSA प्रणाली में Y की विमायें हैं -
- $M^{-3}L^{-2}T^{-2}A^{-4}$
  - $ML^{-2}$
  - $M^{-3}L^{-2}A^4T^8$
  - $M^{-3}L^{-2}A^4T^4$

- 15.** If the period of revolution of an artificial satellite just above the earth's surface is  $T$  and the density of earth is  $\rho$ . then  $\rho T^2$
- (1) is a universal constant whose value is  $\frac{3\pi}{G}$   
 (2) is a universal constant whose value is  $\frac{3\pi}{2G}$   
 (3) is proportional to radius of earth  $R$   
 (4) is proportional to square of the radius of earth  $R^2$
- 16.** A car is moving with a constant speed of  $20 \text{ m/s}$  in a circular horizontal track of radius  $40 \text{ m}$ . A bob is suspended from the roof of the car by a massless string. The angle made by the string with the vertical will be : (Take  $g = 10 \text{ m/s}^2$ )  
 (1)  $\frac{\pi}{3}$     (2)  $\frac{\pi}{2}$     (3)  $\frac{\pi}{4}$     (4)  $\frac{\pi}{6}$
- 17.** When you walk through a metal detector carrying a metal object in your pocket, it raises an alarm. This phenomenon works on :  
 (1) Electromagnetic induction  
 (2) Resonance in ac circuits  
 (3) Mutual induction in ac circuits  
 (4) Interference of electromagnetic waves
- 18.** An infinite plane with uniformly distributed positive charge has surface charge of  $\sigma$  coulomb/ metre $^2$ . A metallic sphere  $S$  of mass  $m$  and charge  $+Q$  is attached to a thread and tied to a point  $P$  on the sheet  $AB$  as shown in figure. Find the angle which  $PS$  makes with the plane  $AB$ .
- 
- (1)  $\tan^{-1}\left(\frac{\sigma Q}{\epsilon_0 mg}\right)$     (2)  $\tan^{-1}\left(\frac{\sigma Q}{2\epsilon_0 mg}\right)$   
 (3)  $\tan^{-1}\left(\frac{\sigma Q}{4\epsilon_0 mg}\right)$     (4)  $\tan^{-1}\left(\frac{2\sigma Q}{\epsilon_0 mg}\right)$
- 15.** यदि पृथ्वी की सतह के ठीक ऊपर एक कृत्रिम उपग्रह का परिक्रमण काल  $T$  है और पृथ्वी का घनत्व  $\rho$  है, तो  $\rho T^2$
- (1) एक सार्वभौमिक स्थिरांक है जिसका मान  $\frac{3\pi}{G}$  है  
 (2) एक सार्वभौमिक स्थिरांक है जिसका मान  $\frac{3\pi}{2G}$  है  
 (3) पृथ्वी की त्रिज्या  $R$  के समानुपातिक है  
 (4) पृथ्वी की त्रिज्या के वर्ग  $R^2$  के समानुपाती है
- 16.** एक कार  $40 \text{ m}$  त्रिज्या के वृत्ताकार क्षेत्रिज पथ में  $20 \text{ m/s}$  की नियत चाल से गतिमान है। द्रव्यमान रहित डोरी द्वारा एक गोलक को कार की छत से निलंबित किया जाता है। डोरी द्वारा उर्ध्वाधर से बनाया गया कोण होगा: ( $g = 10 \text{ m/s}^2$ )  
 (1)  $\frac{\pi}{3}$     (2)  $\frac{\pi}{2}$     (3)  $\frac{\pi}{4}$     (4)  $\frac{\pi}{6}$
- 17.** जब आप अपनी जेब में धातु की कोई वस्तु लेकर मेटल डिटेक्टर से गुजरते हैं, तो यह अलार्म बजाता है। यह घटना निम्न पर काम करती है:-  
 (1) विद्युत चुम्बकीय प्रेरण  
 (2) प्रत्यावर्ती धारा परिपथों में अनुनाद  
 (3) प्रत्यावर्ती धारा परिपथों में अन्योन्य प्रेरण  
 (4) विद्युत चुम्बकीय तरंगों का व्यतिकरण
- 18.** एकसमान रूप से वितरित धनात्मक आवेश वाले अनंत तल का पृष्ठीय आवेश  $\sigma$  कूलम्ब/मीटर $^2$  है। द्रव्यमान  $m$  और आवेश  $+Q$  वाले एक धात्विक गोले  $S$  को एक धागे से जोड़ा गया है तथा चित्र में दिखाए अनुसार शीट  $AB$  पर एक बिंदु  $P$  से बांधा गया है।  $PS$  द्वारा समतल  $AB$  के साथ बनाया गया कोण ज्ञात कीजिए।
- 
- (1)  $\tan^{-1}\left(\frac{\sigma Q}{\epsilon_0 mg}\right)$     (2)  $\tan^{-1}\left(\frac{\sigma Q}{2\epsilon_0 mg}\right)$   
 (3)  $\tan^{-1}\left(\frac{\sigma Q}{4\epsilon_0 mg}\right)$     (4)  $\tan^{-1}\left(\frac{2\sigma Q}{\epsilon_0 mg}\right)$

- 19.** A 1 kg mass is suspended from the ceiling by a rope of length 4m. A horizontal force ' $\vec{F}$ ' is applied at the mid-point of the rope so that the rope makes an angle of  $45^\circ$  with respect to the vertical axis as shown in figure. The magnitude of  $F$  is: (Assume that the system is in equilibrium and  $g = 10 \text{ m/s}^2$ )



- (1) 10 N
- (2) 1 N
- (3)  $\frac{10}{\sqrt{2}} \text{ N}$
- (4)  $\frac{1}{10 \times \sqrt{2}} \text{ N}$

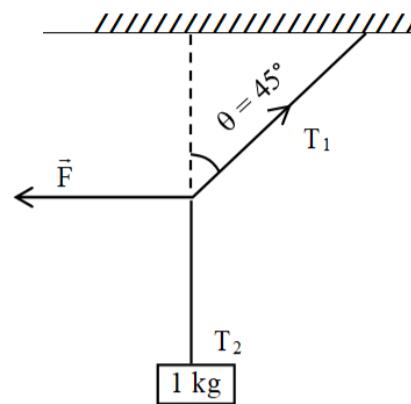
- 20.** 5.6 liter of helium gas at STP is adiabatically compressed to 0.7 liter. Taking the initial temperature to be  $T_1$ , the work done in the process is-

- (1)  $\frac{9}{8}RT_1$
- (2)  $\frac{3}{2}RT_1$
- (3)  $\frac{15}{8}RT_1$
- (4)  $\frac{9}{2}RT_1$

- 21.** The number of significant figures in  $11.118 \times 10^{-6}$  is
- (1) 3
  - (2) 4
  - (3) 5
  - (4) 6

- 22.** When a proton is accelerated through 1V its kinetic energy will be :
- (1) 1540 eV
  - (2) 13.6 eV
  - (3) 1 eV
  - (4) zero

- 19.** 1 kg का द्रव्यमान 4 m लंबी रस्सी द्वारा छत से लटकाया गया है। रस्सी के मध्य-बिंदु पर एक क्षेत्रिज बल ' $\vec{F}$ ' लगाया जाता है ताकि रस्सी ऊर्ध्वाधर अक्ष के सापेक्ष  $45^\circ$  का कोण बनाये जैसा कि चित्र में दिखाया गया है।  $F$  का परिमाण है: (मान लें कि निकाय साम्यावस्था में है और  $g = 10 \text{ m/s}^2$ )



- (1) 10 N
- (2) 1 N
- (3)  $\frac{10}{\sqrt{2}} \text{ N}$
- (4)  $\frac{1}{10 \times \sqrt{2}} \text{ N}$

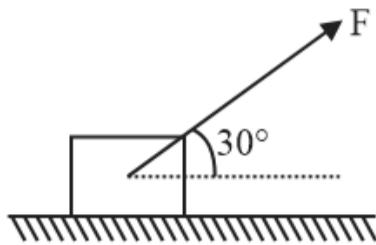
- 20.** STP पर 5.6 लीटर हीलियम गैस को रुद्धोष्म रूप से 0.7 लीटर तक संपीड़ित किया जाता है। प्रारंभिक तापमान को  $T_1$  मानते हुए प्रक्रम में किया गया कार्य है-

- (1)  $\frac{9}{8}RT_1$
- (2)  $\frac{3}{2}RT_1$
- (3)  $\frac{15}{8}RT_1$
- (4)  $\frac{9}{2}RT_1$

- 21.**  $11.118 \times 10^{-6}$  में सार्थक अंकों की संख्या है
- (1) 3
  - (2) 4
  - (3) 5
  - (4) 6

- 22.** जब एक प्रोटॉन को 1V त्वरित किया जाता है तो उसकी गतिज ऊर्जा होगी:
- (1) 1540 eV
  - (2) 13.6 eV
  - (3) 1 eV
  - (4) शून्य

- 23.** As shown in the figure a block of mass 10 kg lying on a horizontal surface is pulled by a force  $F$  acting at an angle  $30^\circ$ , with horizontal. For  $\mu_3 = 0.25$ , the block will just start to move for the value of  $F$ : Given [Given  $g = 10 \text{ ms}^{-2}$ ]



- (1) 20 N
- (2) 33.3 N
- (3) 25.2 N
- (4) 35.7 N

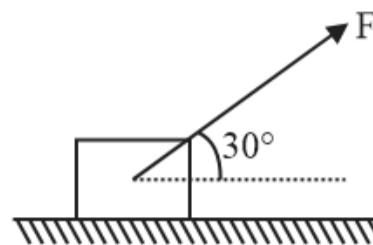
- 24.** A 2m long rod of radius 1 cm which is fixed from one end is given a twist of 0.8 radians. The shear strain developed will be
- (1) 0.002
  - (2) 0.004
  - (3) 0.008
  - (4) 0.016

- 25.** A student measures time for 20 oscillations of a simple pendulum as 30 s, 32 s, 35 s and 31 s. If the minimum division in the measuring clock is 1 s, then correct mean time in second is
- (1)  $32 \pm 3$
  - (2)  $32 \pm 1$
  - (3)  $32 \pm 2$
  - (4)  $32 \pm 5$

- 26.** A copper wire is stretched to make it 0.1% longer, what is the percentage change in its resistance ?
- (1) 0.2%
  - (2) 0.6%
  - (3) 0.8%
  - (4) 0.5%

- 27.** The nucleus of nucleon number 6, has nuclear radius  $3 \times 10^{-15} \text{ m}$ , then the radius of nucleus having nucleon number 162 is :
- (1)  $1.5 \times 10^{-15} \text{ m}$
  - (2)  $3 \times 10^{-15} \text{ m}$
  - (3)  $6 \times 10^{-15} \text{ m}$
  - (4)  $9 \times 10^{-15} \text{ m}$

- 23.** जैसा कि चित्र में दिखाया गया है कि क्षेत्रिज सतह पर रखे हुए 10 kg द्रव्यमान के एक ब्लॉक को क्षेत्रिज के साथ  $30^\circ$  के कोण पर कार्यरत बल  $F$  द्वारा खींचा जाता है।  $\mu_3 = 0.25$  के लिए,  $F$  के किस मान के लिए ब्लॉक मात्र गति करना प्रारम्भ कर देगा ? दिया गया है [  $g = 10 \text{ ms}^{-2}$  ]



- (1) 20 N
- (2) 33.3 N
- (3) 25.2 N
- (4) 35.7 N

- 24.** 1 cm त्रिज्या वाली 2m लंबी छड़ को एक सिरे से दृढ़ करके 0.8 रेडियन कोण से मोड़ा जाता है। उत्पन्न होने वाली अपरूपण विकृति होगी -
- (1) 0.002
  - (2) 0.004
  - (3) 0.008
  - (4) 0.016

- 25.** एक छात्र एक साधारण लोलक के 20 दोलनों के लिए समय को 30 s, 32 s, 35 s और 31 s के रूप में मापता है। यदि मापने वाली घड़ी में न्यूनतम विभाजन 1 सेकंड है, तो सेकंड में सही औसत समय है
- (1)  $32 \pm 3$
  - (2)  $32 \pm 1$
  - (3)  $32 \pm 2$
  - (4)  $32 \pm 5$

- 26.** एक तांबे के तार को 0.1% लम्बा करने के लिए खींचा जाता है, इसके प्रतिरोध में प्रतिशत परिवर्तन क्या है?
- (1) 0.2%
  - (2) 0.6%
  - (3) 0.8%
  - (4) 0.5%

- 27.** न्यूक्लिओन संख्या 6 के नाभिक की नाभिकीय त्रिज्या  $3 \times 10^{-15} \text{ m}$  है तो न्यूक्लिओन संख्या 162 वाले नाभिक की त्रिज्या होगी -
- (1)  $1.5 \times 10^{-15} \text{ m}$
  - (2)  $3 \times 10^{-15} \text{ m}$
  - (3)  $6 \times 10^{-15} \text{ m}$
  - (4)  $9 \times 10^{-15} \text{ m}$

- 28.** A copper block of mass 2 kg is heated to a temperature of  $500^{\circ}\text{C}$  and then placed in a large block of ice at  $0^{\circ}\text{C}$ . What is the maximum amount of ice that can melt? The specific heat of copper is  $400 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$  and latent heat of fusion of water is  $3.5 \times 10^5 \text{ J kg}^{-1}$
- (1)  $\frac{4}{3} \text{ kg}$   
 (2)  $\frac{6}{5} \text{ kg}$   
 (3)  $\frac{8}{7} \text{ kg}$   
 (4)  $\frac{10}{9} \text{ kg}$
- 29.** A Vernier calipers has 1 mm marks on the main scale. It has 20 equal divisions on the Vernier scale which match with 16 main scale division. For this Vernier calipers the least count is
- (1) 0.02 mm  
 (2) 0.05 mm  
 (3) 0.1 mm  
 (4) 0.2 mm
- 30.** A 220 V, 100 W bulb is connected to a 110 V source. Calculate the power consumed by the bulb
- (1) 28 W  
 (2) 21 W  
 (3) 23 W  
 (4) 25 W
- 31.** One electron & one proton is accelerated by equal potential. Ratio in their de-broglie wavelength is-
- (1)  $\sqrt{\frac{m_p}{m_e}}$   
 (2)  $\sqrt{\frac{m_e}{m_p}}$   
 (3)  $\frac{m_p}{m_e}$   
 (4) 1
- 28.** 2 kg द्रव्यमान के एक तांबे के ब्लॉक को  $500^{\circ}\text{C}$  के तापमान तक गर्म किया जाता है और फिर  $0^{\circ}\text{C}$  पर बर्फ के एक बड़े ब्लॉक में रखा जाता है। बर्फ की अधिकतम कितनी मात्रा पिघल सकती है? तांबे की विशिष्ट ऊष्मा  $400 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$  है और पानी के गलन की गुप्त ऊष्मा  $3.5 \times 10^5 \text{ J kg}^{-1}$  है
- (1)  $\frac{4}{3} \text{ kg}$   
 (2)  $\frac{6}{5} \text{ kg}$   
 (3)  $\frac{8}{7} \text{ kg}$   
 (4)  $\frac{10}{9} \text{ kg}$
- 29.** एक वर्नियर कैलीपर्स के मुख्य पैमाने पर 1mm चिन्ह अंकित है। इसके वर्नियर पैमाने पर 20 समान भाग हैं जो मुख्य पैमाने के 16 भागों से मेल खाते हैं। इस वर्नियर कैलीपर्स का अल्पतमांक है -
- (1) 0.02mm  
 (2) 0.05mm  
 (3) 0.1mm  
 (4) 0.2 mm
- 30.** एक 220 V, 100 W बल्ब 110 V स्रोत से जुड़ा हुआ है। बल्ब द्वारा उपभोग की गई शक्ति की गणना करें
- (1) 28 W  
 (2) 21 W  
 (3) 23 W  
 (4) 25 W
- 31.** एक इलेक्ट्रॉन और एक प्रोटॉन को समान विभव से त्वरित किया जाता है। उनके डी-ब्रॉग्ली तरंगदैर्घ्य में अनुपात है-
- (1)  $\sqrt{\frac{m_p}{m_e}}$   
 (2)  $\sqrt{\frac{m_e}{m_p}}$   
 (3)  $\frac{m_p}{m_e}$   
 (4) 1

- 32.** Match the corresponding entries of column 1 with column 2. [Where 'm' is the magnification produced by the mirror]

<b>Column 1</b>	<b>Column 2</b>
(A) $m = -2$	(a) Convex mirror
(B) $m = -\frac{1}{2}$	(b) Concave mirror
(C) $m = +2$	(c) Real image
(D) $m = +\frac{1}{2}$	(d) Virtual image

- (1)  $A \rightarrow b$  and  $c$ ;  $B \rightarrow b$  and  $c$ ;  $C \rightarrow b$  and  $d$ ;  $D \rightarrow a$  and  $d$
  - (2)  $A \rightarrow a$  and  $c$ ;  $B \rightarrow a$  and  $d$ ;  $C \rightarrow a$  and  $b$ ;  $D \rightarrow c$  and  $d$
  - (3)  $A \rightarrow a$  and  $d$ ;  $B \rightarrow b$  and  $c$ ;  $C \rightarrow b$  and  $d$ ;  $D \rightarrow b$  and  $c$
  - (4)  $A \rightarrow c$  and  $d$ ;  $B \rightarrow b$  and  $d$ ;  $C \rightarrow b$  and  $c$ ;  $D \rightarrow a$  and  $d$



- 34.** A potential difference  $V$  is applied to a copper wire of diameter  $d$  and length  $L$ . Match the statements given in Column I with the statements given in Column II

	<b>Column I</b>		<b>Column II</b>
A.	Voltage V is doubled	(i)	Drift speed will decrease
B.	Length L is doubled	(ii)	Drift speed will be doubled
C.	Diameter d is doubled	(iii)	Drift speed will be halved
D.	Temperature of wire is increased	(iv)	Drift speed will not change

Choose the correct answer from the options given below

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

- 32.** कॉलम-1 की संगत प्रविष्टियों का मिलान कॉलम-2 की प्रविष्टियों से कीजिए। यहाँ 'm' दर्पण द्वारा उत्पन्न आवर्धन है।

कॉलम 1	कॉलम 2
(A) $m = -2$	(a) उत्तल दर्पण
(B) $m = -\frac{1}{2}$	(b) अवतल दर्पण
(C) $m = +2$	(c) वास्तविक प्रतिबिम्ब
(D) $m = +\frac{1}{2}$	(d) आभासी प्रतिबिम्ब

- (1) A → b तथा c; B → b तथा c; C → b तथा d; D → a तथा d

(2) A → a तथा c ; B → a तथा d; C → a तथा b; D → c तथा d

(3) A → a तथा d ; B → b तथा c; C → b तथा d; D → b तथा c

(4) A → c तथा d ; B → b तथा d; C → b तथा c; D → a तथा d

- 33.** किसी कण पर आरोपित शक्ति समय के साथ  $P = (3t^2 - 2t + 1)$  watt के अनुसार बदलती रहती है, जहां  $t$  सेकण्ड में है। समय  $t=2\text{s}$  से  $t = 4\text{s}$  के बीच इसकी गतिज ऊर्जा में परिवर्तन होगा :-



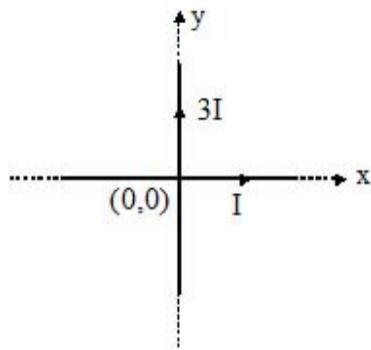
- 34.** व्यास d और लंबाई L वाले तांबे के तार पर विभवांतर V लगाया जाता है। कॉलम I में दिए गए कथनों का कॉलम II में दिए गए कथनों से मिलान करें

	<b>Column I</b>		<b>Column II</b>
A.	वोल्टेज V दोगुना हो जाता है	(i)	अपवाह चाल कम हो जाएगी
B.	लंबाई L दोगुनी हो जाती है	(ii)	अपवाह चाल दोगुनी हो जाएगी
C.	व्यास d दोगुना हो जाता है	(iii)	अपवाह चाल आधी हो जाएगी
D.	तार का तापमान बढ़ जाता है	(iv)	अपवाह चाल नहीं बदलेगी

नीचे दिए गए विकल्पों में से सही उत्तर चुनें।

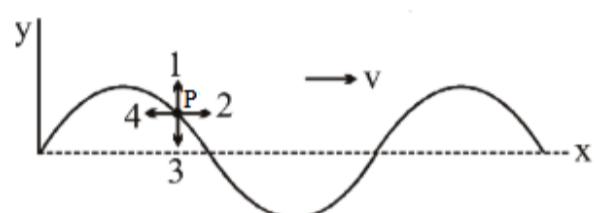
- (1) A-(iii), B-(iv), C-(i), D-(ii)
  - (2) A-(ii), B-(iii), C-(iv), D-(i)
  - (3) A-(ii), B-(iv), C-(i), D-(iii)
  - (4) A-(iv), B-(i), C-(ii), D-(iii)

- 35.** The equation of line on which magnetic field is zero due to system of two perpendicular infinitely long current carrying straight wires, is



- (1)  $x = y$       (2)  $x = 2y$   
 (3)  $x = 3y$       (4)  $3x = y$

- 36.** A sinusoidal transverse progressive wave is travelling on stretched string along x axis. Choose appropriate number for direction of velocity and acceleration respectively for a particle P shown in the diagram.



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

- 37.** An object placed at a distance of a 9cm. from the first principal focus of a convex lens produces a real image at a distance of 25cm. from its second principal focus. then the focal length of the lens is :

- (1) 9cm      (2) 25cm  
 (3) 15cm      (4) 17cm

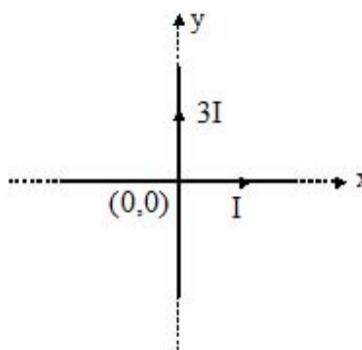
- 38.** The energy gap of silicon is 1.14eV. The maximum wavelength at which silicon will begin absorbing energy is -

- (1) 10877 Å  
 (2) 1088.8 Å  
 (3) 2088.7 Å  
 (4) 4088.6 Å

- 39.** Two coherent sources of equal intensities produce a maximum of 100 units. If the amplitude of one of the sources is reduced by 20%, then the maximum intensity produced will be :

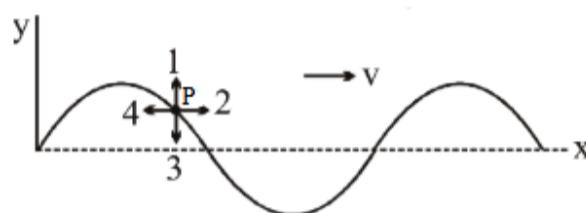
- (1) 100  
 (2) 81  
 (3) 89  
 (4) 60

- 35.** उस रेखा का समीकरण जिस पर दो लंबवत् अनंत लंबे सीधे धारावाही तारों के निकाय के कारण चुंबकीय क्षेत्र शून्य है, है



- (1)  $x = y$       (2)  $x = 2y$   
 (3)  $x = 3y$       (4)  $3x = y$

- 36.** एक ज्यावक्रीय अनुप्रस्थ प्रगामी तरंग x अक्ष के अनुदिश तभी रस्सी पर गतिमान है। चित्रानुसार एक कण P के लिए वेग v तथा त्वरण की दिशा के लिए उपयुक्त संख्या चुनिये-



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

- 37.** एक उत्तल लैंस के प्रथम मुख्य फोकस से 9cm दूरी पर वस्तु रखी है यह इसके द्वितीय मुख्य फोकस से 25cm दूरी पर वास्तविक प्रतिबिम्ब बनाता है तो लैंस की फोकस दूरी है :

- (1) 9cm      (2) 25cm  
 (3) 15cm      (4) 17cm

- 38.** सिलिकॉन का ऊर्जा अंतराल 1.14eV है। वह अधिकतम तरंगदैर्घ्य जिस पर सिलिकॉन ऊर्जा अवशोषित करना प्रारंभ कर देगा -

- (1) 10877 Å  
 (2) 1088.8 Å  
 (3) 2088.7 Å  
 (4) 4088.6 Å

- 39.** समान तीव्रता के दो कला संबद्ध स्लोट 100 इकाई का उच्चिष्ठ उत्पन्न करते हैं। यदि किसी एक स्लोट का आयाम 20% तक घटा दिया जाये तब उत्पन्न अधिकतम तीव्रता होगी :

- (1) 100  
 (2) 81  
 (3) 89  
 (4) 60

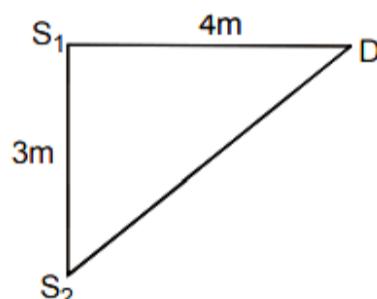
**40.** Two stretched strings of same material are vibrating under the same tension in fundamental mode. The ratio of their frequencies is  $1 : 2$  and ratio of the length of the vibrating segments is  $1 : 4$ . Then the ratio of the radii of the strings is:

- (1)  $2 : 1$       (2)  $4 : 1$   
 (3)  $3 : 2$       (4)  $8 : 1$

**41.** A potential barrier of  $0.50\text{ V}$  exists across a P-N junction. If the depletion region is  $5.0 \times 10^{-7}\text{ m}$  wide, the intensity of the electric field in this region is -

- (1)  $1.0 \times 10^6\text{ V/m}$       (2)  $1.0 \times 10^5\text{ V/m}$   
 (3)  $2.0 \times 10^5\text{ V/m}$       (4)  $2.0 \times 10^6\text{ V/m}$

**42.** In the figure, the intensity of waves arriving at D from two coherent sources  $S_1$  and  $S_2$  is  $I_0$ . The wavelength of the wave is  $\lambda = 4\text{m}$ . Resultant intensity at D will be :-



- (1)  $4I_0$       (2)  $I_0$       (3)  $2I_0$       (4) Zero

**43.** In a single slit diffraction pattern, a light of wavelength  $6000\text{\AA}$  is used. The distance between the first and third minima in the diffraction pattern is found to be  $3\text{ mm}$  when the screen is placed  $50\text{ cm}$  away from slits. The width of the slit is \_\_\_\_\_  $\times 10^{-4}\text{ m}$ .

- (1) 4      (2) 2      (3) 5      (4) 3

**44.** A parallel plate capacitor is maintained at a certain potential difference. When a  $3\text{ mm}$  slab is introduced between the plates, in order to maintain the same potential difference, the distance between the plates is increased by  $2.4\text{ mm}$ . Find the dielectric constant of the slab.

- (1) 3      (2) 4      (3) 5      (4) 1

**45.** A thin metal disc of radius  $0.25\text{ m}$  and mass  $2\text{ kg}$  starts from rest and rolls down an inclined plane. If its rotational kinetic energy is  $4\text{J}$  at the foot of the inclined plane, then its linear velocity at the same point is-

- (1)  $1.2\text{ m/s}$       (2)  $2\sqrt{2}\text{ m/s}$   
 (3)  $20\text{ m/s}$       (4)  $2\text{ m/s}$

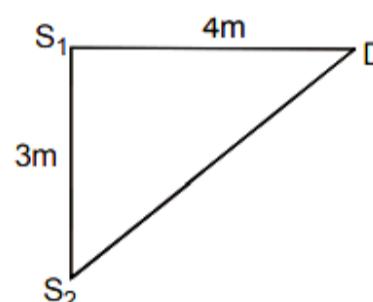
**40.** एक ही पदार्थ की दो फैली हुई तारें मूल विधा में एक ही तनाव के अंतर्गत कंपन कर रही हैं। उनकी आवृत्तियों का अनुपात  $1 : 2$  है और कंपन खंडों की लंबाई का अनुपात  $1 : 4$  है। तो तारों की त्रिज्याओं का अनुपात है:

- (1)  $2 : 1$       (2)  $4 : 1$   
 (3)  $3 : 2$       (4)  $8 : 1$

**41.** P-N संधि के परितः  $0.50\text{ V}$  का विभव प्राचीर उत्पन्न होता है। यदि अवक्षय क्षेत्र की चौड़ाई  $5.0 \times 10^{-7}\text{ m}$  है, तो इस क्षेत्र में विद्युत क्षेत्र की तीव्रता है -

- (1)  $1.0 \times 10^6\text{ V/m}$       (2)  $1.0 \times 10^5\text{ V/m}$   
 (3)  $2.0 \times 10^5\text{ V/m}$       (4)  $2.0 \times 10^6\text{ V/m}$

**42.** चित्र में, दो कलासंबद्ध स्रोतों  $S_1$  और  $S_2$  से D पर पहुँचने वाली तरंगों की तीव्रता  $I_0$  है। तरंग की तरंगदैर्घ्य  $\lambda = 4\text{m}$  है। D पर परिणामी तीव्रता होगी :-



- (1)  $4I_0$       (2)  $I_0$       (3)  $2I_0$       (4) शून्य

**43.** एक डिसी विवर्तन पैटर्न में,  $6000\text{\AA}$  की तरंगदैर्घ्य के एक प्रकाश का उपयोग किया गया है। इस विवर्तन पैटर्न में प्रथम तथा तृतीय निम्निष्ट के बीच की दूरी  $3\text{ mm}$  है। जब पर्दा डिसीयों से  $50\text{ cm}$  की दूरी पर है। डिसी की चौड़ाई \_\_\_\_\_  $\times 10^{-4}\text{ m}$  है।

- (1) 4      (2) 2      (3) 5      (4) 3

**44.** एक समानान्तर प्लेट संधारित्र एक निश्चित विभवान्तर पर बनाये रखा जाता है। जब एक  $3\text{ mm}$  की पट्टिका प्लेटो के बीच प्रवेश कराई जाती है, तब वही विभवान्तर बनाये रखने के लिए प्लेटो के बीच दूरी  $2.4\text{ mm}$  बढ़ाई जाती है। पट्टिका का परावैद्युतांक ज्ञात करो -

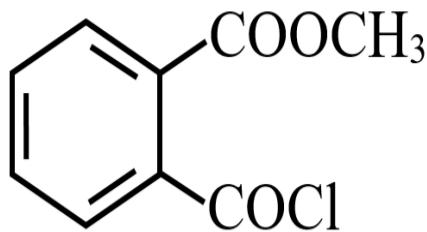
- (1) 3      (2) 4      (3) 5      (4) 1

**45.** धातु की एक पतली चकती की त्रिज्या  $0.25\text{ m}$  एवं द्रव्यमान  $2\text{ kg}$  है। यह विरामावस्था से नत तल पर लुढ़कती है। यदि नत तल की तली पर इसकी घूर्णन गतिज ऊर्जा  $4\text{J}$  हैं तो उसी बिन्दु पर इसका रेखीय वेग होगा-

- (1)  $1.2\text{ m/s}$       (2)  $2\sqrt{2}\text{ m/s}$   
 (3)  $20\text{ m/s}$       (4)  $2\text{ m/s}$

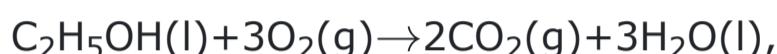
## [CHEMISTRY]

- 46.** The IUPAC name of



- (1) 2-chlorocarbonylethyl benzoate
- (2) 2-carboxyethylbenzoyl chloride
- (3) Methyl 2-chlorocarbonylbenzoate
- (4) None is correct

- 47.** For complete combustion of ethanol,



the amount of heat produced as measured in bomb calorimeter, is 1500.0 kJ mol<sup>-1</sup> at 25°C. Assuming ideally the Enthalpy of combustion,  $\Delta_C H$ , for the reaction will be :

$$(R = 8.314 \text{ J mol}^{-1})$$

- (1) -1502.67 kJ mol<sup>-1</sup>
- (2) -1602.67 kJ mol<sup>-1</sup>
- (3) -1402.67 kJ mol<sup>-1</sup>
- (4) -1702.67 kJ mol<sup>-1</sup>

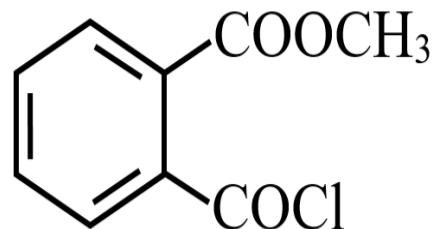
- 48.** What volume of 0.10 M  $H_2SO_4$  must be added to 50 mL of a 0.10 M NaOH solution to make a solution in which the molarity of the  $H_2SO_4$  is 0.050 M ?

- (1) 400 mL
- (2) 50 mL
- (3) 100 mL
- (4) 150 mL

- 49.** Noble gases are –

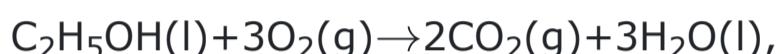
- (1) Colourless
- (2) Odourless
- (3) Tasteless and non inflammable
- (4) All

- 46.** निम्न का सही IUPAC नाम है:



- (1) 2-क्लोरोकार्बोनिलएथिल बेन्जोएट
- (2) 2-कार्बोक्सीएथिलबेन्जोइल क्लोराइड
- (3) मेथिल-2-क्लोरोकार्बोनिलबेन्जोएट
- (4) कोई सही नहीं है

- 47.** ऐथेनॉल के पूर्ण दहन के लिये



25°C पर बम कैलोरीमीटर में मापी गई उत्पन्न ऊष्मा की मात्रा 1500.0 kJ mol<sup>-1</sup> है आदर्श स्थिति मानते हुये अभिक्रिया के लिये दहन की एन्थैल्पी  $\Delta_C H$  होगी (R = 8.314 J mol<sup>-1</sup>)

- (1) -1502.67 kJ mol<sup>-1</sup>
- (2) -1602.67 kJ mol<sup>-1</sup>
- (3) -1402.67 kJ mol<sup>-1</sup>
- (4) -1702.67 kJ mol<sup>-1</sup>

- 48.**  $H_2SO_4$  की मोलरता 0.050 M का विलयन बनाने के लिये 50 mL, 0.10 M NaOH विलयन में 0.10 M,  $H_2SO_4$  का कितना आयतन मिलाना चाहिये।

- (1) 400 mL
- (2) 50 mL
- (3) 100 mL
- (4) 150 mL

- 49.** नोबल गैसे हैं -

- (1) रंगहीन
- (2) गंधहीन
- (3) स्वादहीन तथा अज्वलनशील
- (4) सभी

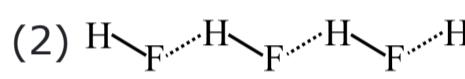
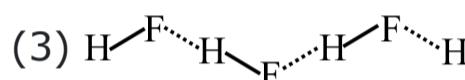
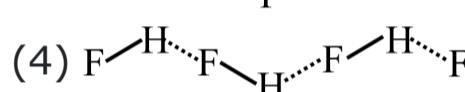
**50.** Match Column-I with Column-II.

	<b>Column-I</b>		<b>Column-II</b>
A	16 g of $\text{CH}_4(g)$	I	Weighs 28g
B	1 g of $\text{H}_2(g)$	II	$60.2 \times 10^{23}$ electrons
C	1 mole of $\text{N}_2(g)$	III	Weighs 96 g
D	1.5 mole of $\text{SO}_2(g)$	IV	Occupies 11.4 L volume at STP

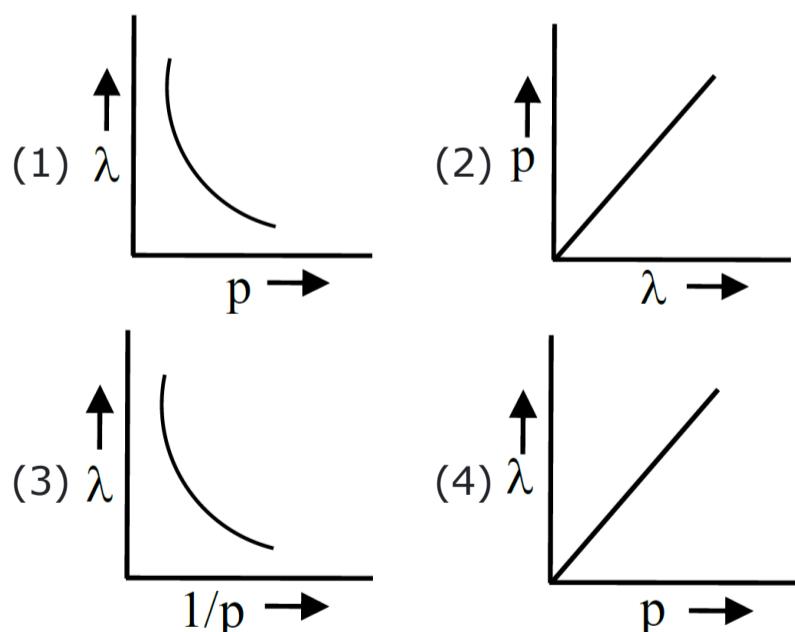
Choose the correct answer from the options given below:

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

**51.** The bond in solid HF can be best represented as :

- (1)  $\text{H} - \text{F} \dots \text{H} - \text{F} \dots \text{H} - \text{F}$
- (2) 
- (3) 
- (4) 

**52.** According to the wave-particle duality of matter by de-Broglie, which of the following graph plot presents most appropriate relationship between wavelength of electron( $\lambda$ ) and momentum of electron( $p$ ) ?



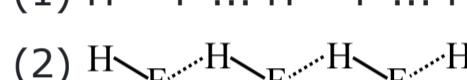
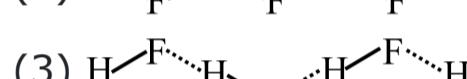
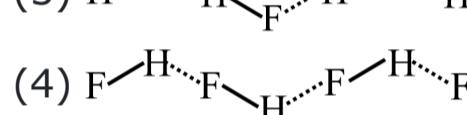
**50. स्तंभ-I का मिलान स्तंभ-II से करें**

	<b>स्तंभ-I</b>		<b>स्तंभ-II</b>
A	$\text{CH}_4(g)$ के 16 g	I	28 g भार
B	$\text{H}_2(g)$ के 1 g	II	$60.2 \times 10^{23}$ इलेक्ट्रॉन
C	$\text{N}_2(g)$ के 1 मोल	III	96 g भार
D	$\text{SO}_2(g)$ के 1.5 मोल	IV	STP पर 11.4 L आयतन ग्रहण करता है

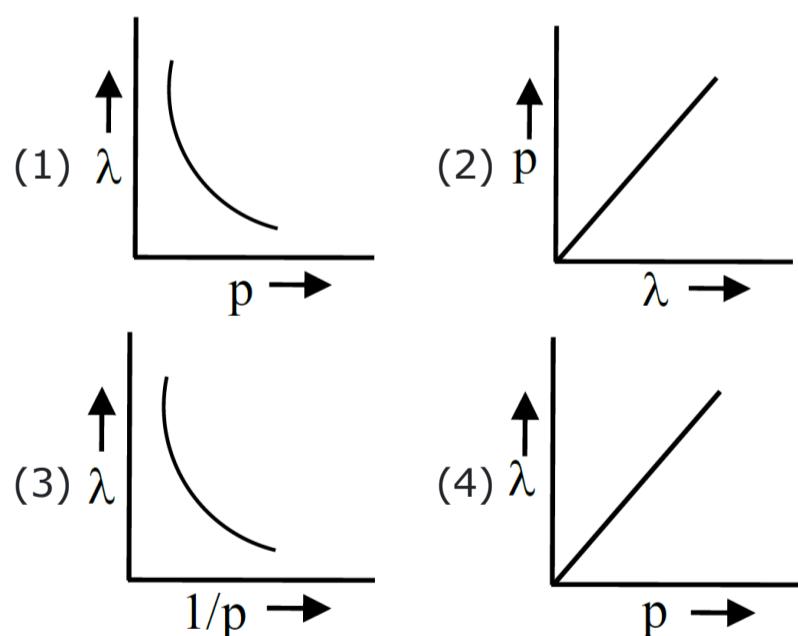
नीचे दिए गए विकल्पों में से सही उत्तर चुनें:

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

**51.** ठोस HF में बंध सर्वोत्तम निरूपित निम्न में हो सकते हैं:-

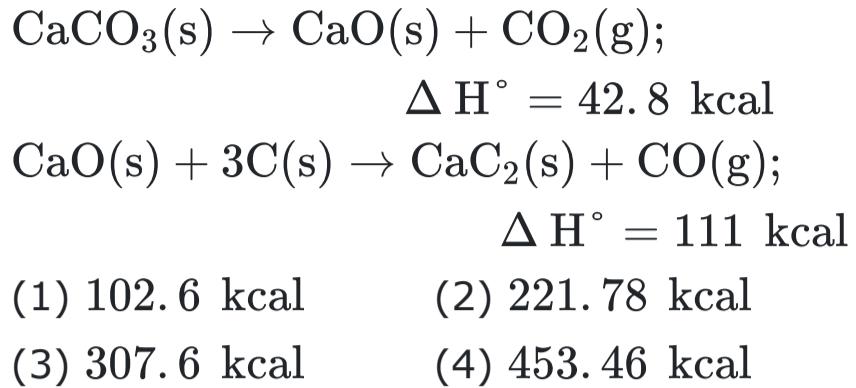
- (1)  $\text{H} - \text{F} \dots \text{H} - \text{F} \dots \text{H} - \text{F}$
- (2) 
- (3) 
- (4) 

**52.** डी-ब्रोगली द्वारा पदार्थ के तरंग-कण सिद्धांत के अनुसार, निम्न में से कौन सा ग्राफ चित्र इलेक्ट्रॉन की तरंग दैर्घ्य ( $\lambda$ ) और इलेक्ट्रॉन की संवेग( $p$ ) के बीच सबसे उपयुक्त संबंध दर्शाता है?



- 53.** What is the amount of heat to be supplied to prepare 128g of  $\text{CaC}_2$  by using  $\text{CaCO}_3$  and followed by reaction with carbon.

Reactions are:



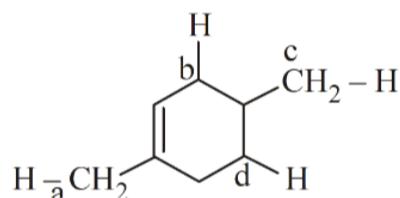
- 54.** Which of them is not equal to zero for an ideal solution?

(1)  $\Delta V_{\text{mix}}$       (2)  $\Delta P = P_{\text{Observed}} - P_{\text{Raoult}}$   
 (3)  $\Delta H_{\text{mix}}$       (4)  $\Delta S_{\text{mix}}$

- 55.** Number of geometrical isomers formed from  $\text{C}_2(\text{Cl})(\text{Br})(\text{I})(\text{F})$

(1) 4      (2) 8      (3) 6      (4) 9

- 56.** Compare the bond energy of different C - H bonds shown in the following molecule



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

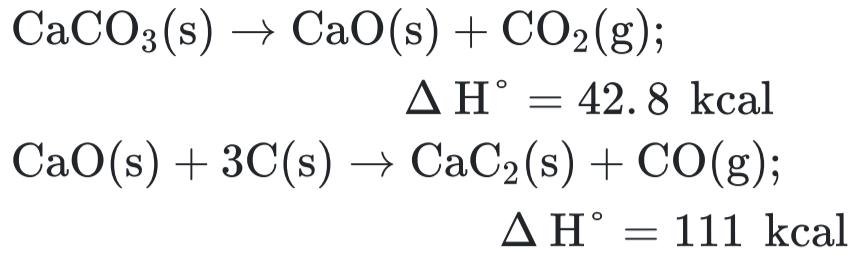
- 57.** Match List-I with List-II.

List-I (Reaction)	List-II (Type of redox reaction)
(A) $\text{N}_{2(g)} + \text{O}_{2(g)} \rightarrow 2\text{NO}_{(g)}$	(I) Decomposition
(B) $2\text{Pb}(\text{NO}_3)_2(s) \rightarrow 2\text{PbO}_{(s)} + 4\text{NO}_{2(g)} + \text{O}_{2(g)}$	(II) Displacement
(C) $2\text{Na}_{(s)} + 2\text{H}_2\text{O}_{(l)} \rightarrow 2\text{NaOH(aq.)} + \text{H}_{2(g)}$	(III) Disproportionation
(D) $2\text{NO}_{2(g)} + 2\text{OH}^-(aq.) \rightarrow \text{NO}_2^-(aq.) + \text{NO}_3^-(aq.) + \text{H}_2\text{O}_{(l)}$	(IV) Combination

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

- 53.**  $\text{CaCO}_3$  का उपयोग करके तथा तत्पश्चात् कार्बन के साथ अभिक्रिया से 128g  $\text{CaC}_2$  को बनाने के लिये कितनी ऊष्मा की मात्रा दी जानी चाहिये अभिक्रियायें निम्न हैं



(1) 102.6 kcal      (2) 221.78 kcal  
 (3) 307.6 kcal      (4) 453.46 kcal

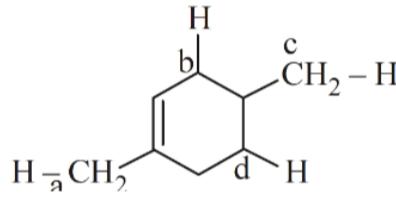
- 54.** एक आदर्श विलयन के लिए इनमें से कौनसा शून्य के बराबर नहीं है?

(1)  $\Delta V_{\text{mix}}$       (2)  $\Delta P = P_{\text{Observed}} - P_{\text{Raoult}}$   
 (3)  $\Delta H_{\text{mix}}$       (4)  $\Delta S_{\text{mix}}$

- 55.**  $\text{C}_2(\text{Cl})(\text{Br})(\text{I})(\text{F})$  से निर्मित ज्यामितिये समावयवीयों की संख्या है

(1) 4      (2) 8      (3) 6      (4) 9

- 56.** निम्न अणु में दर्शाए गए विभिन्न C - H बंधों की बंध ऊर्जा की तुलना कीजिए।



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

- 57.** सूची-I का मिलान सूची -II से करें :

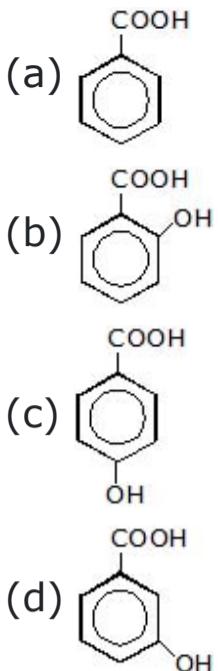
सूची -I (अभिक्रिया)	सूची -II (रेडॉक्स अभिक्रिया का प्रकार)
(A) $\text{N}_{2(g)} + \text{O}_{2(g)} \rightarrow 2\text{NO}_{(g)}$	(I) अपघटन
(B) $2\text{Pb}(\text{NO}_3)_2(s) \rightarrow 2\text{PbO}_{(s)} + 4\text{NO}_{2(g)} + \text{O}_{2(g)}$	(II) विस्थापन
(C) $2\text{Na}_{(s)} + 2\text{H}_2\text{O}_{(l)} \rightarrow 2\text{NaOH(aq.)} + \text{H}_{2(g)}$	(III) असमानुपातन
(D) $2\text{NO}_{2(g)} + 2\text{OH}^-(aq.) \rightarrow \text{NO}_2^-(aq.) + \text{NO}_3^-(aq.) + \text{H}_2\text{O}_{(l)}$	(IV) योग

नीचे दिए गए विकल्पों में से सही उत्तर को चुनें

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

- 58.** Units of rate constant for first and zero order reactions in terms of molarity (M) are respectively.
- $\text{sec}^{-1}$ ,  $M \text{ sec}^{-1}$
  - $\text{sec}^{-1}$ , M
  - $M \text{ sec}^{-1}$ ,  $\text{sec}^{-1}$
  - M,  $\text{sec}^{-1}$
- 59.** The osmotic pressure of which solution is maximum (consider that decimolar solution of each 90% dissociated)
- Aluminium sulphate
  - Barium chloride
  - Sodium sulphate
  - A mixture of equal volumes of (2) and (3)
- 60.** Which of the following order is incorrect ?
- Ionic character :  $\text{MCl} < \text{MCl}_2 < \text{MCl}_3$
  - Polarizability :  $\text{F}^- < \text{Cl}^- < \text{Br}^- < \text{I}^-$
  - Polarising power :  $\text{Na}^+ < \text{Ca}^{+2} < \text{Mg}^{+2} < \text{Al}^{+3}$
  - Covalent character :  $\text{LiF} < \text{LiCl} < \text{LiBr} < \text{LiI}$
- 61.** The units of rate and rate constant are identical in
- fractional order reactions
  - first order reactions
  - second order reactions
  - zero order reactions.
- 62.** At  $25^\circ\text{C}$  dissociation constants of acid HA and base BOH in aqueous solution are same. The pH of 0.01 M solution of HA is 5. The pOH of  $10^{-4}$  M solution of BOH at the same temperature is
- 3.5
  - 4
  - 6
  - None of these
- 58.** मोलरता (M) के पदों में प्रथम तथा शून्य कोटि अभिक्रियाओं के लिये दर स्थिरांक की इकाईयां क्रमशः हैं
- $\text{sec}^{-1}$ ,  $M \text{ sec}^{-1}$
  - $\text{sec}^{-1}$ , M
  - $M \text{ sec}^{-1}$ ,  $\text{sec}^{-1}$
  - M,  $\text{sec}^{-1}$
- 59.** कौनसे विलयन का परासरण दाब अधिकतम है (यह मानते हुये की प्रत्येक का डेसीमोलर विलयन 90% वियोजित होता है)
- एल्युमिनियम सल्फेट
  - बेरियम क्लोराइड
  - सोडीयम सल्फेट
  - (2) तथा (3) के समान आयतनों का एक मिश्रण
- 60.** निम्न में से कौनसा क्रम गलत है
- आयनिक लक्षण :  $\text{MCl} < \text{MCl}_2 < \text{MCl}_3$
  - ध्रुवीयता :  $\text{F}^- < \text{Cl}^- < \text{Br}^- < \text{I}^-$
  - ध्रुवण क्षमता :  $\text{Na}^+ < \text{Ca}^{+2} < \text{Mg}^{+2} < \text{Al}^{+3}$
  - सहसंयोजक लक्षण :  $\text{LiF} < \text{LiCl} < \text{LiBr} < \text{LiI}$
- 61.** दर तथा दर नियतांक की इकाईयाँ समान होती हैं
- भिन्नात्मक कोटि अभिक्रियाओं में
  - प्रथम कोटि अभिक्रियाओं में
  - द्वितीय कोटि अभिक्रियाओं में
  - शून्य कोटि अभिक्रियाओं में
- 62.**  $25^\circ\text{C}$  पर अम्ल HA तथा क्षार BOH का जलीय विलयन में वियोजन स्थिरांक समान है HA के 0.01 M विलयन का pH, 5 है समान ताप पर BOH के  $10^{-4}$  M विलयन का pOH होगा
- 3.5
  - 4
  - 6
  - इनमें से कोई नहीं

**63.** Select the correct order of acidic strength.

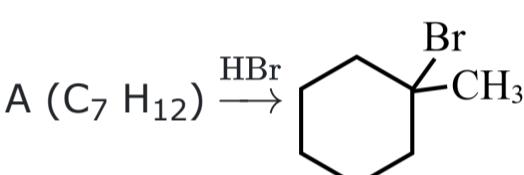


- (1) d > a > b > c    (2) b > d > a > c  
 (3) a > b > c > d    (4) d > b > a > c

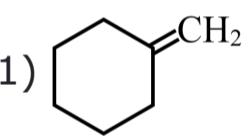
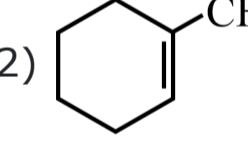
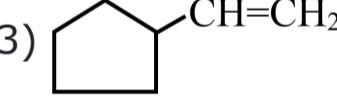
**64.** Which of the following have no unit?

- (1) Electronegativity  
 (2) Electron gain enthalpy  
 (3) Ionisation enthalpy  
 (4) None of these

**65.**



Compound A can be

- (1) 
- (2) 
- (3) 
- (4) All of these

**66.** Which is Amphoteric oxide :-

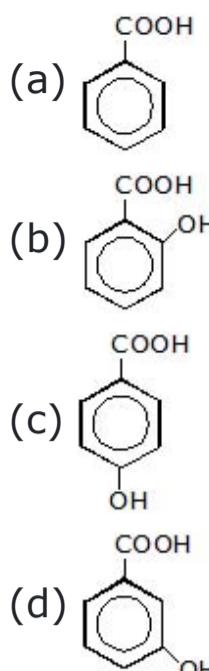
- (1) BeO  
 (2) ZnO  
 (3) Cr<sub>2</sub>O<sub>3</sub>  
 (4) All of these

**67.** Calculate pH of given mixture at 90°C temperature:

0.01M, 2L of H<sub>2</sub>SO<sub>4</sub>+0.02M, 3L of Ba(OH)<sub>2</sub>

- (1) 12.2  
 (2) 10.2  
 (3) 1.8  
 (4) 4.2

**63.** अम्लीय सामर्थ्य के सही क्रम का चयन करें।

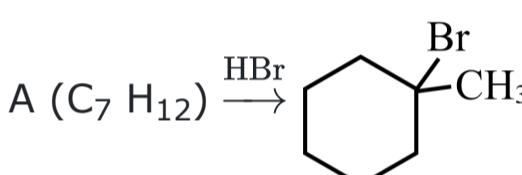


- (1) d > a > b > c    (2) b > d > a > c  
 (3) a > b > c > d    (4) d > b > a > c

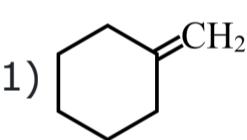
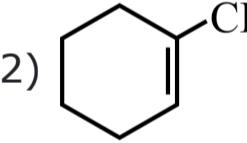
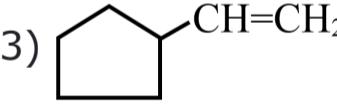
**64.** निम्न में कौनसा मात्रक नहीं रखता है ?

- (1) विद्युतऋणता  
 (2) इलेक्ट्रॉन ग्रहण एन्थैल्पी  
 (3) आयनन एन्थैल्पी  
 (4) इनमें से कोई नहीं

**65.**



यौगिक A हो सकता है

- (1) 
- (2) 
- (3) 
- (4) उपरोक्त सभी

**66.** कौनसा उभयधर्मी ऑक्साइड है

- (1) BeO  
 (2) ZnO  
 (3) Cr<sub>2</sub>O<sub>3</sub>  
 (4) उपरोक्त सभी

**67.** 90°C ताप पर दिये गये मिश्रण की pH की गणना कीजिये

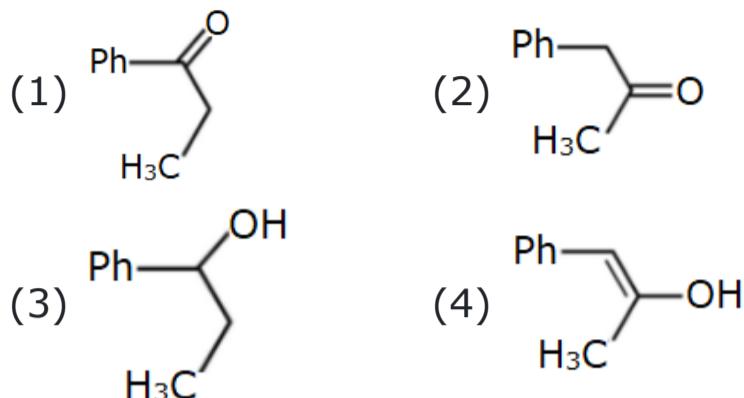
0.01M, 2L, H<sub>2</sub>SO<sub>4</sub>+0.02M, 3L, Ba(OH)<sub>2</sub>

- (1) 12.2  
 (2) 10.2  
 (3) 1.8  
 (4) 4.2

**68.** Phenolphthalein is a-

- (1) Strong acid
- (2) Strong base
- (3) Weak base
- (4) Weak acid

**69.**  $\text{Ph}-\text{C}\equiv\text{C}-\text{CH}_3 \xrightarrow{\text{Hg}^{2+}/\text{H}^+} \text{A}$ , A is-



**70.** Among the following, the molecule with highest dipole moment is :

- (1)  $\text{CH}_3\text{Cl}$
- (2)  $\text{CH}_2\text{Cl}_2$
- (3)  $\text{CHCl}_3$
- (4)  $\text{CCl}_4$

**71.** Water is liquid due to

- (1) Hydrogen bonding
- (2) Covalent bond
- (3) Ionic bond
- (4) Vandan wall's forces

**72.** Emf of the cell

$\text{Ni} | \text{Ni}^{2+}(0.1 \text{ M}) || \text{Au}^{3+}(1.0 \text{ M}) | \text{Au}$  will be

$$E_{\text{Ni}/\text{Ni}^{2+}}^0 = 0.25$$

$$E_{\text{Au}/\text{Au}^{3+}}^0 = -0.25$$

- (1) + 1.22
- (2) 0.529 V
- (3) + 1.75
- (4) - 1.75

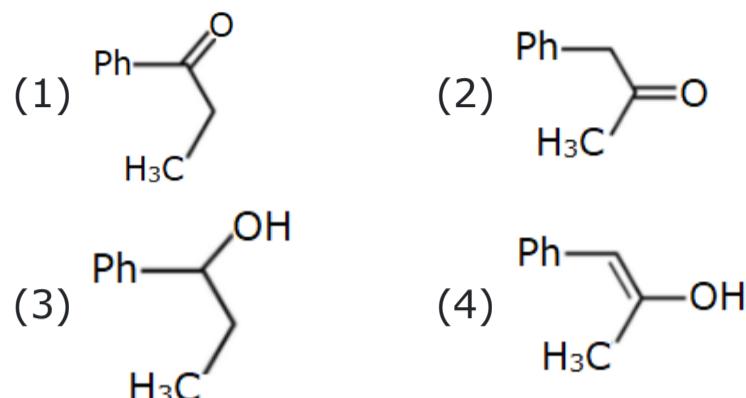
**73.** Which of the following species is most reactive in  $\text{S}_{\text{N}2}$  reaction ?

- (1)  $\text{CH}_3\text{CH}_2-\text{Cl}$
- (2)  $\text{CH}_3\text{CH}_2-\text{Br}$
- (3)  $\text{CH}_3\text{CH}_2-\text{I}$
- (4)  $\text{CH}_3\text{CH}_2-\text{F}$

**68.** फिनोफ्थैलीन हैं एक

- (1) प्रबल अम्ल
- (2) प्रबल क्षार
- (3) दुर्बल क्षार
- (4) दुर्बल अम्ल

**69.**  $\text{Ph}-\text{C}\equiv\text{C}-\text{CH}_3 \xrightarrow{\text{Hg}^{2+}/\text{H}^+} \text{A}$ , A होगा-



**70.** निम्न में उच्चतम द्विधुव आघूर्ण वाला अणु है

- (1)  $\text{CH}_3\text{Cl}$
- (2)  $\text{CH}_2\text{Cl}_2$
- (3)  $\text{CHCl}_3$
- (4)  $\text{CCl}_4$

**71.** जल किसके कारण द्रव होता है-

- (1) हाइड्रोजन बन्ध
- (2) सहसंयोजक बन्ध
- (3) आयनिक बन्ध
- (4) वानडर वाल्स बल

**72.** सेल :

$\text{Ni} | \text{Ni}^{2+}(0.1 \text{ M}) || \text{Au}^{3+}(1.0 \text{ M}) | \text{Au}$  का EMF होगा

$$E_{\text{Ni}/\text{Ni}^{2+}}^0 = 0.25$$

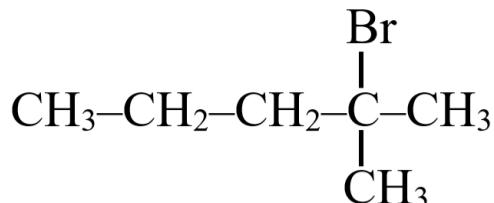
$$E_{\text{Au}/\text{Au}^{3+}}^0 = -0.25$$

- (1) + 1.22
- (2) 0.529 V
- (3) + 1.75
- (4) - 1.75

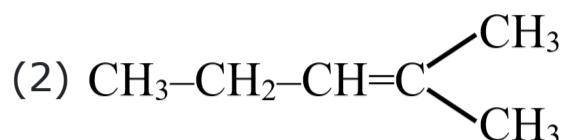
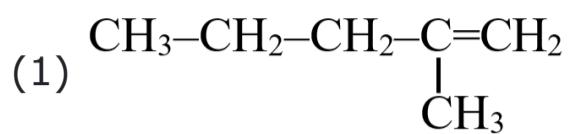
**73.** निम्न में से कौनसी स्पीशीज  $\text{S}_{\text{N}2}$  अभिक्रिया में सर्वाधिक क्रियाशील है ?

- (1)  $\text{CH}_3\text{CH}_2-\text{Cl}$
- (2)  $\text{CH}_3\text{CH}_2-\text{Br}$
- (3)  $\text{CH}_3\text{CH}_2-\text{I}$
- (4)  $\text{CH}_3\text{CH}_2-\text{F}$

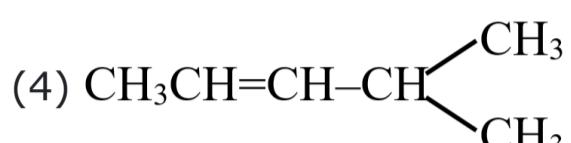
- 74.** Consider the following compound



Possible product/s obtained by  $E_2$  reaction is/are ?



(3) both (1) and (2)



- 75.** The molar conductance at infinite dilution of  $\text{AgNO}_3$ ,  $\text{NaCl}$  and  $\text{NaNO}_3$  are 116.5, 110.3 and 105.2 mho  $\text{cm}^2 \text{ mol}^{-1}$  respectively. The molar conductances of  $\text{AgCl}$  is :

(1) 121.6

(2) 111.4

(3) 130.6

(4) 150.2

- 76.** Highest melting point would be of

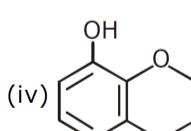
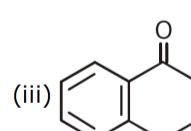
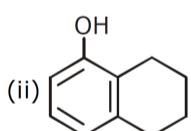
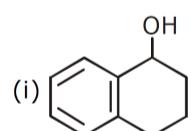
(1) He

(2)  $\text{CsCl}$

(3)  $\text{NH}_3$

(4)  $\text{CHCl}_3$

- 77.** Increasing order of rate of reaction with  $\text{Br}_2/\text{AlCl}_3$  is ;



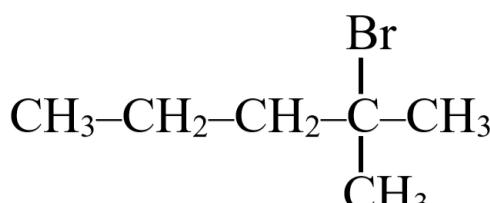
(1) iii < i < ii < iv

(2) iv < ii < i < iii

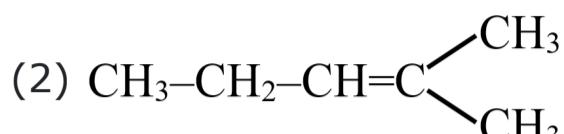
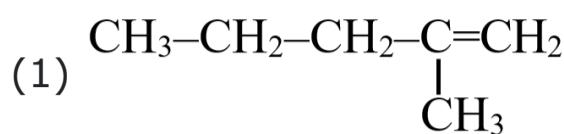
(3) ii < iv < iii < i

(4) iv < ii < iii < i

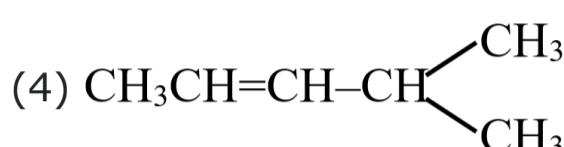
- 74.** निम्न यौगिक पर विचार कीजिये



$E_2$  अभिक्रिया द्वारा प्राप्त संभव उत्पाद है/हैं



(3) दोनों (1) तथा (2)



- 75.**  $\text{AgNO}_3$ ,  $\text{NaCl}$  तथा  $\text{NaNO}_3$  की अनन्त तनुकरण पर मोलर चालकता क्रमशः 116.5, 110.3 तथा 105.2 mho  $\text{cm}^2 \text{ mol}^{-1}$  है,  $\text{AgCl}$  की मोलर चालकता होगी

(1) 121.6

(2) 111.4

(3) 130.6

(4) 150.2

- 76.** किसका गलनांक अधिक होगा

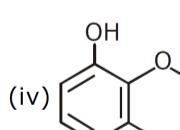
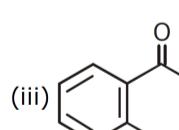
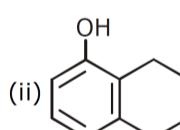
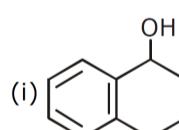
(1) He

(2)  $\text{CsCl}$

(3)  $\text{NH}_3$

(4)  $\text{CHCl}_3$

- 77.**  $\text{Br}_2/\text{AlCl}_3$  के साथ अभिक्रिया दर का बढ़ता हुआ क्रम है।



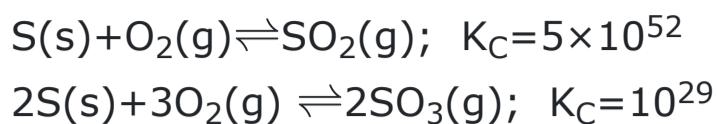
(1) iii < i < ii < iv

(2) iv < ii < i < iii

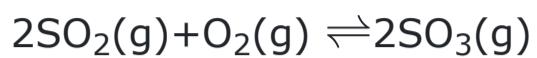
(3) ii < iv < iii < i

(4) iv < ii < iii < i

- 78.** At a certain temperature, the following reactions have the equilibrium constants as shown below



What is the equilibrium constant  $K_C$  for the reaction at the same temperature

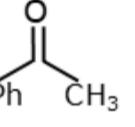
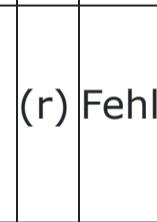
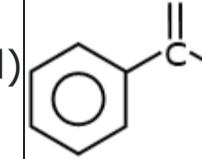
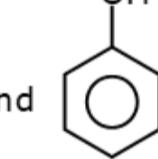


- (1)  $2.5 \times 10^{76}$
- (2)  $4 \times 10^{23}$
- (3)  $4 \times 10^{-77}$
- (4) None of these

- 79.** The bond order of  $O_2^+$  is the same as in

- (1)  $N_2^+$
- (2)  $CN^-$
- (3) CO
- (4)  $NO^+$

- 80.** Match the column :

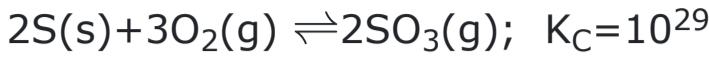
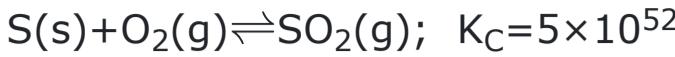
	<b>Column-I (Compound)</b>	<b>Column-II (Distinguished by)</b>
(a)	$\text{CH}_3-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_3$ and $\text{CH}_3-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{H}$	(p) $\text{NaHSO}_3$
(b)	$\text{CH}_3-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_3$ and 	(q) $\text{NaOH}/\text{I}_2$
(c)	$\text{CH}_3-\overset{\text{OH}}{\underset{\text{CH}_3}{\text{CH}}}-\text{CH}_3$ and 	(r) Fehling solution
(d)	 and 	(s) Aq. $\text{NaHCO}_3$

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

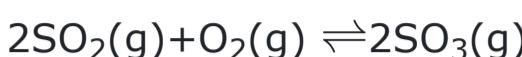
- 81.** Which is correct in the case of  $[\text{Fe}(\text{CN}_6)]^{4-}$  complex -

- (1) Diamagnetic
- (2) Octahedral
- (3)  $d^2sp^3$ -hybridization
- (4) All are correct

- 78.** एक निश्चित तापमान पर निम्न अभिक्रिया नीचे दर्शये अनुसार निम्न साम्य नियतांक रखती है



समान ताप पर निम्न अभिक्रिया के लिये साम्य नियतांक  $K_C$  क्या होगा



- (1)  $2.5 \times 10^{76}$

- (2)  $4 \times 10^{23}$

- (3)  $4 \times 10^{-77}$

- (4) इनमें से कोई नहीं

- 79.**  $O_2^+$  का बन्ध क्रम निम्न के समान है

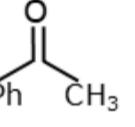
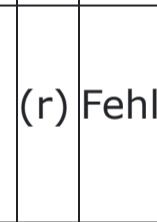
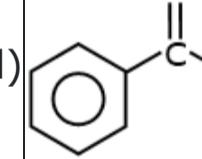
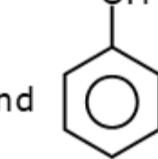
- (1)  $N_2^+$

- (2)  $CN^-$

- (3) CO

- (4)  $NO^+$

- 80.** स्तम्भ को सुमेलित कीजिये :

	<b>स्तम्भ-I (यौगिक)</b>	<b>स्तम्भ-II (से विभेदित)</b>
(a)	$\text{CH}_3-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_3$ and $\text{CH}_3-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{H}$	(p) $\text{NaHSO}_3$
(b)	$\text{CH}_3-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_3$ and 	(q) $\text{NaOH}/\text{I}_2$
(c)	$\text{CH}_3-\overset{\text{OH}}{\underset{\text{CH}_3}{\text{CH}}}-\text{CH}_3$ and 	(r) फेहलिंग विलयन
(d)	 and 	(s) जलीय $\text{NaHCO}_3$

- (1) (a)-(q), (b)-(r), (c)-(s), (d)-(p)

- (2) (a)-(r), (b)-(p), (c)-(q), (d)-(s)

- (3) (a)-(p), (b)-(r), (c)-(q), (d)-(s)

- (4) (a)-(r), (b)-(p), (c)-(s), (d)-(q)

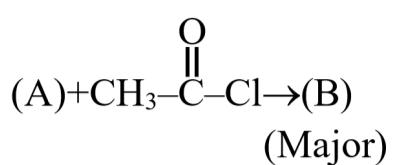
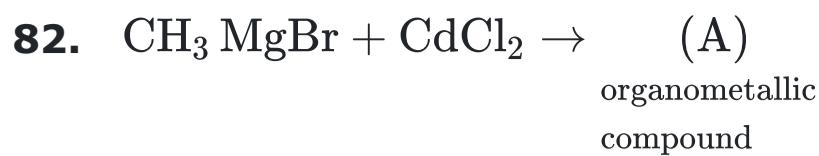
- 81.**  $[\text{Fe}(\text{CN}_6)]^{4-}$  योगिक के संदर्भ में सही है -

- (1) प्रतिचुम्बकीय

- (2) अष्टफलकीय

- (3)  $d^2sp^3$ -संकरण

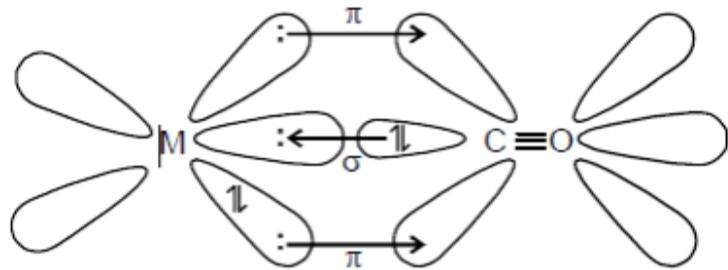
- (4) उपर्युक्त सभी



Product (B) is

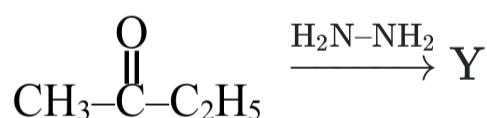
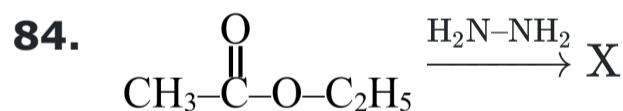
- (1)  $\text{CH}_3\text{CH}_2\text{CN}$
- (2)  $\text{CH}_3-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{H}$
- (3)  $\text{CH}_3-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_3$
- (4)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{CH}_3 \\ | \\ \text{OH} \end{array}$

**83.**



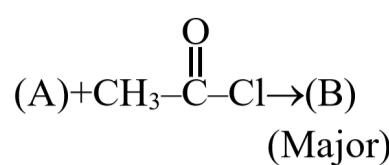
Which of the following statement(s) is/are correct for above schematic diagram of metal carbonyl?

- (1) It shows synergic bonding interactions in a carbonyl complex
- (2) The (M – C)  $\pi$  bond is formed by the donation of a pair of electrons from a filled d-orbital of metal into the vacant antibonding  $\pi^*$  orbital of carbon monoxide
- (3) CO acts as  $\sigma$ -donor and  $\pi$ -acceptor
- (4) All of these



X and Y are

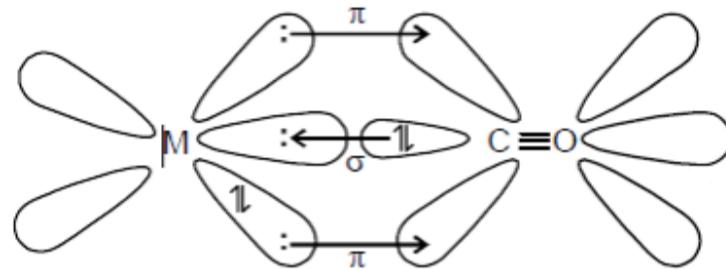
- (1)  $\text{X}=\text{CH}_3-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{OC}_2\text{H}_5, \text{Y}=\text{H}_3\text{C}-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{C}_2\text{H}_5$
- (2)  $\text{X}=\text{CH}_3-\overset{\parallel}{\underset{\text{O}}{\text{C}}}-\text{NH}_2, \text{Y}=\text{H}_3\text{C}-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{C}_2\text{H}_5$
- (3)  $\text{X}=\text{CH}_3-\overset{\parallel}{\underset{\text{O}}{\text{C}}}-\text{NH}-\text{NH}_2, \text{Y}=\text{H}_3\text{C}-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{C}_2\text{H}_5$
- (4)  $\text{X}=\text{CH}_3-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{C}_2\text{H}_5, \text{Y}=\text{H}_3\text{C}-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{C}_2\text{H}_5$



उत्पाद (B) है

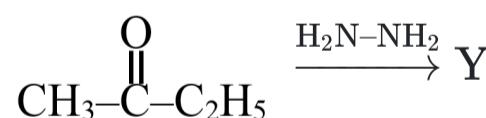
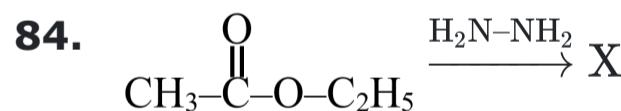
- (1)  $\text{CH}_3\text{CH}_2\text{CN}$
- (2)  $\text{CH}_3-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{H}$
- (3)  $\text{CH}_3-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_3$
- (4)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{CH}_3 \\ | \\ \text{OH} \end{array}$

**83.**



निम्न में से कौनसा कथन धातु कार्बोनिल के उपरोक्त आरेखीय चित्र के लिये सही है

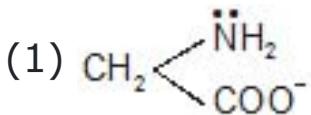
- (1) यह कार्बोनिल संकुल में सहक्रियाशीलता बन्धन अन्तःक्रिया को दर्शाता है
- (2)  $(\text{M} - \text{C}) \pi$  बन्ध, कार्बन मोनोऑक्साइड के रिक्त प्रतिआबन्धी  $\pi^*$  कक्षक में धातु के भरित dकक्षक से एक इलेक्ट्रॉन युग्म के दान से निर्मित होता है
- (3) CO,  $\sigma$ -दाता तथा  $\pi$ -ग्राही के रूप में कार्य करता है
- (4) उपरोक्त सभी



X तथा Y हैं

- (1)  $\text{X}=\text{CH}_3-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{OC}_2\text{H}_5, \text{Y}=\text{H}_3\text{C}-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{C}_2\text{H}_5$
- (2)  $\text{X}=\text{CH}_3-\overset{\parallel}{\underset{\text{O}}{\text{C}}}-\text{NH}_2, \text{Y}=\text{H}_3\text{C}-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{C}_2\text{H}_5$
- (3)  $\text{X}=\text{CH}_3-\overset{\parallel}{\underset{\text{O}}{\text{C}}}-\text{NH}-\text{NH}_2, \text{Y}=\text{H}_3\text{C}-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{C}_2\text{H}_5$
- (4)  $\text{X}=\text{CH}_3-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{C}_2\text{H}_5, \text{Y}=\text{H}_3\text{C}-\overset{\parallel}{\underset{\text{N}-\text{NH}_2}{\text{C}}}-\text{C}_2\text{H}_5$

**85.** Glycinato ligand is –



- (2) Bidentate ligand
- (3) Two donor sites N and O<sup>-</sup>
- (4) All of these

**86.** Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).

**Assertion (A) :** A simple distillation can be used to separate a mixture of propanol and propanone.

**Reason (R) :** Two liquids with a difference of more than 20°C in their boiling points can be separated by simple distillations.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
- (2) (A) is false but (R) is true.
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are correct and (R) is the correct explanation of (A).

**87.** In the transition of Zn atoms to Zn<sup>++</sup> ions there is a decrease in the

- (1) Number of valency electrons
- (2) Atomic weight
- (3) Atomic number
- (4) Equivalent weight

**88.** A white metal sulphide soluble in water is:

- (1) CuS (2) Na<sub>2</sub>S (3) PbS (4) ZnS

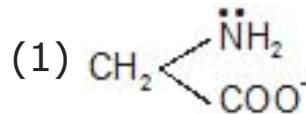
**89.** When a mixture of solid NaCl, solid K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> is heated with conc. H<sub>2</sub>SO<sub>4</sub>, orange red vapours are obtained. These are of the compound.

- (1) chromous chloride
- (2) chromyl chloride
- (3) chromic chloride
- (4) chromic sulphate

**90.** On heating with concentrated H<sub>2</sub>SO<sub>4</sub> a mixture of solid NaCl and KI produces

- (1) Cl<sub>2</sub>, I<sub>2</sub>, and SO<sub>2</sub>
- (2) HCl, HI and I<sub>2</sub>
- (3) HCl, I<sub>2</sub> and SO<sub>2</sub>
- (4) HCl and HI

**85.** ग्लाइसीनेटो लिगेण्ड है –



- (2) द्विदन्तुक लिगेण्ड
- (3) दो दाता स्थल N और O<sup>-</sup>
- (4) इनमें से सभी

**86.** नीचे दो कथन दिए हैं। एक का नाम अभिकथन (A) तथा दूसरे का कारण (R) है।

**अभिकथन (A):** प्रोपेनॉल तथा प्रोपेनॉन के मिश्रण को साधारण आसवन से पृथक कर सकते हैं।

**कारण (R):** दो द्रवों जिनके कथनांकों में 20°C से अधिक का अन्तर है उनकों साधारण आसवन से पृथक किया जा सकता है।

उपरोक्त कथनों के संदर्भ में, सर्वाधिक उचित उत्तर निम्न विकल्पों में से चुनिए।

- (1) दोनों (A) तथा (R) सही है और (R) सही व्याख्या नहीं हैं (A) की।
- (2) (A) सही नहीं है परन्तु (R) सही है।
- (3) (A) सही है परन्तु (R) सही नहीं है।
- (4) दोनों (A) तथा (R) सही है और (R) सही व्याख्या है (A) की।

**87.** Zn परमाणु का Zn<sup>++</sup> आयन में संक्रमण से कमी आती है

- (1) संयोजकता इलेक्ट्रॉनों की संख्या में
- (2) परमाणु भार में
- (3) परमाणु संख्या में
- (4) तुल्यांकी भार में

**88.** जल में विलेयशील एक श्वेत धातु सल्फाइड है:

- (1) CuS (2) Na<sub>2</sub>S (3) PbS (4) ZnS

**89.** जब ठोस NaCl तथा ठोस K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> के मिश्रण को सान्द्र H<sub>2</sub>SO<sub>4</sub> के साथ गर्म किया जाता है तो नारंगी लाल रंग की वाष्प किसके कारण प्राप्त होती है -

- (1) क्रोमस क्लोराइड
- (2) क्रोमिल क्लोराइड
- (3) क्रोमिक क्लोराइड
- (4) क्रोमिक सल्फेट

**90.** ठोस NaCl तथा KI का एक मिश्रण सान्द्र H<sub>2</sub>SO<sub>4</sub> के साथ गर्म करने पर बनाता है

- (1) Cl<sub>2</sub>, I<sub>2</sub>, और SO<sub>2</sub>
- (2) HCl, HI और I<sub>2</sub>
- (3) HCl, I<sub>2</sub> और SO<sub>2</sub>
- (4) HCl और HI

## [BIOLOGY]

**91.** Stem tendril of pumpkin develop from-

- (1) Accessory bud
- (2) Axillary bud
- (3) Extra – axillary bud
- (4) Floral bud

**92.** Match List – I with List – II.

	<b>List I</b>		<b>List-II</b>
(a)	Scapula	(i)	Cartilaginous joints
(b)	Cranium	(ii)	Flat bone
(c)	Sternum	(iii)	Fibrous joints
(d)	Vertebral column	(iv)	Triangular flat bone

Choose the correct answer from the options given below.

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

**93.** ATP synthesis in chloroplast and mitochondria is due to proton gradient across the membrane. Select correct statement w.r.t. ATP formation in chloroplast

- (a) Proton accumulates in lumen of thylakoid
  - (b) Splitting of water occurs on inner side of thylakoid membrane
  - (c) Proton accumulates in stroma side of chloroplast
  - (d) NADP reductase is located on stroma side of membrane
- (1) Only (a) and (b) are correct
  - (2) Only (b) and (c) are correct
  - (3) Only (c) and (d) are correct
  - (4) (a), (b) and (d) are correct

**91.** कद्दू के स्तम्भ प्रतान कहाँ से विकसित होती है-

- (1) सहायक कलिका
- (2) कक्षस्थ कलिका
- (3) अतिरिक्त कक्षस्थ कलिका
- (4) पुष्प कलिका

**92.** सूची-I का सूची-II के साथ मिलान करो।

	<b>सूची-I</b>		<b>सूची-II</b>
a	स्कैपुला	i	उपस्थि युक्त जोड़
b	कपाल	ii	चपटी अस्थि
c	उरोस्थि	iii	रेशीय जोड़
d	कशेरूक दंड	iv	त्रिभुजाकार चपटी अस्थि

नीचे दिये गये निम्न विकल्पों में से उचित उत्तर का चयन करो।

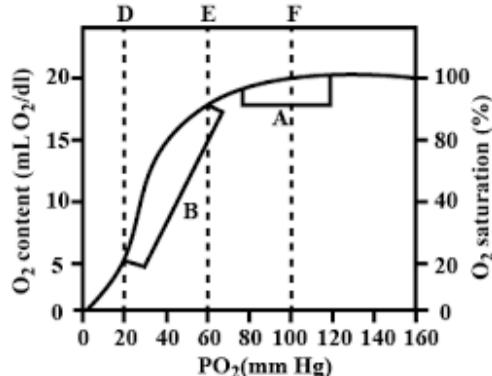
- (1) (a)-iv, (b)-iii, (c)-ii, (d)-i
- (2) (a)-i, (b)-iii, (c)-ii, (d)-iv
- (3) (a)-ii, (b)-iii, (c)-iv, (d)-i
- (4) (a)-iv, (b)-ii, (c)-iii, (d)-i

**93.** हरितलवक और माइटोकॉण्ड्रिया में ATP का संश्लेषण, झिल्ली के आर-पार प्रोटॉन प्रवणता के कारण होता है। हरितलवक में ATP के निर्माण के सन्दर्भ में सही कथन का चयन कीजिये :

- (a) प्रोटॉन, थायलेकॉइड की अवकाशिका में एकत्रित होते हैं
  - (b) जल का विघटन थाइलाकॉयड झिल्ली के अन्दर की ओर वाले भाग पर होता है
  - (c) प्रोटॉन, हरितलवक के पीठिका की ओर वाले भाग में एकत्रित होते हैं
  - (d) NADP रिडक्टेज़, झिल्ली के पीठिका की ओर वाले भाग पर स्थित होता है
- (1) केवल (a) तथा (b) सही हैं
  - (2) केवल (b) तथा (c) सही हैं
  - (3) केवल (c) तथा (d) सही हैं
  - (4) (a), (b) तथा (d) सही हैं



- 99.** **Direction :** Refer the given graph and select the correct options for the questions that follow



Which of these is incorrect regarding A and B in the given graph ?

- (1) A is deoxygenated blood leaving the tissues
- (2) B is reduced blood returning from tissues
- (3) A is oxygenated blood leaving the lungs
- (4) B is deoxygenated blood in the systemic veins

- 100.** Parthenocarpic fruit is -

- (1) Develop after fertilization from ovary
- (2) Develop without fertilization
- (3) Develop after fertilization from thalamus
- (4) (1) & (3) both

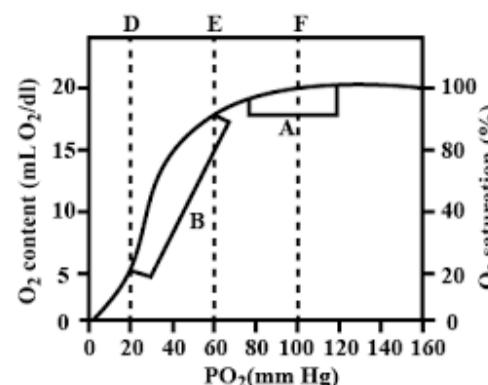
- 101.** Myelin sheath is produced by

- (1) Astrocytes and Schwann Cells
- (2) Oligodendrocytes and Osteoclasts
- (3) Osteoclasts and Astrocytes
- (4) Schwann Cells and Oligodendrocytes

- 102.** The essential role of air in the growth of green plants was revealed by

- (1) Priestley
- (2) Van Niel
- (3) Blackmann
- (4) Emerson

- 99. निर्देश :** दिये गये ग्राफ को देखें और नीचे दिये गए प्रश्नों के सही विकल्प चुनें।



दिये गये ग्राफ में A तथा B से संबंधित निम्न में से कौनसा कथन गलत है ?

- (1) A ऑक्सीजनरहित रक्त है जो ऊतक से निकलता है।
- (2) B ऊतकों से आने वाला हासित रक्त है।
- (3) A ऑक्सीजनयुक्त रक्त है जो फेफड़ो से निकलता है।
- (4) B ऑक्सीजनरहित रक्त है जो दैहिक शिरा में पाया जाता है।

- 100. अनिषेकफलित फल होता है -**

- (1) निषेचन के पश्चात् अण्डाशय से विकसित होता है
- (2) निषेचन के बिना विकसित होता है
- (3) निषेचन के बाद थैलेमस से विकसित होता है
- (4) (1) और (3) दोनों

- 101. मायलिन आच्छद किसके द्वारा उत्पन्न होता हैं ?**

- (1) तारा कोशिका एवं श्वान कोशिकाएं
- (2) ऑलिगोडेंड्रोसाइट्स एवं अस्थिशोषक
- (3) अस्थिशोषक एवं तारा कोशिकाएं
- (4) श्वान कोशिकाएं एवं ऑलिगोडेंड्रोसाइट्स

- 102. हरे पादपों की वृद्धि में वायु की अनिवार्य भूमिका का खुलासा किसके द्वारा किया गया?**

- (1) प्रीस्टले
- (2) वैन नील
- (3) ब्लैकमैन
- (4) इमरसन

**103.** Match the column :

	<b>Column-I</b>		<b>Column-II</b>
I	Recombinant DNA technology	A	Vector
II	Extrachromosomal element	B	Sealing enzyme
III	Macromolecular separation	C	Electrophoresis
IV	DNA ligase	D	Genetic engineering

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

**104.** Read the following statements and select the **correct** options :-

- (A) The hormone, human chorionic gonadotropin facilitates parturition by softening the connective tissue of the pubic symphysis.
- (B) Spermatogonium has 23 chromosomes in its nucleus.
- (C) During fertilisation, a sperm comes in contact with the zona pellucida layer of the ovum and induces the changes in the membrane that block the entry of additional sperms.
- (D) After one month of pregnancy, the major organ systems are formed.
- (E) The milk produced during the initial few days of lactation is called Colostrum.

- (1) B, C & E are correct, but A & D are incorrect
- (2) A, C & E are correct, but B & D are incorrect
- (3) A & B are correct, but C, D & E are incorrect
- (4) C & E are correct, but A, B & D are incorrect

**105.** Ecology is basically concerned with four levels of biological organization. These levels are:-

- (1) Organisms, populations, communities and biomes
- (2) Organisms and communities, species and population
- (3) Species, populations, biomes and organisms
- (4) Organisms, populations, biome and species

**103. कॉलम को सुमेलित करे-**

	<b>कॉलम -I</b>		<b>कॉलम -II</b>
I	पुनर्योगज DNA तकनीक	A	वाहक
II	अतिरिक्त गुणसूत्रीय तत्व	B	सीलिंग एंजाइम
III	वृहद अणुओं का पृथक्करण	C	विद्युत कण संचलन
IV	DNA लाइगेज	D	आनुवांशिक अभियांत्रिकी

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

**104. निम्नलिखित कथनों को पढ़ें और सही विकल्प का चयन करें**

- (A) मानव जरायु गोनैडोट्रॉफिन (HCG) यूबिक सिम्फिसिस के संयोजी ऊतक को नरम बनाकर प्रसव में सहायता करता है,
  - (B) शुक्राणुजन के केंद्रक में 23 गुणसूत्र होते हैं।
  - (C) निषेचन के दौरान एक शुक्राणु अंडाणु के पारदर्शी अंडावरण (जोना पेल्युसिडा) स्तर के संपर्क में आता है और अतिरिक्त शुक्राणुओं के प्रवेश को रोकने हेतु उसके उक्त स्तर में बदलाव प्रेरित करता है।
  - (D) गर्भावस्था के एक महीने बाद, प्रमुख अंग तंत्र बन जाता है।
  - (E) दुग्धस्रवण के आरंभिक कुछ दिनों तक जो दूध निकलता है उसे प्रथम स्तन्य या खीस (कोलोस्ट्रम) कहते हैं,
- (1) B, C व E सही हैं, लेकिन A व D गलत हैं।
  - (2) A, C व E सही हैं, लेकिन B व D गलत हैं।
  - (3) A व B सही हैं, लेकिन C, D व E गलत हैं।
  - (4) C व E सही हैं, लेकिन A, B व D गलत हैं।

**105. परिस्थितिकी को जैविक संगठन के आधार पर चार स्तरों में लिया जाता है, ये स्तर हैं-**

- (1) जीव, समष्टि, समुदाय तथा बायोम
- (2) जीव, तथा समुदाय, जाति तथा समष्टि
- (3) जाति, समष्टि बायोम तथा जीव
- (4) जीव, समष्टि, बायोम, तथा जाति

**106.** Which of the following is the defining property of living?

- (1) Reproduction
- (2) Metabolism
- (3) Growth
- (4) Both (1) & (3)

**107.**  $Ebr \oplus \text{♀} K_{2+2} C_4 A_{2+4} G_{(2)}$

given floral formula is belong to:-

- (1) Compositae
- (2) Malvaceae
- (3) Poaceae
- (4) Cruciferae

**108.** Receptor sites for neurotransmitters are present on-

- (1) Pre-synaptic membrane
- (2) Tips of axons
- (3) Post-synaptic membrane
- (4) Membranes of synaptic vesicles

**109.** Select correct match

(a)	OEC	(i)	Primary $e^-$ acceptor
(b)	NADP reductase	(ii)	Photolysis of $H_2O$
(c)	Cyt b <sub>6</sub> f	(iii)	Outer surface of thylakoid membrane
(d)	Phaeophytin	(iv)	Connects PS II & I

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

**110.** Which among the following be considered as a key tool in recombinant DNA technology

- (a) Restriction enzymes
  - (b) Polymerase enzymes
  - (c) Ligases
  - (d) Vectors
  - (e) Host organisms
- (1) d
  - (2) a, b
  - (3) c, e
  - (4) All of these

**106.** निम्नलिखित में जीवन को परिभाषित करने वाला लक्षण है?

- (1) जनन
- (2) उपापचय
- (3) वृद्धि
- (4) (1) तथा (3) दोनों

**107.**  $Ebr \oplus \text{♀} K_{2+2} C_4 A_{2+4} G_{(2)}$

दिया गया पुष्प सूत्र किसे संबंधित है-

- (1) कम्पोजिटी
- (2) मालवेसी
- (3) पोएसी
- (4) क्रूसिफेरी

**108.** न्यूरो ट्रान्समीटर के लिये ग्राही स्थल कहाँ उपस्थित होते हैं-

- (1) पूर्व-सिनेट्रिक डिल्ली पर
- (2) तंत्रिका के सिरों पर
- (3) पश्च सिनेट्रिक डिल्ली पर
- (4) सिनेट्रिक आशयों की डिल्लीयों पर

**109.** सही मिलान चुनें

(a)	OEC	(i)	प्राथमिक इलेक्ट्रॉन ग्राही
(b)	NADP रिडक्टेज़	(ii)	$H_2O$ का प्रकाशअपघटन
(c)	Cyt b <sub>6</sub> f	(iii)	थाइलेकोइड डिल्ली की बाहरी सतह
(d)	फीओफाइटिन	(iv)	जुड़े हुए PS II व I

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

**110.** पुनर्संयोजी DNA प्रौद्योगिकी में कौन मुख्य उपकरणों में सम्मिलित किया जाता है-

- (a) रेस्ट्रिक्शन एंजाइम
  - (b) पॉलीमरेज एंजाइम
  - (c) लाइगेज
  - (d) संवाहक
  - (e) परपोषी जीव
- (1) d
  - (2) a, b
  - (3) c, e
  - (4) उपरोक्त सभी

**111.** Scrotum helps in maintaining the low temperature of the testis **A** lower than the normal internal body temperature. Each testis, with a length about **B** and a width of **C**.

Each testis has about **D** compartments called testicular lobules.

- (1) A- 2-2.5°C, B- 4 to 5 cm, C- 2 to 3 cm, D- 250
- (2) A- 3 - 3.5°C, B- 6 - 7 cm, C- 2 to 3 cm, D- 250
- (3) A- 2- 2.5°C, B- 4 to 5 cm, C- 2 to 3 cm, D- 350
- (4) A- 3 - 3.5°C, B- 6 - 7 cm, C- 2 to 5 cm, D- 350

**112.** Which of the following is most important and ecologically relevant environmental abiotic factor-

- (1) Light
- (2) Temperature
- (3) Water
- (4) Soil

**113.** Which of the following is a group of 'living fossils'?

- (1) Fungi
- (2) Archaeabacteria
- (3) Mycoplasma
- (4) Cyanobacteria

**114.** Given below are two statement -

**Statement-I :** The atrium and ventricle of same side are separated by thick muscular tissue called atrio ventricular septum.

**Statement-II :** Atrio ventricular septum has a muscular valve between the atria and ventricle of same side.

In the light of above statements choose the most appropriate answer from the options given below.

- (1) Both statement-I and statement II are incorrect
- (2) Statement I is correct but statement II is incorrect
- (3) Statement I is incorrect but statement II is correct
- (4) Both statement I and statement II are correct

**111.** वृषणकोष वृषणों के तापमान को शरीर के तापमान से **A** कम रखने में सहायक होता है। प्रत्येक वृषण, जिसकी लम्बाई लगभग **B** और चौड़ाई लगभग **C** होती है। प्रत्येक वृषण में लगभग **D** कक्ष होते हैं जिन्हें वृषण पालिकाएं (टेस्टिकुलर लोब्युल्स) कहते हैं।

- (1) A- 2-2.5°C, B- 4 से 5 cm, C- 2 से 3 cm, D- 250
- (2) A- 3 - 3.5°C, B- 6 - 7 cm, C- 2 से 3 cm, D- 250
- (3) A- 2- 2.5°C, B- 4 से 5 cm, C- 2 से 3 cm, D- 350
- (4) A- 3 - 3.5°C, B- 6 - 7 cm, C- 2 से 5 cm, D- 350

**112.** निम्नलिखित में से कौनसा पारिस्थितिकीय रूप से आवश्यक व उपयुक्त वातावरणीय अजैविक कारक है-

- (1) प्रकाश
- (2) तापमान
- (3) जल
- (4) मृदा

**113.** निम्नलिखित में से कौनसा एक समूह जीवाशमों का है ?

- (1) कवक
- (2) आद्यजीवाणु
- (3) माइकोप्लाज्मा
- (4) साइनोबैक्टीरिया

**114.** निम्नलिखित दो कथन दिए गए हैं -

**कथन-I:** अपनी-अपनी ओर के अलिंद एवं निलय एक मोटे पेशीय ऊतक द्वारा पृथक रहते हैं जिसे अलिंद निलय पट कहते हैं।

**कथन-II:** अलिंद निलय पट में एक पेशीय कपाट होता है, जो एक ही ओर के अलिंद और निलय के बीच होता है।

उपरोक्त कथनों के संदर्भ में, नीचे दिये गये विकल्पों की सहायता से उपयुक्त उत्तर का चयन कीजिए।

- (1) कथन-I और कथन-II दोनों गलत हैं।
- (2) कथन-I सही है लेकिन कथन-II गलत है।
- (3) कथन-I गलत है लेकिन कथन-II सही है।
- (4) कथन-I और कथन-II दोनों सही हैं।

**115.** Read the following statements and choose the incorrect option.

- (1) A plant is made up of different kinds of tissues.
- (2) Tissues are classified into two main groups, namely, simple and permanent tissues.
- (3) Different organs in a plant show differences in their internal structure.
- (4) Within angiosperms, the monocots and dicots are also seen to be anatomically different.

**116.** Select the correct one:-

- (i) Pons made up of fibre tracts that interconnect different region of brain.
  - (ii) The front portion of midbrain consist of 4 rounded swelling called corpora quadrigemina
  - (iii) Limbic system and hypothalamus regulate libido, and emotional reactions.
  - (iv) Hypothalamus lie at the apex of thalamus
- (1) i, iii
  - (2) i, iv
  - (3) ii, iii
  - (4) iii, iv

**117. Statement-I :** Equal amounts of CO<sub>2</sub> and O<sub>2</sub> are evolved and consumed when carbohydrates are incompletely oxidised.

**Statement-II :** Pure proteins or fats are never used as respiratory substrates.

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

**118.** Which of the following restriction sites are not present on pBR322?

- (1) Pst I, Eco RI
- (2) Cla I, Hind III
- (3) BamH I, Sal I
- (4) Hind II, Pst II

**115.** नीचे दिए गए कथनों को पढ़ें और गलत विकल्प का चयन करें

- (1) एक पौधा विभिन्न प्रकार के ऊतकों से बना होता है।
- (2) ऊतक दो मुख्य समूहों में वर्गीकृत होते हैं, अर्थात् सरल और स्थायी ऊतक।
- (3) पौधे में विभिन्न अंग उनकी आंतरिक संरचना में भिन्नता दर्शाते हैं।
- (4) ऐंजियोस्पर्म में, एकबीजपत्री तथा द्विबीजपत्री भी शारीरिक रूप से अलग दिखाई देते हैं।

**116.** सही एक का चयन कीजिए-

- (i) पोंस फाइबर के बने होते हैं जो मस्तिष्क के विभिन्न क्षेत्रों को आपस में जोड़ते हैं।
  - (ii) मध्यमस्तिष्क का अग्र भाग गोल सूजन से बना होता है जिन्हें कॉर्पोरा काड्रिजेमिना कहते हैं।
  - (iii) लिम्बिक सिस्टम और हाइपोथैलेमस लिबिडो व भावनात्मक प्रतिक्रियाओं की अभिव्यक्ति करते हैं।
  - (iv) हाइपोथैलेमस थैलेमस के शीर्ष पर स्थित होता है।
- (1) i, iii
  - (2) i, iv
  - (3) ii, iii
  - (4) iii, iv

**117. कथन-I :** जब कार्बोहाइड्रेट अपूर्ण रूप से ऑक्सीकृत होते हैं तो CO<sub>2</sub> और O<sub>2</sub> की समान मात्रा निष्कासित और खपत होती है।

**कथन-II :** शुद्ध प्रोटीन व वसा श्वसनी क्रियाधारों के रूप में कभी प्रयुक्त नहीं होते हैं।

- (1) कथन I और कथन II दोनों गलत हैं।
- (2) कथन I सही है लेकिन कथन II गलत है
- (3) कथन I गलत है लेकिन कथन II सही है
- (4) कथन I और कथन II दोनों सही हैं

**118.** निम्न में से कौनसे प्रतिबंधन स्थल pBR322 में उपस्थित नहीं होते हैं ?

- (1) Pst I, Eco RI
- (2) Cla I, Hind III
- (3) BamH I, Sal I
- (4) Hind II, Pst II

**119.** What is true for "Lactational amenorrhoea"?

- (i) It means absence of menstruation.
  - (ii) Ovulation does not occur during the initial 6 months of lactational period.
  - (iii) Chances of contraception are almost nil upto six months following parturition.
  - (iv) Side effect are almost nil
  - (v) Chances of failure, though of this method are also very low.
  - (vi) It is a natural method of contraception.
  - (vii) It increasing phagocytosis of sperms.
- (1) (ii), (iii), (iv), (v), (vi)  
 (2) (i), (ii), (iii), (iv), (vi)  
 (3) (ii), (iii), (iv), (v)  
 (4) (i), (ii), (iii), (iv), (v), (vi)

**120.** Which of the following is the example of biological control?

- (1) Control of mosquitoes by DDT
- (2) Control of Opuntia by a predator (moth), a type of insect
- (3) Decreasing the carrying capacity of the habitat by poisoning it
- (4) All the above

**121.** Match the columns :

	<b>Column-I</b>		<b>Column-II</b>
A.	Amoeboid protozoans	(i)	Paramoecium
B.	Flagellated protozoans	(ii)	Plasmodium
C.	Ciliated protozoans	(iii)	Entamoeba
D.	Sporozoans	(iv)	Trypanosoma

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

**122.** Read the following sentences carefully and choose incorrect options:-

- (1) Reptiles and amphibia have incomplete double circulation.
- (2) Eosinophils counting increased in allergic condition.
- (3) Circulatory pathway between alimentary canal and liver is hepatic portal system.
- (4) For safe blood transfusion, recipients blood should contain antibodies against donor's bloods antigen

**119.** स्तनपान अनार्तव के संदर्भ में क्या सत्य है?

- (i) इसका अर्थ मासिक धर्म का अभाव है।
  - (ii) स्तनपान के प्रारंभिक 6 माह की अवधि के दौरान की अंडोत्सर्जन नहीं होता।
  - (iii) प्रसव के बाद छह महीने तक गर्भधारण के अवसर लगभग न के बराबर होते हैं।
  - (iv) इसके दुष्प्रभाव लगभग न के बराबर होते हैं।
  - (v) इस विधि की विफलता की संभावना बहुत कम होती है।
  - (vi) यह गर्भ निरोध की एक प्राकृतिक विधि है।
  - (vii) यह शुक्राणुओं की फागोसाइटोसिस को बढ़ाता है।
- (1) (ii), (iii), (iv), (v), (vi)  
 (2) (i), (ii), (iii), (iv), (vi)  
 (3) (ii), (iii), (iv), (v)  
 (4) (i), (ii), (iii), (iv), (v), (vi)

**120.** निम्नलिखित में से कौनसा एक जैविक नियंत्रण का उदाहरण है?

- (1) DDT द्वारा मच्छरों का नियंत्रण
- (2) नागफनी का नियंत्रण एक परभक्षी (माँथ) द्वारा जो एक प्रकार का कीट है
- (3) विष के द्वारा आवास की वहन क्षमता कम करना
- (4) उपरोक्त सभी

**121.** कॉलम सुमेलित करे-

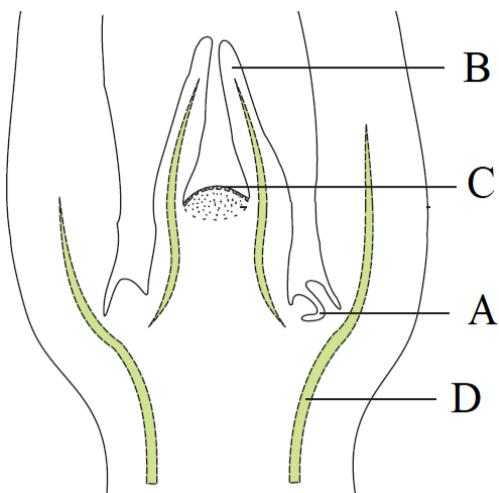
	<b>कॉलम -I</b>		<b>कॉलम -II</b>
A.	अमीबीय प्रोटोजोआ	(i)	पैरामीशियम
B.	कशाभयुक्त प्रोटोजोआ	(ii)	प्लाज्मोडियम
C.	पक्षमाधी प्रोटोजोआ	(iii)	एंटअमीबा
D.	स्पोरोजोआ	(iv)	ट्रिपैनोसोमा

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

**122.** निम्नलिखित वाक्यों को ध्यानपूर्वक पढ़े तथा गलत विकल्प का चयन करे-

- (1) सरीसृप और उभयचर में अपूर्ण दोहरा परिसंचरण होता है।
- (2) एलर्जी की स्थिति में इओसिनोफिल्स की संख्या बढ़ जाती है।
- (3) आहार नाल तथा यकृत के मध्य परिसंचरण पथ, यकृतीय निवाहिका तंत्र है।
- (4) सुरक्षित रक्त आधान के लिए, ग्राही के रक्त में दाता के रक्त प्रतिजन के प्रति एंटीबॉडी होना चाहिए

**123.** Examine the figure given below and select the correct option that represents the correct labelling A, B, C and D.



- (1) A-Leaf primordium, B-Meristematic, C-Axillary bud, D-Intercalary meristem
- (2) A-Leaf Primordium, B-Short optical meristem, C-Axillary bud, D-Cork cambium
- (3) A-Axillary bud, B-Leaf primordium, C-Shoot apical meristem, D-Differentiating vascular tissue
- (4) A-Axillary bud, B-Shoot apical meristem, C-Meristematic zone, D-Leaf primordia

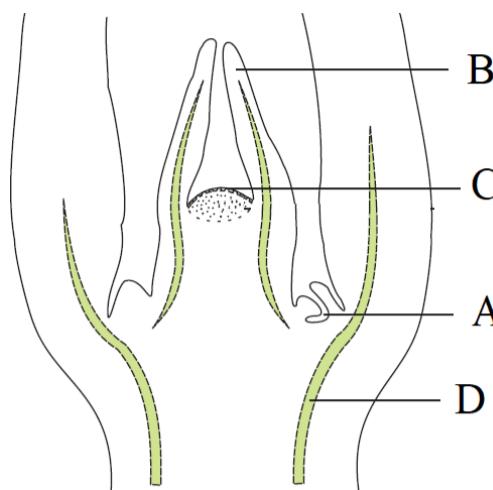
**124.** Match the following columns and select the **correct** option.

Column-I	Column-II
(a) Pituitary gland	(i) Grave's disease
(b) Thyroid gland	(ii) Diabetes mellitus
(c) Adrenal gland	(iii) Diabetes insipidus
(d) Pancreas	(iv) Addison's disease
(1) (a) → (iii), (b) → (ii), (c) → (i), (d) → (iv)	
(2) (a) → (iii), (b) → (i), (c) → (iv), (d) → (ii)	
(3) (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)	
(4) (a) → (iv), (b) → (iii), (c) → (i), (d) → (ii)	

**125.**  $F_1$  part of complex V-

- (1) Integral transmembrane protein
- (2) Peripheral component made of complex lipids
- (3) Have specific proton tunnels for pumping protons across inner membrane of mitochondria
- (4) Peripheral membrane protein with ATP synthase activity

**123.** नीचे दिए गए चित्र का अध्ययन करें और सही विकल्प का चयन करें जो A, B, C और D के सही चिन्हों को दर्शाता है।



- (1) A - पत्ती आद्यक, B- मेरिस्टेमेटिक, C- कक्षीय कली, D- अंतरर्वेशी विभज्योतक
- (2) A - पत्ती आद्यक, B - शोर्ट ऑप्टिकल विभज्योतक, C - कक्षीय कली, D - छाल केम्बियम
- (3) A- कक्षीय कली, B - पत्ती आद्यक, C - प्ररोह शीर्ष विभज्योतक, D - विभेदित संवहन ऊतक
- (4) A - कक्षीय कली, B - प्ररोह शीर्ष विभज्योतक, C - मेरिस्टेमेटिक क्षेत्र, D - पत्ती आद्यक

**124.** निम्न स्तम्भों का मिलान कर सही विकल्प का चयन करें।

स्तम्भ प्रथम	स्तम्भ द्वितीय
(a) पीयूष ग्रंथि	(i) ग्रेवस रोग
(b) थाइरॉइड ग्रंथि	(ii) डायबिटीज मेलिटस
(c) अधिवृक्क ग्रंथि	(iii) डायबिटीज इन्सीपिडस
(d) अस्याशय	(iv) एडीसन रोग

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

**125.** कॉम्प्लैक्स V का  $F_1$  भाग होगा-

- (1) आन्तरिक ट्रान्समैम्ब्रेन प्रोटीन
- (2) जटिल लीपिड से बना परिधीय घटक
- (3) माइटोकाण्ड्रिया की आन्तरिक कला के आर-पार प्रोटॉन को पम्प करने हेतु विशिष्ट प्रोटॉन टनल
- (4) ATP सिन्थेज क्रियाविधि युक्त परिधीय झिल्ली प्रोटीन।

**126.** Select the correct option to fill up the blanks.

(i) \_\_\_\_\_ enzyme is crucial for the immune system to function and its absence is caused by the deletion of a gene.

(ii) Insulin consists of \_\_\_\_\_ and \_\_\_\_\_ that are linked together by \_\_\_\_\_.

(iii) Transgenic mice are being used to test the safety of the \_\_\_\_\_.

(iv) \_\_\_\_\_ involves silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents translation of the mRNA.

(1) (i) Adenosine deaminase, (ii) A-chain, B-chain, disulphide bridges. (iii) polio vaccine (iv) RNAi

(2) (i) RNAi (ii) A-chain, B-chain, disulphide bridges, (iii) adenosine deaminase, (iv) polio vaccine

(3) (i) Adenosine deaminase (ii) A-chain, B-chain, hydrogen bonds (iii) polio vaccine (iv) RNAi

(4) (i) RNAi (ii) A-chain, B-chain, noncovalent bridges, (iii) polio vaccine (iv) adenosine deaminase

**127.** Who proposed the process of evolution as a result of saltation?

- (1) A scientist working on Galapagos Islands
- (2) A scientist working with *Mirabilis jalapa*
- (3) A scientist working on *Oenothera lamarckiana* (evening primrose)
- (4) A scientist working on Malay archipelago

**128.** The pyramid that cannot take the 'inverted' shape is -

- (1) Pyramid of numbers
- (2) Pyramid of biomass
- (3) Pyramid of energy
- (4) Pyramid of parasitism

**129.** Silica gel (Keieselghur) / Diatomite / Diatomaceous earth is obtained by-

- (1) Chrysophyta
- (2) Dinoflagellates
- (3) Euglenoids
- (4) Brown algae

**126.** रिक्त स्थानों की पूर्ति के लिये सही विकल्प का चयन करें-

(i) \_\_\_\_\_ एन्जाइम प्रतिरक्षा तंत्र के कार्य करने के लिए महत्वपूर्ण है तथा इसकी अनुपस्थिति, एक जीन के विलोपन के कारण होती है

(ii) इन्सुलिन \_\_\_\_\_ तथा \_\_\_\_\_ से बना होता है तथा \_\_\_\_\_ द्वारा आपस में जुड़े होते हैं

(iii) \_\_\_\_\_ की सुरक्षा का परीक्षण करने के लिए पारजीनी चूहों का उपयोग किया जा रहा है

(iv) \_\_\_\_\_ में पूरक dsRNA अणु द्वारा विशिष्ट mRNA का संदर्भ सम्मिलित होता है जो mRNA से जुड़कर अनुवादन को रोकता है

(1) (i) एडिनोसिन डिएमीनेज, (ii) A-शृंखला, B-शृंखला, डाइसल्फाइड सेतु. (iii) पोलियो वेक्सीन (iv) RNAi

(2) (i) RNAi (ii) A-शृंखला, B-शृंखला, डाइसल्फाइड सेतु, (iii) एडिनोसिन डिएमीनेज, (iv) पोलियो वेक्सीन

(3) (i) एडिनोसिन डिएमीनेज (ii) A-शृंखला, B-शृंखला, हाइड्रोजन बन्ध (iii) पोलियो वेक्सीन (iv) RNAi

(4) (i) RNAi (ii) A-शृंखला, B-शृंखला, असहसंयोजी सेतु, (iii) पोलियो वेक्सीन (iv) एडिनोसिन डिएमीनेज

**127.** विकास की प्रक्रिया को उच्छलन के परिणामस्वरूप किसने प्रस्तावित किया था?

(1) एक वैज्ञानिक जो गैलापेगोस द्वीपों पर काम कर रहा था

(2) एक वैज्ञानिक जो मिराबिलिस जलापा पर काम कर रहा था

(3) एक वैज्ञानिक जो ओएनोथीरा लैमार्कियाना (इवनिंग प्राइमरोज) पर काम कर रहा था

(4) एक वैज्ञानिक जो मलय आर्कपिलेगो पर काम कर रहा था

**128.** वह पिरामिड जो उल्टा आकार नहीं ले सकता है -

- (1) संख्याओं के पिरामिड
- (2) बायोमास के पिरामिड
- (3) ऊर्जा के पिरामिड
- (4) परजीविता के पिरामिड

**129.** सिलिका जेल (कीसेलगर) / डायटोमाइट / डाईटमेशियस मृदा किससे प्राप्त होती है?

- (1) क्राईसोफाईटा
- (2) डाइनोफ्लैजलेट्स
- (3) यूग्लीना
- (4) भूरे शैवाल

**130.** In counter current mechanism, NaCl is returned to-

- (1) The interstitium by the ascending portion of vasa recta
- (2) The interstitium by the descending portion of vasa recta
- (3) The interstitium by the ascending portion of Henle loop
- (4) The interstitium by the descending portion of Henle's loop

**131.** Starch grains are abundant in the endodermal cells of

- (1) Monocot root
- (2) Dicot stem
- (3) Monocot stem
- (4) Dicot root

**132.** Presence of which of the following conditions in urine are indicative of Diabetes Mellitus?

- (1) Uremia and Renal Calculi
- (2) Ketonuria and Glycosuria
- (3) Renal calculi and Hyperglycaemia
- (4) Uremia and Ketonuria

**133.** In the process of Respiration in plants 180 gm of Glucose plus 192 gm of oxygen produce-

- (1) 132 gm of CO<sub>2</sub>, 54 gm of H<sub>2</sub>O & 483 Cal. Energy
- (2) 264 gm of CO<sub>2</sub>, 108 gm of H<sub>2</sub>O, & 686 KCAL Energy
- (3) 200 gm of C<sub>2</sub>H<sub>5</sub>OH, 72 gm of H<sub>2</sub>O & 21 K. Cal Energy
- (4) None

**134.** Bt toxins exist as inactive protoxins in bacteria but when an insect ingest the inactive toxin it becomes active toxin in the presence of-

- (1) Alkaline pH of insect mid gut
- (2) Acidic pH of insect mid gut
- (3) Bacterial enzyme
- (4) Specific protein

**135.** Gases found in primitive atmospheres are:

- (1) CH<sub>4</sub>, NH<sub>3</sub>, H<sub>2</sub>, H<sub>2</sub>O (vapour form)
- (2) CH<sub>4</sub>, NH<sub>3</sub>, CO<sub>2</sub>, H<sub>2</sub>O
- (3) CH<sub>4</sub>, H<sub>2</sub>O, CO<sub>2</sub>
- (4) CH<sub>4</sub>, O<sub>2</sub>, CO<sub>2</sub>

**130.** प्रतिधारा प्रवाह प्रक्रिया में, NaCl लौटा दिया जाता है?

- (1) अंतराकाश को वासा रेक्टा की आरोही भुजा द्वारा
- (2) अंतराकाश को वासा रेक्टा की अवरोही भुजा द्वारा
- (3) अंतराकाश को हेनले के लूप की आरोही भुजा द्वारा
- (4) अंतराकाश को हेनले के लूप की अवरोही भुजा द्वारा

**131.** किसकी अन्तस्त्वचीय कोशिकाओं में मण्ड कण प्रचुर मात्रा में होते हैं?

- (1) एकबीजपत्री जड़
- (2) द्विबीजपत्री तना
- (3) एकबीजपत्री तना
- (4) द्विबीजपत्री जड़

**132.** निम्न में मूत्र की कौनसी अवस्था डायबिटीज मेलिटस की ओर संकेत करती है ?

- (1) यूरेमिया एवं रीनल कैल्कुली
- (2) कीटोनुरिया एवं ग्लाइकोसूरिया
- (3) रीनल कैल्कुली एवं हाइपरग्लाइसिमिया
- (4) यूरेमिया एवं कीटोनुरिया

**133.** पादपों में श्वसन क्रिया में 180 ग्राम ग्लूकोज और 192 ग्राम ऑक्सीजन से उत्पन्न होते हैं-

- (1) 132 ग्राम CO<sub>2</sub>, 54 ग्राम H<sub>2</sub>O और 483 कैलोरी ऊर्जा
- (2) 264 ग्राम CO<sub>2</sub>, 108 ग्राम H<sub>2</sub>O और 686 KCAL ऊर्जा
- (3) 200 ग्राम C<sub>2</sub>H<sub>5</sub>OH, 72 ग्राम H<sub>2</sub>O और 21 KCAL ऊर्जा
- (4) कोई नहीं

**134.** जीवाणु में Bt टॉक्सिन निष्क्रिय प्रोटोक्सीन के रूप में होता है, परन्तु जब एक कीट इसका अन्तःग्रहण करता है तो यह निष्क्रिय टॉक्सिन, सक्रिय टॉक्सिन में किसकी उपस्थिति में बदलता है, किसकी उपस्थिति में-

- (1) कीट की मध्यांत्र की क्षारीय pH में
- (2) कीट की मध्यांत्र की अम्लीय pH में
- (3) जीवाणु के एंजाइम से
- (4) विशिष्ट प्रोटीन

**135.** प्राचीन वातावरण में निम्न गैसें उपस्थित थीं:

- (1) CH<sub>4</sub>, NH<sub>3</sub>, H<sub>2</sub>, H<sub>2</sub>O (वाष्ष रूप में)
- (2) CH<sub>4</sub>, NH<sub>3</sub>, CO<sub>2</sub>, H<sub>2</sub>O
- (3) CH<sub>4</sub>, H<sub>2</sub>O, CO<sub>2</sub>
- (4) CH<sub>4</sub>, O<sub>2</sub>, CO<sub>2</sub>

**136.** The Pyramid of numbers in grassland ecosystem will be -

- (1) Up right                          (2) Inverted  
(3) Irregular                          (4) Linear

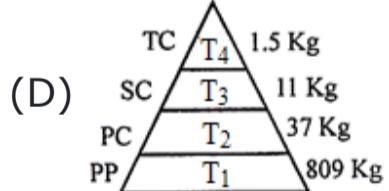
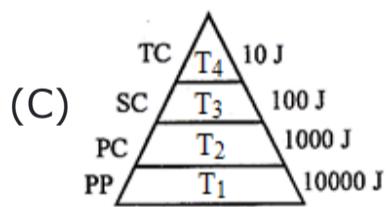
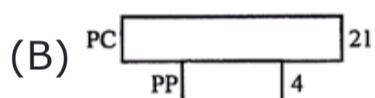
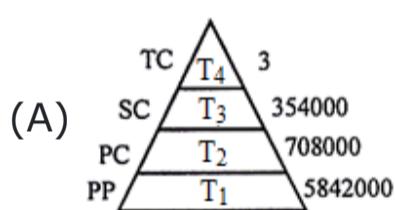
**137.** Plants having vascular tissues but lacking seeds are:-

- (1) Bryophytes      (2) Pteridophytes  
(3) Gymnosperms    (4) Angiosperms

**138.** Which of the following is not true about micturition reflex?

- (1) It is initiated by stretch receptors in the ureters
  - (2) It relies on parasympathetic impulses from the micturition centre
  - (3) It results in contraction of muscles of urinary bladder
  - (4) It stimulates the internal urethral sphincter to relax

**139.** The four pyramids (A, B, C and D) given below represent four different type of ecosystem ecological pyramids, which one of these is correctly identified in the options given, along with its correct ecosystem & type of pyramid :



(1)	Type of pyramid	Ecosystem
	Pyramid of number	Tree ecosystem

Type of pyramid	Ecosystem
Pyramid of Biomass	Grassland ecosystem

(3)	Type of pyramid	Ecosystem
	Pyramid of energy	Grassland ecosystem

(4)	Type of pyramid	Ecosystem
	Pyramid of Biomass	Sap ecosystems

**136.** एक घास स्थल पारितंत्र में संख्या का पिरैमिड होगा -



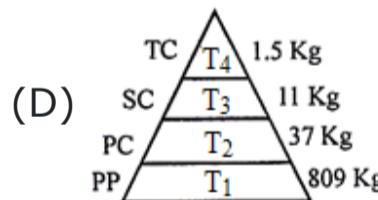
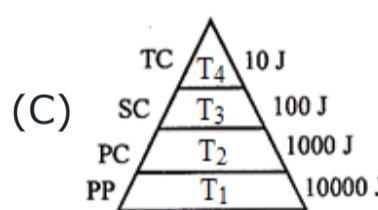
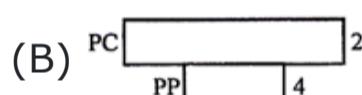
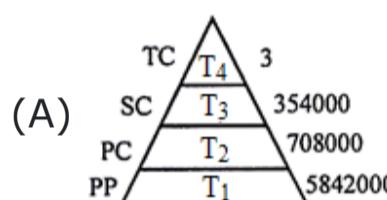
**137.** कौनसे पादपों में संवहन ऊतक होते हैं परन्तु बीजों की कमी होती है-



**138.** निम्न में से कौनसा कथन मूत्रण प्रतिवर्त प्रक्रिया से सम्बन्धित नहीं है?

- (1) इसकी शुरूवात प्रसार ग्राही द्वारा होती है जो मूत्रवाहिका में होते हैं
  - (2) मूत्रण केन्द्र से आने वाले परानुकंपी आवेग पर निर्भर करता है
  - (3) यह मूत्राशय की मांसपेशियों के संकुचन का परिणाम होता है
  - (4) मूत्र मार्ग पर उपस्थित आंतरिक अवरोधनी का शिथिलन प्रेरित होता है

**139.** नीचे दिये गये चार पिरेमिड (A, B, C तथा D) चार भिन्न प्रकार के पारितन्त्र पारिस्थितिकी पिरेमिड को प्रदर्शित करते हैं, इसमें से एक पारितन्त्र एवं पिरैमिड के प्रकार के अनुसार सही मिलान को पहचानिये :



(1)	पिरैमिड का प्रकार	पारितन्त्र
	संख्या का पिरैमिड	वक्ष पारितन्त्र

(2)	पिरैमिड का प्रकार	पारितन्त्र
	जैव भार का पिरैमिड	घास स्थल पारितन्त्र

(3)	पिरैमिड का प्रकार	पारितन्त्र
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जुआ का परामर्श	धास स्वल पारितन्त्र
(4)	पिरैमिड का प्रकार पारितन्त्र

**140.** Mendelism is related with

- (1) heredity in living beings
- (2) meiosis during sexual reproduction
- (3) mutation in living organisms
- (4) None of the above

**141.** Find odd one w.r.t. differentiation

- (1) Loss of nucleus in sieve tube
- (2) Death of protoplasm in tracheary elements
- (3) Callus formation
- (4) Lignification in vessels

**142.** Given below are two statements :

**Statement-I :** At present about 27 recombinant therapeutics have been approved for human use the world over.

**Statement-II :** 30 documented varieties of Basmati rice are grow in India.

Choose the correct answer from the option given below.

- (1) Both statement I and statement II are incorrect
- (2) Statement I is correct but statement II is incorrect
- (3) Statement I is correct but Statement II is correct
- (4) Both Statement I and Statement II are correct

**143.** Algae have cell wall made up of

- (1) Cellulose, hemicellulose and pectins
- (2) Cellulose, galactans, mannans
- (3) Hemicellulose, pectins and proteins
- (4) Pectins, cellulose and lipid

**144. Assertion :** The primary function of sweat is to facilitate a cooling effect on the body surface.

**Reason :** Sweat produced by the sweat gland is a watery fluid containing NaCl, small amounts of urea and lactic acid.

- (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.

**140. मेंडलिज्म (मेंडलवाद) से संबंधित है:-**

- (1) जीवित जीवों में आनुवाशिंकता से
- (2) लैंगिक जनन के दौरान अर्द्धसूत्री विभाजन से
- (3) जीवित जीवों में उत्परिवर्तन से
- (4) उपरोक्त में से कोई नहीं

**141. विभेदीकरण के संदर्भ में विषम ज्ञात कीजिए-**

- (1) चालनी नलिकाओं में केंद्रक का नष्ट होना
- (2) वाहिनिका तत्वों में प्रोटोप्लाज्म का नष्ट होना
- (3) कैलस का निर्माण
- (4) वाहिकाओं में लिप्रीकरण

**142. नीचे दो कथन दिए गए हैं :**

**कथन -I:** वर्तमान समय में लगभग 27 पुनर्योगज चिकित्सीय औषधियाँ विश्व में मनुष्यों के प्रयोग हेतु स्वीकृत हो चुकी हैं।

**कथन -II :** बासमती धान की 30 पहचानी गई किस्में भारत में उगायी जाती है।

नीचे दिए विकल्पों में से सही उत्तर चुनें

- (1) दोनों कथन I और कथन II गलत हैं।
- (2) कथन I सही परन्तु कथन II गलत है।
- (3) कथन I गलत है परन्तु कथन II सही है।
- (4) दोनों कथन I और कथन II सही हैं।

**143. शैवालों में कोशिका भित्ति निम्न की बनी होती है**

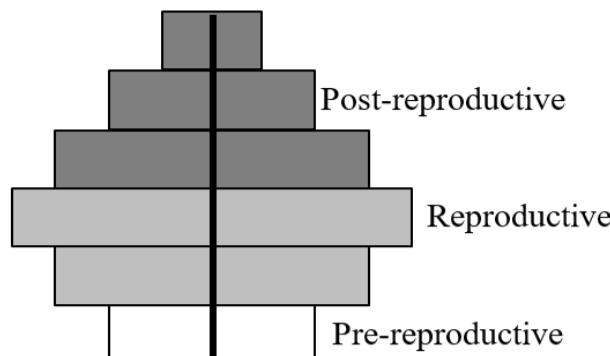
- (1) सेल्यूलोज, हेमीसेल्यूलोज तथा पेक्टिन
- (2) सेल्यूलोज, गैलेक्टेन्स, मेनेन्स
- (3) हेमीसेल्यूलोज, पेक्टिन तथा प्रोटीन्स
- (4) पेक्टिन, सेल्यूलोज तथा लिपिड

**144. कथन :** पसीने का मुख्य कार्य वाष्णीकरण द्वारा शरीर सतह को ठंडा रखना है

**कारण :** स्वेद ग्रंथि द्वारा निकलने वाला पसीना एक जलीय द्रव है, जिसमें NaCl, कुछ मात्रा में यूरिया व लैक्टिक अम्ल होते हैं।

- (1) (A) और (R) दोनों सत्य हैं और (R) (A) की सही व्याख्या है।
- (2) (A) और (R) दोनों सत्य हैं लेकिन (R) (A) की सही व्याख्या नहीं है।
- (3) (A) सत्य कथन है लेकिन (R) असत्य है।
- (4) (A) और (R) दोनों असत्य हैं।

**145.** What type of human population is represented by the following age pyramid



- (1) Vanishing population
- (2) Stable population
- (3) Declining population
- (4) Expanding population

**146.** The concept of genetic map was given by -

- |                |            |
|----------------|------------|
| (1) de Vries   | (2) Morgan |
| (3) Sturtevant | (4) Mendel |

**147.** Given below are two statements; one is labelled as Assertion (A) and the other is labelled Reason (R).

**Assertion (A) :** In arithmetic growth, mitotic cell division occurs in which, only one daughter cell continues to divide, while other differentiate and matures.

**Reason (R) :** The simplest expression of arithmetic growth is exemplified by zygote elongating at a constant rate.

- (1) If both assertion and reason are true and reason is the 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 reason is false.
- (4) If both assertion and reason are false.

**148.** Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R)

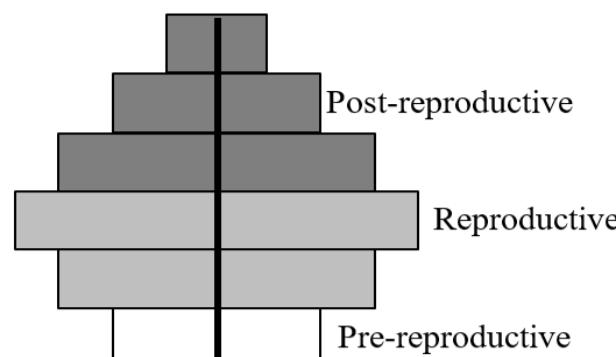
**Assertion (A) :** Micro injection is direct method of gene transfer.

**Reason (R) :** Ti plasmid use to deliver genes of our interest in animal cells.

In the light of the above statements, choose the correct answer from the options given below :

- (1) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
- (2) (A) is correct but (R) is not correct
- (3) (A) is not correct but (R) is correct
- (4) Both (A) and (R) are correct and (R) is the correct explanation of (A)

**145.** नीचे दिये जा रहे आयु पिरामिड में किस प्रकार की मानव समष्टि प्रदर्शित की गयी है-



- (1) गायब होती समष्टि
- (2) स्थिर समष्टि
- (3) घटती समष्टि
- (4) बढ़ती समष्टि

**146.** आनुवंशिक मानचित्र का सिद्धांत किसने दिया था?

- |                 |            |
|-----------------|------------|
| (1) डि व्रीस    | (2) मोर्गन |
| (3) स्टुर्टवेंट | (4) मेंडल  |

**147.** नीचे दो कथन दिये गये हैं, एक अभिकथन (A) तथा दूसरा कारण (R) को चिह्नित करता है।

**कथन (A) :** अंकगणितीय वृद्धि में समसुत्री कोशिका विभाजन होता है। जिसमें, केवल एक पुत्री कोशिका विभाजित होती रहती है, जबकि अन्य विभेदित होती है एवं परिपक्ष हो जाती है।

**कारण (R) :** अंकगणितीय वृद्धि की सबसे सरल अभिव्यक्ति एक नियत दर में वृद्धिरत युग्मनज से उदाहरणात होती है।

- (1) यदि कथन एवं कारण दोनों सत्य हैं तथा कारण कथन का सही स्पष्टीकरण है।
- (2) यदि कथन एवं कारण दोनों सत्य हैं, लेकिन कारण, कथन का सही स्पष्टीकरण नहीं है।
- (3) यदि कथन सत्य है, लेकिन कारण असत्य है।
- (4) यदि कथन व कारण दोनों असत्य हैं।

**148.** निम्नलिखित दो कथन दिए गए हैं, एक अभिकथन (A) से और दूसरा कारण (R) से लेवल्ड है

**अभिकथन (A) :** माइक्रोइंजेक्शन जीन स्थानातंरित करने की प्रत्यक्ष विधि है।

**कारण (R) :** Ti प्लाज्मिड का उपयोग अपनी अभिरूचि की जीन का जन्तु कोशिका में स्थानातंरित करने के लिए किया जाता है।

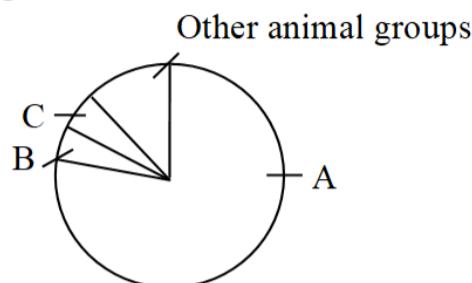
उपरोक्त कथनों के संदर्भ में सही चयन करें, नीचे दिए गए विकल्पों में सही उत्तर का चयन कीजिए-

- (1) दोनों (A) और (R) सही है लेकिन (R), (A) का सही व्याख्यान नहीं करता है।
- (2) (A) सही है परन्तु (R) सही है।
- (3) (A) सही नहीं है परन्तु (R) सही है।
- (4) दोनों (A) और (R) सही है और (R), (R) की सही व्याख्या करता है।

**149.** Naked seeds of gymnosperms mean

- (1) Fruits without parent tissues
- (2) Phanerogams without seed
- (3) Seeds not enclosed in ovary wall
- (4) All of these

**150.** A pie chart with proportionate number of species of major taxa of invertebrates is given below.



Select the option which correctly identifies the labels A, B and C.

- (1) A -Molluscs, B-Insects, C- Crustaceans
- (2) A -Insects, B-Molluscs, C- Crustaceans
- (3) A -Insects, B-Crustaceans, C- Molluscs
- (4) A -Crustaceans, B-Molluscs, C- Insects

**151.** In sickle cell anaemia the disorder is caused due to the change in chemical nature of:-

- (1)  $\alpha$  chain of haemoglobin
- (2)  $\beta$  chain of haemoglobin
- (3) Both the chains
- (4) Neither of them

**152. Assertion:** Juvenile conifers are sprayed with GA

**Reason:** GA delays senescence and malting period

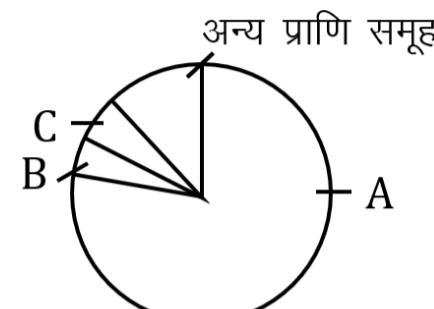
Which of the given options are correct?

- (1) Both assertion & reason are correct and reason is correct explanation of assertion
- (2) Both assertion & reason are correct but reason is not explanation of assertion
- (3) Assertion is correct but reason is wrong
- (4) Both assertion & reason are in correct

**149.** जिम्बोस्पर्म का नग्न बीज होता है:-

- (1) पैतृक ऊतकों रहित फल
- (2) बीज रहित फेनेरोगेम
- (3) बीज अंडाशय भित्ती में संलग्न नहीं होते हैं।
- (4) ये सभी

**150.** एक पाई चार्ट में अकशेष्वकीयों के प्रमुख वर्गों की जातियों की संख्या का अनुपात नीचे दिया गया है।



निम्नलिखित में से चिह्नित A, B और C के लिए सही विकल्प ज्ञात कीजिए-

- (1) A - मोलस्कस, B - कीट, C - क्रस्टैशियंस
- (2) A - कीट, B - मोलस्कस, C - क्रस्टैशियंस
- (3) A - कीट, B - क्रस्टैशियंस, C - मोलस्कस
- (4) A - क्रस्टैशियंस, B - मोलस्कस, C - कीट

**151.** दात्र कोशिका अरक्तता में विकार रासायनिक प्रकृति में परिवर्तन के कारण होता है-

- (1)  $\alpha$  श्रृंखला हीमोग्लोबिन की
- (2)  $\beta$  श्रृंखला हीमोग्लोबिन की
- (3) दोनों श्रृंखलाएं
- (4) इनमें से कोई नहीं

**152. अभिकथन:** तरूण शंकुधारी पर GA का छिड़काव किया जाता है।

**कारण:** GA जीर्णता और मॉल्टिंग अवधि को विलंबित करता है।

दिये गये विकल्पों में से कौनसा सही हैं?

- (1) दोनों अभिकथन और कारण सही हैं और कारण अभिकथन का सही स्पष्टीकरण है।
- (2) दोनों अभिकथन और कारण सही हैं लेकिन कारण अभिकथन का स्पष्टीकरण नहीं है।
- (3) अभिकथन सही है लेकिन कारण गलत है।
- (4) दोनों अभिकथन और कारण गलत हैं।

**153. Assertion (A) :** Aschelminthes represent pseudocoelomates.

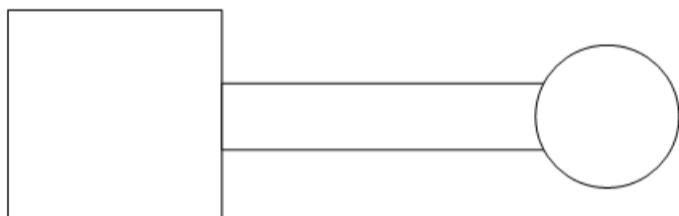
**Reason (R) :** In aschelminthes, mesoderm is present as scattered pouches in between ectoderm and endoderm.

- (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.

**154.** Ladybird insects have proved very useful for the control of-

- (1) Glomus
- (2) Mosquito
- (3) Aphids
- (4) Carrot grass

**155.** In a pedigree analysis, the given symbol represents :-



- (1) Affected individuals
- (2) Mating
- (3) Consanguineous mating
- (4) Unspecified sex

**156.** After culturing the anther of a plant, a few diploid plants were found along with haploid plants. The diploid plants could have arisen from:-

- (1) Generative cell of pollen
- (2) Cells of anther wall
- (3) Vegetative cells of pollen
- (4) Exine of pollen wall

**153. कथन (A) :** एस्केहेल्मिन्यज कुटगुहीका जंतुओं को दर्शाति है।

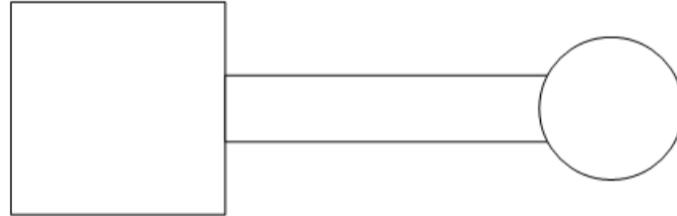
**कारण (R) :** एस्केहेल्मिन्यज में, मीजोडर्म बिखरे हुए पाउच के रूप में एक्टोडर्म तथा एन्डोडर्म के बीच पाई जाती है।

- (1) दोनों (A) एवं (R) सही है तथा (R), (A) की सही व्याख्या है।
- (2) दोनों (A) एवं (R) सही है लेकिन (R), (A) की सही व्याख्या नहीं है।
- (3) (A) सही है लेकिन (R) गलत है।
- (4) (A) तथा (R) दोनों ही असत्य है।

**154.** किसके नियंत्रण के लिए लेडीबर्ड कीट बहुत उपयोगी सिद्ध हुआ-

- (1) ग्लोमस
- (2) मच्छर
- (3) एफिड
- (4) गाजर घास

**155.** वंशावली विश्लेषण में, दिया गया चिह्न निम्नलिखित को दर्शाता है-



- (1) प्रभावित व्यक्ति
- (2) मैथुन
- (3) निकट सम्बंधी मैथुन
- (4) अनिर्दिष्ट लिंग

**156.** पौधे के परागकोष का संवर्धन करने के बाद, अगुणित पौधे के साथ कुछ द्विगुणित पौधे पाए गए। द्विगुणित पादप उत्पन्न हुए हैं-

- (1) पराग की जनन कोशिका से
- (2) परागकोष भित्ति की कोशिकाओं से
- (3) पराग की कायिक कोशिकाओं से
- (4) पराग भित्ति की बाह्यचोल से

**157. Statement-1:** Cephalochordata bears notochord all along the body throughout life.

**Statement-2 :** Urochordate bears vertebral column only in tail region throughout the life.

Then which is correct?

- (1) Both statement-1 and statement-2 are correct
- (2) Statement-1 is correct, statement-2 is wrong
- (3) Statement-1 is wrong, statement-2 is correct
- (4) Both statement-1 and statement-2 are wrong

**158.** Thick cuticle, sunken and scotoactive stomata. CAM photosynthesis and conversion of leaves into spines are some of the important characters of:-

- (1) Desert plants
- (2) Hydrophytes
- (3) Xerophytes
- (4) More than one options are correct

**159.** The substance which causes a definite change in genes is called:-

- |               |              |
|---------------|--------------|
| (1) Mutagen   | (2) Toxin    |
| (3) Cytotoxin | (4) Alkaloid |

**160.** Select wrong statement for cleistogamy of flower in plant:-

- (1) Cleistogamous flower lack requirement of pollinators
- (2) It is a adaptation of autogamy
- (3) It perform in Oxalis and Viola
- (4) Their flowers are coloured contain aroma and nectar

**161.** Match list 'A' and list 'B' **correctly** and find your answer from the code given below :

List-A (Animal)	List-B (Common name)
(i) Physalia	(A) Brain coral
(ii) Pennatula	(B) Sea fan
(iii) Gorgonia	(C) Sea pen
(iv) Meandrina	(D) Portuguese man of war

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

**157. कथन.1:-** सिफैलोकॉर्डेटा में मेरूदण्ड सम्पूर्ण शरीर में जीवन भर पायी जाती है।

**कथन.2:-** यूरोकॉर्डेट में केवल पूँछ वाले भाग में कशेरूक दण्ड जीवन भर पाया जाता है। निम्न में से कौनसा कथन सही है?

- (1) कथन-1 व कथन-2 दोनों सही है
- (2) कथन-1 सही है, कथन-2 गलत है
- (3) कथन-1 गलत है, कथन-2 सही है
- (4) कथन-1 व कथन-2 दोनों गलत हैं

**158.** मोटी उपत्वचा, भीतर धंसे हुए और स्कोटोएक्टिव रंध, CAM प्रकाश संश्लेषण तथा पत्तियों का कांटों में रूपांतरण किसके महत्वपूर्ण लक्षण हैं-

- (1) मरुस्थलीय पौधों के
- (2) जलोद्धिद पौधों के
- (3) मरुद्धिद पौधों के
- (4) एक से अधिक विकल्प सही हैं

**159.** वह पदार्थ जो जीन में निश्चित परिवर्तन का कारण बनता है | उसे कहते हैं-

- |                  |               |
|------------------|---------------|
| (1) उत्परिवर्तजन | (2) टॉक्सिन   |
| (3) साइटोटॉक्सिन | (4) एल्केलॉइड |

**160.** पौधे में पुष्प की अनुनीत्यता के लिए गलत कथन का चयन करें

- (1) अनुनीत्य-परागणी पुष्पों में परागणकर्ताओं की आवश्यकता नहीं होती है
- (2) यह स्वपरागण का एक अनुकूलन है
- (3) यह ऑक्जेलिस और वायोला में होता है
- (4) उनके पुष्प रंगीन होते हैं, उनमें सुगंध और मकरंद होता है

**161.** सूची 'A' एवं सूची 'B' का सही मिलान करके सही उत्तर का चयन नीचे दिये गये कूट से करें:-

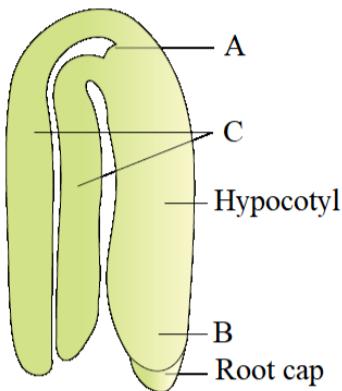
सूची -A (जन्तु)	सूची -B (सामान्य नाम)
(i) फाइसेलिया	(A) ब्रेन कोरल
(ii) पिनेटुला	(B) सी फैन
(iii) गोरगोनिया	(C) सी पेन
(iv) मिएनड्रिना	(D) पुर्तगाली युद्ध मानव

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

**162.** The outer covering of fungi and plants is:-

- Glycocalyx
- Cell wall
- Cell membrane
- All

**163.** Go through the given diagram of a typical dicot embryo. In which of the following all the 3 parts labelled as A, B and C with their characters are correctly identified -



(1)

A	B	C
Plumule, shoot system formation	Radicle, root system formation	Hypophysis, formation of radicle

(2)

A	B	C
Plumule, shoot system formation	Radicle, root system formation	Cotyledon, food storage

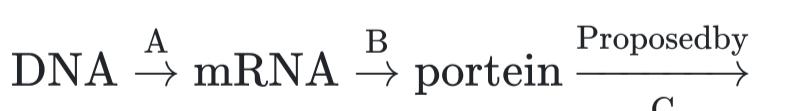
(3)

A	B	C
Radicle, root system formation	Plumule, shoot system formation	Cotyledon food storage

(4)

A	B	C
Radicle, root system formation	Plumule, shoot system formation	Endosperm, food storage

**164.** The diagram shows an important concept in the genetic implication of DNA. Fill in the blanks A to C.

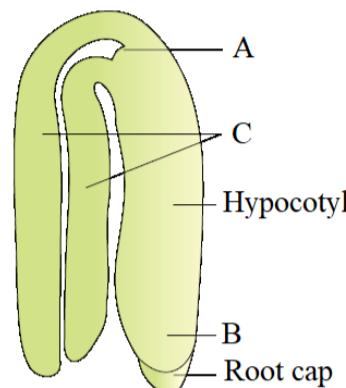


- A-Translation, B-Transcription, C-Ervin Chargaff
- A- Transcription, B-Translation, C-Francis Crick
- A-Translation, B-Extension, C-Rosalind Franklin
- A-Translation, B-Replication, C-James Watson

**162.** कवक एवं पौधों का बाहरी आवरण है-

- ग्लायकोकेलेक्स
- कोशिका भित्ति
- कोशिका डिल्ली
- सभी

**163.** एक सामान्य द्विबीजपत्री भूषण के दिए गए अरेख का अध्ययन करें। निम्नलिखित में से किसमें A, B और C के रूप में चिह्नित किए गए सभी 3 भागों की उनकी विशेषताओं के साथ सही पहचान की गई है -



(1)

A	B	C
प्रांकुर, प्ररोह तंत्र का निर्माण	मूलांकूर, मूल तंत्र का निर्माण	अधःस्फीतिका, मूलांकूर का निर्माण

(2)

A	B	C
प्रांकुर, प्ररोह तंत्र का निर्माण	मूलांकूर, मूल तंत्र का निर्माण	बीजपत्र, भोजन का संग्रहण

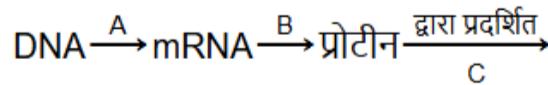
(3)

A	B	C
मूलांकूर, मूल तंत्र का निर्माण	प्रांकुर, प्ररोह तंत्र का निर्माण	बीजपत्र, भोजन का संग्रहण

(4)

A	B	C
मूलांकूर, मूल तंत्र का निर्माण	प्रांकुर, प्ररोह तंत्र का निर्माण	भूषणपोष, भोजन का संग्रहण

**164.** नीचे दिया गया चित्र में DNA के आनुवंशिक निहितार्थ में एक महत्वपूर्ण अवधारणा को दर्शाता है A से C तक रिक्त स्थानों की पूर्ति करें-



- A-अनुवादन, B- अनुलेखन, C-इरविन चारगाफ
- A- अनुलेखन, B-अनुवादन, C-फ्रान्सिस क्रिक
- A- अनुवादन, B- विस्तारण, C-रोजेलिण्ड फ्रेंकलिन
- A- अनुवादन, B-प्रतिकृतिकरण, C-जेम्स वाट्सन

**165.** Match the column-I with Column-II

Column-I		Column-II
(a) Fasciola	(i)	First Eucoelomate
(b) Nereis	(ii)	First triploblastic
(c) Antedon	(iii)	First tissue grade animal
(d) Adamsia	(iv)	First enterocoelomate

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

**166.** The model given by Singer and Nicolson in \_\_\_\_\_ was \_\_\_\_\_ for plasma membrane.

- (1) 1982, fluid mosaic model  
(2) 1992, bilayer model  
(3) 1972, fluid mosaic model  
(4) 1952, bilayer model

**167.** One gene is responsible for making:-

- (1) One protein  
(2) One polypeptide  
(3) Many polypeptides  
(4) All of these

**168.** How many of the following statements are incorrect:-

- i) Acid insoluble fraction has only four types of organic compounds.  
ii) All the compound in acid insoluble fraction have molecular weight in range of 10,000 Da and above.  
iii) Molecular weight less than one thousand Dalton are usually referred to as Micromolecules.  
iv) Biomacromolecules are simply known as Biomolecules.

- (1) (i)  
(2) (ii)  
(3) (iii)  
(4) (iv)

**169.** Secondary cell wall is formed.

- (1) Outside the primary cell wall.  
(2) Inside the cell membrane  
(3) Inside the plasmodesmata.  
(4) Inside the primary cell wall.

**165. कॉलम-I से कॉलम-II का मिलान करे -**

कॉलम-I		कॉलम-II
(a) फेसिओला	(i)	प्रथम सत्य गूहिक
(b) नेरिस	(ii)	प्रथम त्रीकोरकी
(c) एन्टीडोन	(iii)	प्रथम ऊतक श्रेणी के प्राणी
(d) एडमासिया	(iv)	प्रथम एन्ट्रोसीलोमेट

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

**166. जीवद्रव्य कला के लिए सिंगर तथा निकोलसन द्वारा \_\_\_\_\_ में दिया गया मॉडल \_\_\_\_\_ था-**

- (1) 1982, तरल मोजेक मॉडल  
(2) 1992, द्विपरत मॉडल  
(3) 1972, तरल मोजेक मॉडल  
(4) 1952, द्विपरत मॉडल

**167. एक जीन निष्ठ के निर्माण के लिये उत्तरदायी है-**

- (1) एक प्रोटीन  
(2) एक पोलीपेटाइड  
(3) अनेक पोलीपेटाइड  
(4) उपरोक्त सभी

**168. निम्नलिखित में से कितने कथन गलत हैं**

- i) अघुलनशील अंश में केवल चार प्रकार के कार्बनिक यौगिक होते हैं।  
ii) अम्ल अघुलनशील अंश के सभी यौगिकों का आणविक भार 10,000 Da और उससे अधिक होता है।  
iii) एक हजार डाल्टन से कम आणविक भार वाले यौगिकों को सामान्यतया सूक्ष्मअणु कहा जाता है।  
iv) जैववृहदअणु को सामान्यतः जैवअणु के रूप में जाना जाता है।

- (1) (i)  
(2) (ii)  
(3) (iii)  
(4) (iv)

**169. द्वितीयक कोशिका भित्ति का निर्माण होता है।**

- (1) प्राथमिक कोशिका भित्ति के बाहर  
(2) कोशिका झिल्ली के अंदर  
(3) प्लास्मोडेस्मेटा के अंदर  
(4) प्राथमिक कोशिका भित्ति के अंदर

**170.** Dystrophin was found to be-

- (1) Largest known human gene with 2.4 million bases
- (2) Smallest known human gene with 2.4 million bases
- (3) Largest known human gene with 4.8 million bases
- (4) Smallest known human gene with 4.8 million bases

**171.** Match the following column A and B-

	<b>A</b>		<b>B</b>
I	Tight junction	(a)	Connecting cytoplasm of cell
II	Adhering junction	(b)	Help to stop substance from leaking across a tissue
III	Gap junction	(c)	Provide mechanical support

- (1) I(c) II(b) III(a)
- (2) I(b) II(c) III(a)
- (3) I(a) II(c) III(b)
- (4) I(a) II(b) III(c)

**172.** Middle lamella is made up of :

- |                     |                       |
|---------------------|-----------------------|
| (1) Silica          | (2) Calcium carbonate |
| (3) Pectate Ca & Mg | (4) Calcium oxalate   |

**173.** The DNA coiled in prokaryotes are maintained by

- (1) Histone
- (2) Non-histone protein
- (3) Polyamines
- (4) Both (2) and (3)

**174.** Match the column and select the correct option.

Column-I (Structures of Cockroach)		Column-II (Location)	
(A)	Mushroom glands	(i)	4 <sup>th</sup> 6 <sup>th</sup> abdominal segment
(B)	testes	(ii)	10 <sup>th</sup> abdominal segment
(C)	spermatheca	(iii)	6 <sup>th</sup> abdominal segment
(D)	anal cerci	(iv)	6 <sup>th</sup> 7 <sup>th</sup> abdominal segment

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

**170.** डिस्ट्रोफिन में पाया गया था -

- (1) 2.4 करोड़ क्षार के साथ मनुष्य को ज्ञात सबसे बड़ी जीन
- (2) 2.4 करोड़ क्षार के साथ मनुष्य को ज्ञात सबसे छोटी जीन
- (3) 4.8 करोड़ क्षार के साथ मनुष्य को ज्ञात सबसे बड़ी जीन
- (4) 4.8 करोड़ क्षार के साथ मनुष्य को ज्ञात सबसे छोटी जीन

**171.** कॉलम A का मिलान कॉलम B से कीजिए-

	<b>A</b>		<b>B</b>
I	दृढ़ संधि	(a)	कोशिका के कोशिका द्रव्य को जोड़ती है
II	आसंजी संधि	(b)	पदार्थों को ऊतकों से बाहर जाने से रोकना
III	अन्तराली संधि	(c)	यांत्रिक सहारा प्रदान करना

- (1) I(c) II(b) III(a)
- (2) I(b) II(c) III(a)
- (3) I(a) II(c) III(b)
- (4) I(a) II(b) III(c)

**172.** मध्य पटलिका बनी होती है

- |                        |                           |
|------------------------|---------------------------|
| (1) सिलिका की          | (2) कैल्शियम कार्बोनेट की |
|                        | (4) कैल्शियम              |
| (3) पैक्टेट Ca व Mg की | ऑक्जेलेट की               |

**173.** प्रोकेरियोट्स में DNA कुण्डली को किसके द्वारा बनाये रखा जाता है

- (1) हिस्टोन
- (2) नॉन हिस्टोन प्रोटीन
- (3) पॉलीऐमीन्स
- (4) (2) व (3) दोनों

**174.** कॉलमों का मिलान कर सही विकल्प का चयन कीजिये

कॉलम-I (कॉकरोच की संरचना)		कॉलम-II (स्थान)	
(A)	छत्रक ग्रंथि	(i)	4 <sup>th</sup> 6 <sup>th</sup> उदरीय खण्ड
(B)	वृषण	(ii)	10 <sup>th</sup> उदरीय खण्ड
(C)	शुक्रग्राहिका	(iii)	6 <sup>th</sup> उदरीय खण्ड
(D)	गुदालूम	(iv)	6 <sup>th</sup> 7 <sup>th</sup> उदरीय खण्ड

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

**175.** The longest phase of cell cycle is:-

- (1) Prophase of M-phase
- (2) G<sub>1</sub>
- (3) S
- (4) G<sub>2</sub>

**176.** Select the **incorrect** statement with respect to acquired immunity-

- (1) Anamnestic response is elicited on subsequent encounters with the same pathogen.
- (2) Anamnestic response is due to memory of first encounter
- (3) Acquired immunity is non-specific type of defense present at the time of birth
- (4) Primary response is produced when our body encounters a pathogen for the first time

**177.** Mitotic division occur in -

- (1) Diploid somatic cell
- (2) Haploid male honey bee
- (3) (1) & (2)
- (4) Gametes

**178.** Match List – I with List – II.

	<b>List-I</b>		<b>List-II</b>
(a)	Filariasis	(i)	<i>Haemophilus influenzae</i>
(b)	Amoebiasis	(ii)	<i>Trichophyton</i>
(c)	Pneumonia	(iii)	<i>Wuchereria Bancrofti</i>
(d)	Ringworm	(iv)	<i>Entamoeba Histolytica</i>

Choose the **correct** answer from the questions given below.

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

**179.** Karyokinesis of mitosis is divided into \_\_\_\_\_ stages

- (1) 2
- (2) 3
- (3) 4
- (4) 8

**175.** कोशिका चक्र की सबसे लम्बी प्रावस्था है-

- (1) M-प्रावस्था की प्रोफेज
- (2) G<sub>1</sub>
- (3) S
- (4) G<sub>2</sub>

**176.** उपर्जित प्रतिरक्षा के विषय में गलत कथन का चयन करो-

- (1) उसी रोगजनक से दोबारा सामना होने पर बहुत ही उच्च तीव्रता की पूर्ववृत्तीय (एनामिस्टिक) अनुक्रिया होती है
- (2) पूर्ववृत्तीय (एनामिस्टिक) अनुक्रिया प्रथम मुठभेड़ की स्मृति के कारण होती है
- (3) उपर्जित प्रतिरक्षा जन्म के समय उपस्थित अविशिष्ट प्रकार की रक्षा है
- (4) जब हमारे शरीर का पहली बार किसी रोगजनक से सामना होता है तब प्राथमिक अनुक्रिया उत्पन्न होती है।

**177.** समसूत्री विभाजन निम्नलिखित में से किसमें होता है-

- (1) द्विगुणित कायिक कोशिका
- (2) अगुणित नर मधुमक्खी
- (3) (1) और (2)
- (4) युग्मक

**178.** सूची- I का सूची - II के साथ मिलान करो :-

	<b>सूची-I</b>		<b>सूची-II</b>
(a)	फाइलेरिएसिस	(i)	हीमोफिल्स इप्लुएंजी
(b)	अमीबायसिस	(ii)	ट्राइकोफाइटॉन
(c)	न्यूमोनिया	(iii)	वुचेरेरिया बैक्टेरिया
(d)	रिंगवर्म	(iv)	एंटअमीबा हिस्टोलिटिका

निम्न विकल्पों से उचित उत्तर का चयन करो।

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

**179.** समसूत्री विभाजन में कोशिका का केन्द्रक विभाजन \_\_\_\_\_ अवस्थाओं में पूर्ण होता है।

- (1) 2
- (2) 3
- (3) 4
- (4) 8

**180.** Read the following statements carefully.

- (i) Cancer causing viruses have genes called viral oncogenes.
- (ii) Malignant tumors remain confined to their original location.
- (iii) Cancer cells do not exhibit contact inhibition.
- (iv) Cancer detection is based on biopsy and histopathological studies.

Which of the above statements are **correct** regarding cancer?

- (1) (iii) and (iv)
- (2) (ii) and (iv)
- (3) (i), (iii) and (iv)
- (4) (ii) and (iii)

**180.** निम्नलिखित कथनों को ध्यानपूर्वक पढ़िए-

- (i) कैंसर उत्पन्न करने वाले विषाणुओं में विषाणुवीय अर्बुदजीन (वायरल ऑंकोजीन) नामक जीन होते हैं।
- (ii) दुर्दम अर्बुद अपने मूल स्थान तक ही सीमित रहते हैं।
- (iii) कैंसर कोशिकाएं संस्पर्श संदमन प्रदर्शित नहीं करती हैं।
- (iv) कैंसर अभिज्ञान ऊतकों की जीवतिपरीक्षा (बायोप्सी) और ऊतक विकृति (हिस्टोपैथोलॉजिकल) अध्ययनों पर आधारित हैं।

उपरोक्त में से कौन से कथन कैंसर के संबंध में सही हैं?

- (1) (iii) तथा (iv)
- (2) (ii) तथा (iv)
- (3) (i), (iii) तथा (iv)
- (4) (ii) तथा (iii)

**Answer Key [CODE - 27882]**  
**NEET PATTERN TEST Brahmastra Major Test-08**  
**13th NEET - Phase 13 : KOTA**

Date:09-Apr-2025			Duration: 3 Hours				Max Marks:720																																																																																																								
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Student's Solution Copy [Code - 27882]

NEET PATTERN TEST Brahmastra Major Test-08

13th NEET - Phase 13

KOTA

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Date: 09-Apr-2025

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Max Marks: 720

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## Physics - Section A

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1.

**Answer:** 1

**Sol:**

$$\Delta U = \Delta Q = \Delta W$$

$$\text{Now } \Delta W = P \Delta V = 50 [4 - 10] = -300 \text{ J}$$

$$\Delta Q = 100 \text{ J} \quad \Delta Q = 100 \text{ J}$$

So  $\Delta U = 400 \text{ J}$  increased

2.

**Answer:** 2

**Sol:**

There are seven fundamental quantities :

Mass, Length, Time, Temperature, Electric current, Luminous intensity, Amount of substance.

Electric charge is not include in these quantities

3.

**Answer:** 2

**Sol:**

$$F_e = \frac{1}{4\pi\epsilon_0} \cdot \frac{q_1 q_2}{r^2}$$

For  $F_e$  to be minimum,  $q_1$  an  $q_2$  should be minimum, we know that

$$(q_1)_{\min} = (q_2)_{\min} = e = 1.6 \times 10^{-19} \text{ C}$$

$$\text{Hence, } (F_e)_{\min} = \frac{(9 \times 10^9) (1.6 \times 10^{-19}) (1.6 \times 10^{-19})}{(1.0)^2}$$

$$= 2.304 \times 10^{-28} \text{ N}$$

4.

**Answer:** 2

**Sol:**

Given

$$x = 2 + 4t$$

$$y = 3t + 8t^2$$

$$v_x = \frac{dx}{dt} = 4 \left( \text{constant} \right)$$

$$v_y = \frac{dy}{dt} = 3 + 16t$$

$$a_x = 0$$

$$a_y = +16$$

$a_{\text{net}} = +16$  i.e. uniformly accelerated

Also, from given equation  $t = \frac{x-2}{4}$

$$\therefore y = 3 \frac{(x-2)}{4} + 8 \left( \frac{x-2}{4} \right)^2$$

$$= \frac{3}{4}x - \frac{3}{2} + \frac{1}{2}(x^2 + 4 - 4x)$$

$$y = \frac{3}{4}x - \frac{3}{2} + \frac{x^2}{2} + 2 - 2x$$

$$\Rightarrow 4y = 3x - 6 + 2x^2 + 8 - 8x$$

$$\Rightarrow \boxed{4y = 2x^2 - 5x + 2}$$

i.e. parabolic path.

**5.**

**Answer:** 4

**Sol:**

Given :

Kinetic energy of proton,  $E = 2 \text{ MeV} = 2 \times 10^6 \text{ eV} = 3.2 \times 10^{-13} \text{ J}$

Magnetic field,  $B = 2.5 \text{ T}$

Kinetic energy is given by :

$$K = \frac{1}{2}mv^2$$

$m$  is the mass of proton,  $m = 1.67 \times 10^{-27} \text{ kg}$

$$v^2 = \frac{2 \times 3.2 \times 10^{-13}}{1.67 \times 10^{-27}}$$

$$v^2 = 3.83 \times 10^{14}$$

$$v = 1.95 \times 10^7 \text{ m/s}$$

Force on the proton is given by:

$$F = qvB \sin \theta$$

Here,  $\theta = 90^\circ$

$$F = qvB$$

$$= 1.6 \times 10^{-19} \times 10^7 \times 2.5$$

$$F = 7.8 \times 10^{-12} \text{ N} \approx 8 \times 10^{-12} \text{ N}$$

**7.**

**Answer:** 3

**Sol:**

By the Newton's law of cooling

$$\frac{dT}{dt} = k \left( \frac{T_1+T_2}{2} - T_0 \right)$$

$\therefore$  For case -I

$$\frac{3T-2T}{10} = k \left[ \frac{3T+2T}{2} - T \right]$$

$$\frac{T}{10} = k \left[ \frac{3T}{2} \right]$$

$$\text{or } k = \frac{1}{15}$$

According to question in next 10 min it cools from  $2T$  to a unknown temperature  $T'$  then

$$\frac{2T-T'}{10} = k \left[ \frac{2T+T'}{2} - T \right]$$

$$\frac{2T-T'}{10} = \frac{1}{15} \times \frac{T'}{2}$$

$$6T - 3T' = T'$$

$$\text{or } T' = \frac{3}{2}T$$

**6.**

**Answer:** 3

**Sol:**

By Hooke's law

$$Y = \frac{Fl}{A\Delta l}$$

$$\Delta l \propto \frac{Fl}{A}$$

$$\frac{\Delta l_2}{\Delta l_1} = \frac{F_2 l_2}{F_1 l_1} \times \frac{A_1}{A_2}$$

$$= \frac{2f \times 2L}{f \times L} \times \frac{\pi(r)^2}{\pi(2r)^2}$$

$$\Delta l_1 = \Delta l_2$$

$$\Delta l_2 = l$$

Therefore, the correct answer is (3).

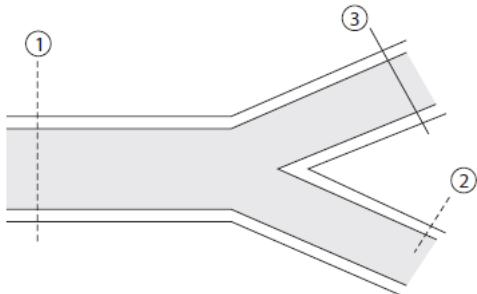
**8.**

**Answer:** 1

**Sol:**

Consider any three sections (1), (2) and (3) in the three pipes of different radii, as shown in the figure. If  $v_1$  and  $v_2$  be the velocity of water at section (1) and (2) respectively, then :-

$$A_1 = \pi (10)^2 \text{ cm}^2 ; A_2 = \pi (5)^2 \text{ cm}^2 ; \\ A_3 = \pi (3)^2 \text{ cm}^2$$



$$v_1 = v_2 = ? \text{ and } v_3 = 5 \text{ cm/s}$$

The rate of discharge the three pipes are

$$A_1 v_1 = 100 \pi v_1 \text{ cm}^3/\text{s} ; \\ A_2 v_2 = 25 \pi v_2 \text{ cm}^3/\text{s}$$

$$\text{and } A_3 v_3 = 9\pi \times 5 = 45\pi \text{ cm}^3/\text{s}$$

$$\text{Now, } Q = A_1 v_1 = A_2 v_2 + A_3 v_3$$

$$\Rightarrow 600\pi = 100\pi v_1 = 25\pi v_2 + 45\pi$$

$$\text{Solving, we get, } v_1 = 6 \text{ cm/s and } v_2 = 22.2 \text{ cm/s}$$

Therefore, the correct answer is (A).

**9.**

**Answer:** 1

**Sol:**

One farad is defined as the capacitance C of a capacitor across which, when charged with Q coulomb, when there is potential difference of 1 volt. So,

$$[C] = \left[ \frac{Q}{V} \right] = \left[ \frac{Q^2}{W} \right] = \left[ \frac{A^2 T^2}{M^1 L^2 T^{-2}} \right]$$

$$[C] = [M^{-1} L^{-2} T^4 A^2]$$

**10.**

**Answer:** 3

**Sol:**

Orbital speed near the earth's surface is

$$v_0 = \sqrt{\frac{GM}{R}}$$

Conserving energy,

$$\frac{1}{2}mv_0^2 - \frac{GMm}{R} = - \frac{GMm}{R+h}$$

$$\text{or } \frac{1}{2} \frac{GM}{R} - \frac{GM}{R} = - \frac{GM}{R+h} = - \frac{GM}{2R}$$

$$\Rightarrow h = R$$

**11.**

**Answer:** 3

**Sol:**

The horizontal range of the projectile is

$$R = \frac{u^2 \sin 2\theta}{g}$$

$$\{\text{Here } u_1 = 40 \text{ m/s}, \theta_1 = 30^\circ,$$

$$u_2 = 60 \text{ m/s}, \theta_2 = 60^\circ\}$$

$$\frac{R_1}{R_2} = \left( \frac{u_1}{u_2} \right)^2 \frac{\sin 2\theta_1}{\sin 2\theta_2}$$

$$\frac{R_1}{R_2} = \left( \frac{40}{60} \right)^2 \frac{\sin 60^\circ}{\sin 120^\circ}$$

$$\Rightarrow \frac{R_1}{R_2} = \frac{4}{9}$$

**12.**

**Answer:** 1

**Sol:**

Given :

Changing rate of radius =  $10^{-2}$  unit

Magnetic field =  $10^{-3}$  unit

Induced emf  $e = 1 \mu V$

The induced emf is given by

$$e = - \frac{d\phi}{dt} = - \frac{B dA}{dt} = - B (2\pi r) \frac{dr}{dt}$$

$$r = \frac{e}{B(2\pi)} \left( \frac{dr}{dt} \right)$$

$$\frac{1 \times 10^{-6}}{10^{-3} \times 2 \times 3.14 \times 10^{-2}}$$

$$r = 1.6 \text{ cm}$$

**13.**

**Answer:** 4

**Sol:**

$$\frac{t}{10} = \frac{6^2 - 2^2}{2^2 - 0^2} \Rightarrow t = 80 \text{ h}$$

**14.**

**Answer:** 3

**Sol:**

$$X = 3YZ^2$$

$$[Y] = \frac{[X]}{[Z]^2} = \frac{[M^{-1}L^{-2}T^4A^2]}{[MT^{-2}A]^2}$$

$$= [M^{-3}L^{-2}T^8A^4]$$

**15.**

**Answer:** 1

**Sol:**

$$\text{Near the earth's surface, } v_0 = \sqrt{\frac{GM}{R}} = \frac{2\pi R}{T}$$

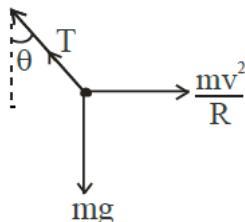
$$\therefore T^2 = \frac{4\pi^2 R^3}{GM} = \frac{4\pi^2 R^3}{G \cdot \frac{4}{3}\pi R^3 \rho} = \frac{3\pi}{G\rho}$$

or  $\rho T^2 = \frac{3\pi}{G}$  = Universal constant.

**16.**

**Answer:** 3

**Sol:**



$$T \cos \theta = mg$$

$$T \sin \theta = \frac{mv^2}{R}$$

$$\tan \theta = \frac{v^2}{Rg}$$

$$\Rightarrow \tan \theta = \frac{20^2}{40 \times 10}$$

$$\Rightarrow \tan \theta = 1$$

$$\Rightarrow \theta = \frac{\pi}{4}$$

**17.**

**Answer:** 1

**Sol:**

By theory

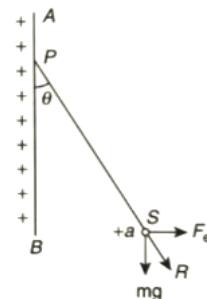
**18.**

**Answer:** 2

**Sol:**

The electric field due to infinite plane sheet of charge

$$E = \frac{\sigma}{2\epsilon_0}$$



The force on sphere S due to electrostatic repulsion is

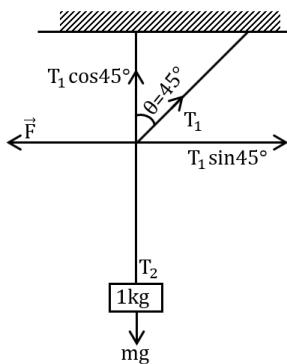
$$\text{Hence, from figure } F_e = QE = \frac{\sigma Q}{2\epsilon_0}$$

$$\tan \theta = \frac{QE}{mg} = \frac{\sigma E}{2\epsilon_0 mg} \text{ or } \theta = \tan^{-1} \left( \frac{\sigma Q}{2\epsilon_0 mg} \right)$$

**19.**

**Answer:** 1

**Sol:**



From figure

AS system is in equilibrium, therefore

$$T_1 \cos 45^\circ = mg$$

$$T_1 \sin 45^\circ = F$$

$$\therefore \tan 45^\circ = \frac{F}{mg}$$

$$\Rightarrow F = mg$$

$$F = 10 \text{ N}$$

**20.**

**Answer:** 1

**Sol:**

$$\begin{aligned} \omega &= \frac{P_1 V_1 - P_2 V_2}{\gamma - 1} = \frac{n R T - n R T_2}{\gamma - 1} \\ &= \frac{n R T_1}{\gamma - 1} \left[ 1 - \left( \frac{V_1}{V_2} \right)^{\gamma - 1} \right] \end{aligned}$$

**21.**

**Answer:** 3

**Sol:**

In a given scientific notation of a number, all non zero numbers are significant.

Hence in  $11.118 \times 10^{-6}$  significant digits are 5.

**22.**

**Answer:** 3

**Sol:**

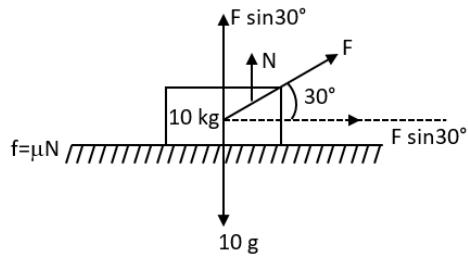
$$\text{KE} = \text{work done} = q \Delta V$$

$$= e[1V] = 1eV$$

**23.**

**Answer:** 3

**Sol:**



$$\text{Given, } m = 10 \text{ kg} \quad \mu_s = 0.25$$

$$\theta = 30^\circ, \quad g = 10 \text{ m/s}$$

$$F \cos 30^\circ = f \dots\dots (1)$$

$$F \sin 30^\circ + N = mg$$

$$N = mg - F \sin 30^\circ \dots\dots (2)$$

By equation (1)

$$F \cos 30^\circ = \mu_s (mg - F \sin 30^\circ)$$

$$F (\cos 30^\circ + \mu_s \sin 30^\circ) = \mu_s mg$$

$$F = \frac{\frac{0.25 \times 10 \times 10}{\sqrt{3} \times 0.25 \times \frac{1}{2}}}{2}$$

$$F = \frac{50}{1.98} \Rightarrow 25.2 \text{ N}$$

**24.**

**Answer:** 2

**Sol:**

Given-

$$L = 2 \text{ m}, r = 1 \text{ cm} = 10^{-2} \text{ m}$$

$$\text{twist} = \theta = 0.8 \text{ rad.}$$

$$\begin{aligned} \text{angle of shear } \phi &= \frac{r\theta}{L} = \frac{10^{-2} \times 0.8}{2} \\ &= 0.4 \times 10^{-2} \end{aligned}$$

$$\text{shear strains} = 0.004 \text{ rad.}$$

**25.**

**Answer:** 3

**Sol:**

$$\text{Mean time: } t_m = \frac{30+32+35+31}{4} = 32$$

$$\text{By rounding off : } \Delta t = \pm 2 \text{ s}$$

$$\therefore t + \Delta t = 32 \pm 2 \text{ s}$$

**26.**

**Answer:** 1

**Sol:**

The resistance of wire of length  $\ell$  cross-sectional area A and resistivity  $\rho$  is given by

$$R = \rho \frac{\ell}{A}$$

If d is the density and m is the mass of wire, then area of wire

$$A = \frac{m}{\ell d}$$

$$\text{therefore, } R = \frac{\rho \ell}{\frac{m}{\ell d}} = \frac{\ell d}{m} \ell^2$$

Since  $\frac{\rho d}{m} = \text{constant}$

$$\frac{\Delta R}{R} \times 100 = 2 \left( \frac{\Delta \ell}{\ell} \times 100 \right)$$

$$\text{Now } \frac{\Delta \ell}{\ell} \times 100 = 0.1\%$$

$$\begin{aligned} \frac{\Delta R}{R} \times 100 &= 2(0.1)\% \\ &= 0.2\% \end{aligned}$$

**27.**

**Answer:** 4

**Sol:**

$$R \propto A^{1/3}$$

$$\frac{R_2}{R_1} = \left( \frac{A_2}{A_1} \right)^{1/3} = \left( \frac{162}{6} \right)^{1/3} = (27)^{1/3} = 3$$

$$R_2 = 3R_1 = 3 \times 3 \times 10^{-15} \text{ m} = 9 \times 10^{-15} \text{ m}$$

**28.**

**Answer:** 3

**Sol:**

The correct option is C  $\frac{8}{7} \text{ kg}$

Specific heat of copper  $S_{cu} = 400 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$

Latent heat of fusion  $L_f = 3.5 \times 10^5 \text{ J kg}^{-1}$

Mass of copper block  $M_{cu} = 2 \text{ kg}$

Heat released by cu block = Heat gained by ice to melt.

$$M_{cu} S_{cu} \Delta \theta = M L_f$$

$$\Rightarrow 2 \times 400 \times 500 = M \times 3.5 \times 10^5$$

$$\Rightarrow M = \frac{2 \times 400 \times 500}{3.5 \times 10^5}$$

$$= \frac{8}{7} \text{ kg}$$

**29.**

**Answer:** 4

**Sol:**

Least count of vernier calipers

$$LC = 1 \text{ MSD} - 1 \text{ VSD}$$

$$= \frac{\text{Smallest division on main scale}}{\text{Number of divisions on vernier scale}}$$

20 divisions of vernier scale = 16 divisions of main scale

$$\therefore 1 \text{ VSD} = \frac{16}{20} \text{ mm} = 0.8 \text{ mm}$$

$$\therefore LC = 1 \text{ MSD} - 1 \text{ VSD}$$

$$= 1 \text{ mm} - 0.8 \text{ mm} = 0.2 \text{ mm}$$

**30.**

**Answer:** 4

**Sol:**

The maximum current allowed in bulb,  
 $i = \frac{P}{V} = \frac{100}{220} = \frac{5}{11} \text{ A}$

$$\text{Resistance of the bulb } R = \frac{V}{i} = \frac{220}{5} = 484 \Omega$$

When the bulb is connected across voltage  $V' (= 110 \text{ V})$  then power consumed,

$$P' = \frac{(V')^2}{R}$$

$$= \frac{(110)^2}{484} = 25 \text{ W}$$

**31.**

**Answer:** 1

**Sol:**

$$\because \lambda \propto \frac{1}{\sqrt{m}} \Rightarrow \lambda_e \propto \frac{1}{\sqrt{m_e}}, \lambda_p \propto \frac{1}{\sqrt{m_p}}$$

$$\therefore \frac{\lambda_e}{\lambda_p} = \sqrt{\frac{m_p}{m_e}}$$

**32.**

**Answer:** 1

**Sol:**

→ Convex mirror form virtual and diminished image

→ Concave mirror may form real and virtual image and may be diminished and enlarged.

**33.**

**Answer:** 2

**Sol:**

From work energy theorem

$$W = \Delta KE$$

$$\text{and we know that } P = \frac{dW}{dt}$$

therefore

$$W = \int_{t_1}^{t_2} P dt = \int_2^4 (3t^2 - 2t + 1) dt = 46 J$$

**34.**

**Answer:** 2

**Sol:**

By theory

**35.**

**Answer:** 3

**Sol:**

$$B_p(x_1y) = 0$$

$$\frac{\mu_0 I}{2\pi y} = \frac{\mu_0(3I)}{2\pi x}$$

$$x = 3y$$

**36.**

**Answer:** 2

**Sol:**

$$v_p = -v \times \text{slope}$$

$$a = -\omega^2 y$$

**37.**

**Answer:** 3

**Sol:**

$$F = \sqrt{x_1 x_2} = \sqrt{9 \times 25} = \sqrt{225}$$

$$F = 15 \text{ cm}$$

**38.**

**Answer:** 1

**Sol:**

$$\lambda = \frac{hc}{E} = \frac{12400}{1.14} \text{ Å} = 10877 \text{ Å}$$

**39.**

**Answer:** 2

**Sol:**

Consider the two coherent sources are  $I_1$  and  $I_2$

$$I_{\max} = (\sqrt{I_1} + \sqrt{I_2})^2$$

$$100 = (\sqrt{I} + \sqrt{I})^2 = (2\sqrt{I})^2 = 4I$$

Therefore;

$$I = 25 \text{ units} \quad \dots(1)$$

$$I_1 = I \text{ and } I_2 \propto (A_2)^2$$

$$\text{And } A_2 = A - \frac{20}{100} A = \left(\frac{4A}{5}\right)$$

Therefore;

$$I_2 \propto (A_2)^2 \propto \left(\frac{4A}{5}\right)^2$$

$$I_2 \propto \frac{16}{25} A^2$$

$$I_2 = \frac{16}{25} I$$

$$I'_{\max} = \left(\sqrt{I} + \sqrt{\frac{16}{25} I}\right)^2 = \left(\sqrt{I} + \frac{4}{5}\sqrt{I}\right)^2 = I\left(\frac{9}{5}\right)^2$$

$$= \frac{81}{25} I = \frac{81}{25} \times 25 = 81$$

So, option (B) is correct.

**40.**

**Answer:** 4

**Sol:**

$$\frac{(F_0)_1}{(F_0)_2} = \frac{1}{2} = \frac{\frac{V_1}{2L_1}}{\frac{V_2}{2L_2}} = \frac{V_1}{V_2} \cdot \frac{L_2}{L_1} = \frac{V_1}{V_2} \cdot \frac{4}{1}$$

$$\frac{V_1}{V_2} = \frac{1}{8} = \frac{\sqrt{\frac{T}{\mu_1}}}{\sqrt{T/\mu_2}}$$

$$\frac{\mu_2}{\mu_1} = \frac{1}{64} = \frac{\rho \cdot A_2}{\rho A_1} = \frac{1}{64}$$

$$\frac{A_1}{A_2} = \frac{\pi r_1^2}{\pi r_2^2} = 64$$

$$\frac{r_1}{r_2} = 8$$

**41.**

**Answer:** 1

**Sol:**

Using formula of Electric field

$$\begin{aligned} E &= \frac{V}{d} \\ &= \frac{0.5}{5 \times 10^{-7}} \\ &= 1 \times 10^6 \text{ V/m} \end{aligned}$$

**42.**

**Answer:** 3

**Sol:**

We have,

$$\begin{aligned} S_2 D &= \sqrt{S_1 D^2 + S_1 S_2^2} \\ &= \sqrt{4^2 + 3^2} \\ &= 5 \text{ m} \end{aligned}$$

$$\Delta x = S_2 D - S_1 D = 5 - 4 = 1 \text{ m}$$

$$\begin{aligned} \Delta \Phi &= \frac{2\pi}{\lambda} \Delta x \\ &= \frac{2\pi}{4} \left(1\right) = \frac{\pi}{2} \end{aligned}$$

$$\text{Now, } I = I_1 + I_2 + 2\sqrt{I_1 I_2} \cos\phi$$

$$I = I_0 + I_0 + 2\sqrt{I_0 I_0} \cos \frac{\pi}{2} = 2I_0$$

**43.**

**Answer:** 2

**Sol:**

$$\begin{aligned} \text{For 3rd minima } \sin \theta &\approx \theta \approx \tan \theta = \frac{y_3}{D} = \frac{3\lambda}{a} \\ &= \frac{y_3}{D} = \frac{3\lambda}{a} \end{aligned}$$

$$\text{Similarly, } y_1 = \frac{\lambda D}{a}$$

Now, according to qn.  $y_3 - y_1 = 3 \text{ mm}$

$$\Rightarrow \frac{2\lambda D}{a} = 3 \text{ mm}$$

$$\Rightarrow a = \frac{2 \times 6000 \times 10^{-10} \times 50 \times 10^{-2}}{3 \times 10^{-3}}$$

$$= 20 \times 10^{-5} \text{ m} = 2 \times 10^{-4} \text{ m}$$

**44.**

**Answer:** 3

**Sol:**

Capacitance of capacitor

$$C_0 = \frac{\epsilon_0 A}{d} \dots (\text{i})$$

If a slab of thickness t is introduced between the plates with new separation d then its new capacitance

$$C' = \frac{\epsilon_0 A}{d' - t + \frac{t}{k}} \dots (\text{ii})$$

As  $q = CV$ , charge on the capacitor is same in both cases, therefore to mention same p.d., the capacitance C and C' must be same, i.e., from (i) and (ii)

$$\frac{\epsilon_0 A}{d} = \frac{\epsilon_0 A}{d' - t + \frac{t}{k}}$$

$$\Rightarrow d = d' - t + \frac{t}{k}$$

$$\text{Here, } d' = d + 2.4 \text{ mm} = d + 2.4 \times 10^{-3} \text{ m}$$

$$t = 3 \text{ mm} = 3 \times 10^{-3} \text{ m}$$

$$\therefore d = d + 2.4 \times 10^{-3} - 3 \times 10^{-3} + \frac{3 \times 10^{-3}}{k}$$

$$\Rightarrow -3 + \frac{3}{k} = -2.4$$

$$\Rightarrow k = 5$$

**45.**

**Answer:** 2

**Sol:**

$$R = 0.25m = \frac{1}{4}$$

$$m = 2\text{kg}$$

$$KE = \frac{1}{2}I^2$$

$$4 \times 2 \times 10 \times \frac{1}{16} = v^2$$

$$v^2 = 8$$

$$v = 2\sqrt{2} \text{ m/s}$$

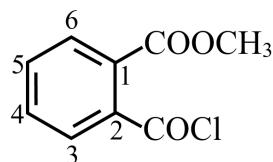
$$I = \frac{mR^2}{2} = \frac{2}{2} \times \frac{1}{16} = \frac{1}{16}$$

## Chemistry - Section A

46.

**Answer:** 3

**Sol:**

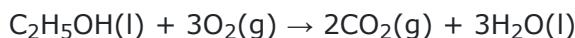


(C) Methyl 2-chlorocarbonylbenzoate

47.

**Answer:** 1

**Sol:**



$$\Delta U = -1500 \text{ kJ mol}^{-1}$$

$$\Delta H = ?$$

$$T = 298 \text{ K}$$

$$\Delta n_g = -1$$

$$R = 8.314 \text{ J mol}^{-1}$$

$$\Delta H = \Delta U + \Delta n_g RT$$

$$= -1500 + (-1) \times 8.314 \times 10^{-3} \times 298$$

$$= -1500 - 2.47 = -1502.47 \text{ kJ mol}^{-1}$$

48.

**Answer:** 3

**Sol:**

we know that ;  $N_1V_1 = N_2V_2$

$N = M \times n$ . ; for  $H_2SO_4$   $n=2$

$N_1 = 0.10 \times 2$  ;  $N_2 = 0.05 \times 2$

$V_1 = 50 \text{ ml}$  ;  $V_2 = x$

$N_1V_1 = N_2V_2$

$0.1 \times 2 \times 50 = 0.05 \times 2 \times x$

$$x = \frac{0.2 \times 50}{0.1}$$

$$x = 100 \text{ ml}$$

49.

**Answer:** 4

**Sol:**

Noble gases –

(i) colourless

(ii) odourless

(iii) tasteless and non inflammable

Noble gases are colorless, odorless, tasteless, and nonflammable gases under standard conditions. In the periodic table, the noble gases are arranged according to their boiling point. Noble gases are widely used in different fields, from incandescent lighting to excimer lasers.

50.

**Answer:** 1

**Sol:**

(A) 16 g of  $CH_4(g)$

Molarmass of  $CH_4 = 12 + 4 \times 1 = 16 \text{ g mol}^{-1}$

Moles of  $CH_4 = \frac{16}{16} = 1 \text{ mole}$

1 mole of  $CH_4$  contains  $6.022 \times 10^{23}$  atoms

$6.022 \times 10^{23}$  atoms have  $6.022 \times 10^{24}$  electrons or  $60.22 \times 10^{23}$  electrons

(B) 1 g of  $H_2(g)$

At STP 1 g  $H_2$  i. e.,  $\frac{1}{2}$  mole  $H_2$

at STP 1 mole = 22.4 L

$\frac{1}{2}$  mole = 11.2 L

(C) 1 mole of  $N_2(g)$

1 mole of  $N_2 = 1 \times 28 = 28 \text{ g}$

(D) 0.5 mole of  $SO_2(g)$

0.5 mole  $SO_2 = \frac{1}{2} \times 64 = 32 \text{ g}$

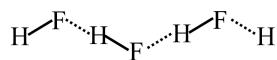
Hence, the correct order is A-II, B-IV, C-I, D-III.

**51.**

**Answer:** 3

**Sol:**

For symmetry



The arrangement of bp and lp around F is tetrahedral. Therefore, angle should appear around F and not around H atom.

**52.**

**Answer:** 1

**Sol:**

As per de-Broglie

$$\lambda = \frac{h}{p}$$

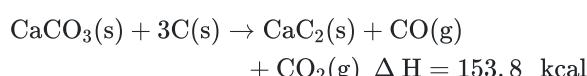
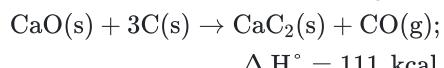
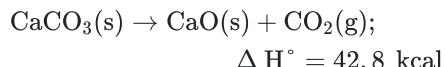
hence  $\lambda \propto \frac{1}{p}$  (hyperbola curve)

$\lambda \uparrow, P \downarrow$

**53.**

**Answer:** 3

**Sol:**



Thus heat required to prepare 1 mole of  $\text{CaC}_2$  from  $\text{CaCO}_3 = 153.8 \text{ kcal}$

Molecular weight of  $\text{CaC}_2 = 40 + 24 = 64$

64 g of  $\text{CaC}_2$  requires 153.8 kcal of heat.

128 g of  $\text{CaC}_2$  requires 307.6 kcal of heat.

**54.**

**Answer:** 4

**Sol:**

The solution which obey Raoult's law over the entire range of concentration are known as ideal solutions.

Thus,  $\Delta P = P_{\text{observed}} - P_{\text{Raoult}} = 0$ .

Since for an ideal solution since the solute-solute and solvent-solvent intermolecular attraction forces are equal to the solute-solvent intermolecular attractive forces, the enthalpy of mixing ( $\Delta_{\text{mix}}H$ ) of the pure components to form the solution is zero and the volume of mixing ( $\Delta_{\text{mix}}V$ ) is also zero.

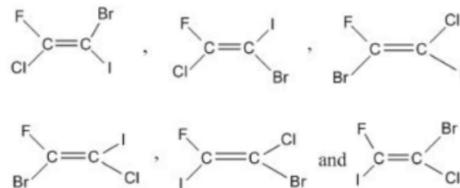
However, for an ideal solution, entropy mixing ( $\Delta_{\text{mix}}S$ ) is not zero. It is positive because a solvent (or solute) in a solution has more molecular disorder.

**55.**

**Answer:** 3

**Sol:**

There are six geometric



trical isomers possible for  $\text{C}_2(\text{Cl})(\text{Br})(\text{I})(\text{F})$

**56.**

**Answer:** 3

**Sol:**

Bond energy  $\alpha \frac{1}{\text{stability of radical}}$

a = resonance + 1°

b = resonance + 2°

c = 1° - carbon

d = 2° - carbon

**57.**

**Answer:** 1

**Sol:**

(Reaction)	(Type of redox reaction)
(A) $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{NO}(\text{g})$	(IV) Combination
(B) $2\text{Pb}(\text{NO}_3)_2(\text{s}) \rightarrow 2\text{PbO}(\text{s}) + 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$	(I) Decomposition
(C) $2\text{Na}(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow 2\text{NaOH}(\text{aq.}) + \text{H}_2(\text{g})$	(II) Displacement
(D) $2\text{NO}_2(\text{g}) + 2\text{OH}^-(\text{aq.}) \rightarrow \text{NO}_2^-(\text{aq.}) + \text{NO}_3^-(\text{aq.}) + \text{H}_2\text{O}(\text{l})$	(III) Disproportionation

(A) In this reaction  $\text{N}_2$  combine with  $\text{O}_2$  gives 2mole of  $\text{NO}$  gas

(B) when we heated  $\text{Pb}(\text{NO}_3)_2$  decompose and give oxygen gas and  $\text{NO}_2$  and  $\text{PbO}$

(C) In this reaction Na displaced  $\text{H}^+$  ion

(D) Disproportionation reaction is a reaction in which, the same element is simultaneously oxidized and reduced

here  $\text{NO}_2$  oxidized as well as reduced

**58.**

**Answer:** 1

**Sol:**

$\text{sec}^{-1}, \text{M sec}^{-1}$

**59.**

**Answer:** 1

**Sol:**

$\text{Al}_2(\text{SO}_4)_3$  gives maximum osmotic pressure because it is gives 5 ion.

**60.**

**Answer:** 1

**Sol:**

(1)  $\text{MCl} > \text{MCl}_2 > \text{MCl}_3$  along the period ionic nature of metals decrease

(2) Polarisability of halide ions increases in the order  $\text{F}^- < \text{Cl}^- < \text{Br}^- < \text{I}^-$ . Polarisability is directly proportional to the size of the anion.

(3)  $\text{Na}^+ < \text{Mg}^{2+} < \text{Al}^{3+}$ . Higher is the charge density, higher is the polarizing power. Charge density is the ratio of charge to size.

(4) Covalent character =  $\text{LiF}$

Covalent character increases with anion size increase.

**61.**

**Answer:** 4

**Sol:**

$n\text{A} \rightarrow \text{product}$

rate =  $K[\text{A}]^n = k[\text{A}]^0 = K$

When  $n = 0$ , then the rate is equal to  $K$  and it is only possible when  $n$  is zero.

So, the units of rate and rate constant are identical in zero order reactions.

**62.**

**Answer:** 3

**Sol:**

$$\text{pH} = \frac{1}{2}\text{pK}_a - \frac{1}{2}\log C$$

$$\Rightarrow 5 = \frac{1}{2}\text{pK}_a + \frac{1}{2} \times 2$$

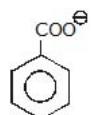
$$\text{pK}_a = 8 \Rightarrow \text{pK}_b = 8;$$

$$\text{pOH} = \frac{1}{2}\text{pK}_b - \frac{1}{2}\log C = 4 + 2 = 6$$

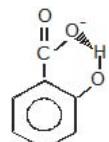
**63.**

**Answer:** 2

**Sol:**

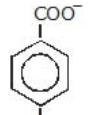


No -H bonding



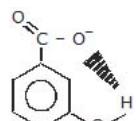
Intermolecular H- bonding

stabilized conjugate base (or Anion)



Less stable conjugate base  $\Rightarrow$

No-intramolecular H-bonding  $\Rightarrow$  least stable



At meta position slight

intramolecular H-bonding stabilized conjugate base.

$\therefore$  Acidic strength order : b > d > a > c

**64.**

**Answer:** 1

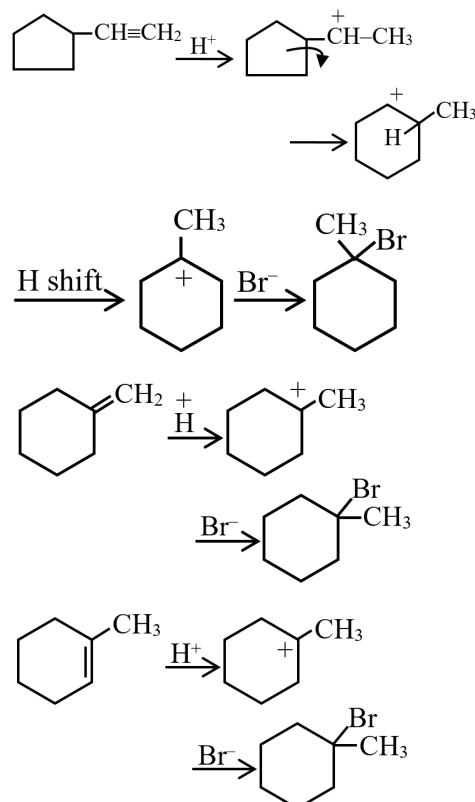
**Sol:**

Electronegativity, Metallic character do not have any unit

**65.**

**Answer:** 4

**Sol:**

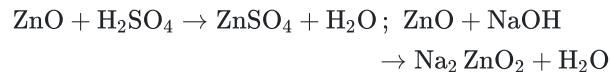
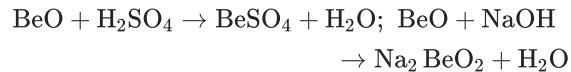


**66.**

**Answer:** 4

**Sol:**

Metal oxide which reacts with both acid as well as bases to produce salts and water is known as amphoteric oxide.



Chromium (III) oxide ( $\text{Cr}_2\text{O}_3$ ) is amphoteric. Although it is soluble in water, it dissolves in acid to produce hydrated chromium ions,  $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$  which react with a base to give salt of  $[\text{Cr}(\text{OH})_6]^{3-}$ .

**67.**

**Answer:** 2

**Sol:**

$$[\text{OH}^-] = \frac{0.04 \times 3 - 0.02 \times 2}{5} = 0.016$$

$$\text{pOH} = -\log(16 \times 10^{-3}) = 1.8$$

$$\text{pH} = 14 - 1.8 = 10.2$$

**68.**

**Answer:** 4

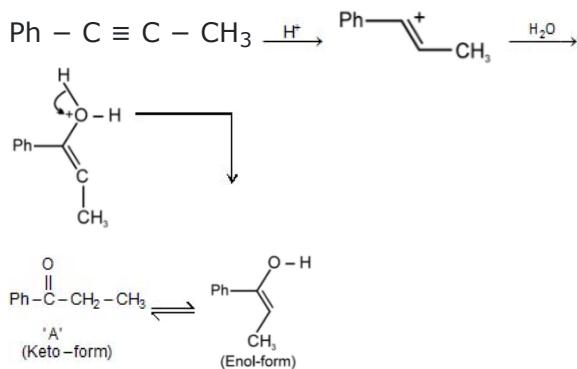
**Sol:**

Phenolphthalein is a weak acid.

**69.**

**Answer:** 1

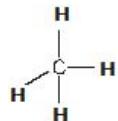
**Sol:**



**70.**

**Answer:** 1

**Sol:**



**71.**

**Answer:** 1

**Sol:**

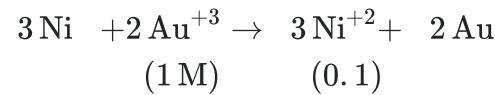
Water molecule has hydrogen bonding so molecules get dissociated so it is liquid.

**72.**

**Answer:** 2

**Sol:**

$$E_{\text{cell}}^{\circ} = 0.25 + 0.25 = 0.50$$



$$E_{\text{cell}} = 0.50 - \frac{0.0591}{6} \log \frac{(0.1)^3}{(1)^2}$$

$$E_{\text{cell}} = 0.50 + \frac{0.0591 \times 3}{6} = 0.529\text{V}$$

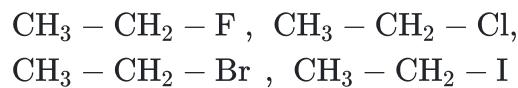
**73.**

**Answer:** 3

**Sol:**

In the given question, the nature of leaving group is the factor responsible for the reactivity of compounds towards  $S_N2$  reaction.

Out of all the alkyl halides,

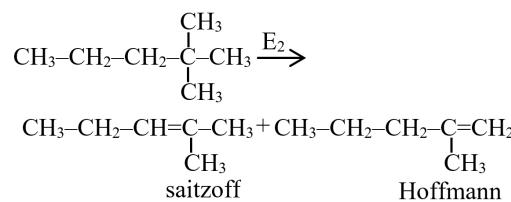


The  $\text{CH}_3-\text{CH}_2-\text{I}$  will be the more reactive as the electronegativity of iodine is less among all the halogen elements as it is considered as the good leaving group which facilitates the occurrence of  $S_N2$  reaction at a good rate.

**74.**

**Answer:** 3

**Sol:**



**75.**

**Answer:** 1

**Sol:**

$$\begin{aligned} \lambda_{\text{AgCl}}^{\infty} &= \lambda_{\text{AgNO}_3}^{\infty} + \lambda_{\text{NaCl}}^{\infty} - \lambda_{\text{NaNO}_3}^{\infty} \\ &= (116.5 + 110.3 + 105.2) \\ &\quad \text{mho cm}^2 \text{ mol}^{-1} \\ &= 121.6 \text{ cm}^2 \text{ mol}^{-1} \end{aligned}$$

**76.**

**Answer:** 2

**Sol:**

The Force of attraction between the molecular affects the melting point of a compound.

Stronger intermolecular interaction results in higher melting points.

Ionic compounds usually have high melting points because electrostatic forces holding the ion are much stronger.

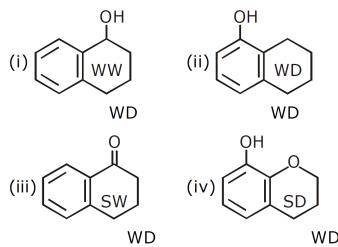
CsCl has ionic bond thus it has highest M.P.

He gas held together by weak vander Waal bond and NH<sub>3</sub> and CHCl<sub>3</sub> have covalent bond.

**77.**

**Answer:** 1

**Sol:**



SD = strong donating

WW = weak withdrawing

WD = weak donating

∴ iv > ii > i > iii

Br<sub>2</sub> reacts with AlCl<sub>3</sub> to form an electrophile Br<sup>⊕</sup>.

As Aluminum have vacant d-orbitals are present so, it can easily accommodate the lone pairs of Bromine atom and form AlCl<sub>3</sub>Br<sup>⊖</sup> complex

Now, Br<sup>⊕</sup> will attack more fastly. at that carbon atom and at that compound where electron density is more

**78.**

**Answer:** 3

**Sol:**

$$K_C = \frac{10^{29}}{(5 \times 10^{52})^2}$$

$$K_C = \frac{10^{29}}{25 \times 10^{104}}$$

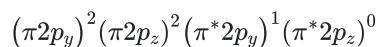
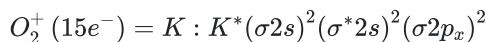
$$= 0.04 \times 10^{-75}$$

$$= 4 \times 10^{-77}$$

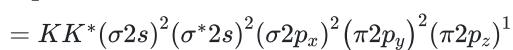
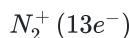
**79.**

**Answer:** 1

**Sol:**



$$\text{Hence, bond order} = \frac{1}{2}(10 - 5) = 2.5$$



$$\text{Hence, bond order} = \frac{1}{2}(9 - 4) = 2.5.$$

**80.**

**Answer:** 2

**Sol:**

In the pair are should react of the other should not react.

(a) Only aldehyde react with fehlings

(b) Ph-C(=O)-CH<sub>3</sub> does not react with NaHSO<sub>3</sub>

(c) CH<sub>3</sub>-CH(OH)-CH<sub>3</sub> shows iodoform, but other will not

(d) Acid reacts with NaHCO<sub>3</sub> but phenol does not



**87.**

**Answer:** 1

**Sol:**

Ion is formed by gaining or losing electrons. To form cation electron are lost from the valency shell, so Zn atoms to  $Zn^{++}$  ions there is a decrease in the no. of valency electron.

**88.**

**Answer:** 2

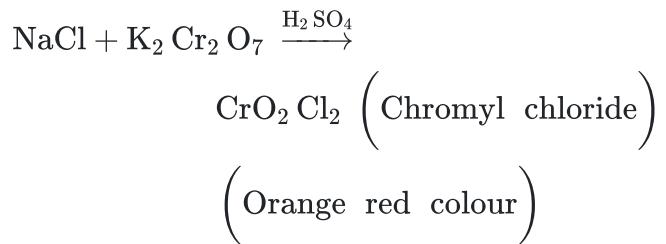
**Sol:**

Sulphides of  $NH_4^+$  IA & IIA are soluble

**89.**

**Answer:** 2

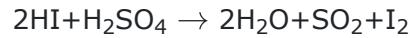
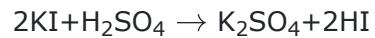
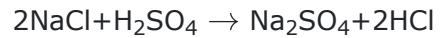
**Sol:**



**90.**

**Answer:** 3

**Sol:**



## Biology - Section A

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91.

**Answer:** 2

**Sol:**

Watermelon, cucumber, and pumpkin have modified auxiliary buds that form thin, wiry, leafless and spirally coiled branches and it helps the weak plant to climb the support known as stem tendrils.

92.

**Answer:** 1

**Sol:**

- scapula (shoulder blade) is a triangular flat bone of the pectoral girdle located on the dorsal part of the thorax.
- Cranium is made up of flat bones that fuse end-to-end with the help of dense fibrous connective tissues. These joints in the cranium do not allow any movement and are called fibrous joints.
- Sternum, also called as breast bone is a flat bone on the ventral midline of the thorax.
- The joints between the adjacent vertebrae in the vertebral column are an example of cartilaginous joints as these are joined with the help of cartilage.

93.

**Answer:** 4

**Sol:**

Photophosphorylation is the synthesis of ATP from ADP and inorganic phosphate in the presence of light. Like in respiration, in photosynthesis too, ATP synthesis is linked to development of a proton gradient across a membrane. Chemiosmosis involves the pumping of protons through special channels in the membranes of mitochondria from the inner to the outer compartment. The pumping establishes a proton ( $H^+$ ) gradient. After the gradient is established, protons diffuse down the gradient through a transport protein called ATP synthase.

This time these are the membranes of thylakoid. The proton accumulation is towards the inside of the membrane, i.e., in the lumen. The causes that develop proton gradient across the membrane are as follows-

- (a) Since splitting of the water molecule takes place on the inner side of the membrane, the protons or hydrogen ions that are produced by the splitting of water accumulate within the lumen of the thylakoids.
- (b) As electrons move through the photosystems, protons are transported across the membrane.
- (c) The NADP reductase enzyme is located on the stroma side of the membrane. Along with electrons that come from the acceptor of electrons of PS I, protons are necessary for the reduction of  $NADP^+$  to  $NADPH + H^+$ . These protons are also removed from the stroma.

94.

**Answer:** 4

**Sol:**

Each **restriction endonuclease** recognises a specific **palindromic nucleotide sequences** in the DNA. It will **bind to the DNA** and cut each of the **two strands of double helix** at **specific points**. **Restriction enzymes** cut the strand of **DNA** a little away from the centre of the **palindrome site**; but between the **same two bases on the opposite strands**.

**95.**

**Answer:** 1

**Sol:**

12th NCERT, Page No.- 33

**96.**

**Answer:** 1

**Sol:**

Adaptation is a quality of the organism (morphological, physiological, behavioral) that enables it to survive and reproduce in its habitat. Adaptations allow organisms to live in different types of habitats. They develop due to natural selection of suitable variations appearing in living beings through mutations and recombination.

**97.**

**Answer:** 4

**Sol:**

A taxon is a group of any one rank of organisms. It is a collection of more than one population of the organisms or organisms seen by the taxonomists for forming a unit.

Hence, the correct answer is **a group of any one rank of organisms.**

**98.**

**Answer:** 3

**Sol:**

NCERT 11<sup>th</sup> Page No. 270, 270

**99.**

**Answer:** 1

**Sol:**

A is deoxygenated blood leaving the tissues

11th OLD NCERT, PAGE NO.- 286

**100.**

**Answer:** 2

**Sol:**

Class 11th NCERT Page No. 65 The fruit

**101.**

**Answer:** 4

**Sol:**

**Oligodendrocytes** are neuroglial cells that produce myelin sheath around axons in CNS.

**Schwann cells** are neuroglial cells that produce myelin sheath around axons in PNS.

**Astrocytes** forms blood brain barrier along with blood capillaries present in the brain. This barrier prevents the entry of neurotoxins from blood into tissues of brain.

**Osteoclast** is a large multinucleated cell responsible for the dissolution and absorption of bone.

**102.**

**Answer:** 1

**Sol:**

Joseph Priestley (1733-1804) in 1770 performed a series of experiments that revealed the essential role of air in the growth of green plants. Joseph Priestley (1770) observed that a candle burning in a closed space - a bell jar, soon gets extinguished. Similarly, a mouse kept in a closed space would soon get suffocated and die. However, when he placed a mint plant in the same bell jar, he found that the mouse stayed alive and the candle continued to burn. Priestly hypothesized that foul air or phlogiston produced during burning of candles or animal (mice) respiration could be converted into pure air by plants (mint).

**103.**

**Answer:** 3

**Sol:**

Genetic engineering, also called recombinant DNA technology, involves the group of techniques used to cut up and join together genetic material, especially DNA from different biological species.

A plasmid or vector is a small, extrachromosomal DNA molecule within a cell that is physical. Artificial plasmids are widely used as vectors in molecular cloning.

Gel electrophoresis is used to separate macromolecules like DNA, RNA and proteins. DNA fragments are separated according to their size. Proteins can be separated according to their size and their charge (different proteins have different charges).

DNA ligases are enzymes that catalyze the joining together of two DNA ends, in a manner that requires either adenosine triphosphate (ATP) or NAD<sup>+</sup>.

**104.**

**Answer:** 4

**Sol:**

12th NCERT, Page No.- 31,35,38

**105.**

**Answer:** 1

**Sol:**

Organisms, populations, communities and biomes

12th NCERT PAGE NO.- 191

**106.**

**Answer:** 2

**Sol:**

Metabolism

**107.**

**Answer:** 4

**Sol:**

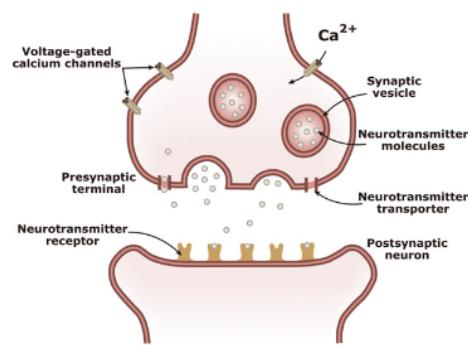
Cruciferae

Class 11th NCERT Page No. 67

**108.**

**Answer:** 3

**Sol:**



**Pre-synaptic membrane-** it involves the release of neurotransmitters in chemical synapse.

**Post synaptic membrane-** Contain receptor sites for neurotransmitters.

**109.**

**Answer:** 1

**Sol:**

The oxygen-evolving complex (OEC), also known as the water-splitting complex, is a water-oxidizing enzyme involved in the photo-oxidation of water during the light reactions of photosynthesis. The splitting of water is associated with the PS II: water is split into H<sup>+</sup>, [O] and electrons. This creates oxygen, one of the net products of photosynthesis. The electrons needed to replace those removed from photosystem I are provided by photosystem II.  $H_2O \rightarrow 4H^+ + O_2 + 4e^-$

The NADP reductase enzyme is located on the stroma side of the membrane (Outer surface of thylakoid membrane). Along with electrons that come from the acceptor of electrons of PS I, protons are necessary for the reduction of NADP<sup>+</sup> to NADPH + H<sup>+</sup>.

For biosynthesis of chlorophyll, raw materials required are succinyl Co-A and glycine.

The primary electron acceptor of PSII is pheophytin, an organic molecule that resembles chlorophyll

**110.**

**Answer:** 4

**Sol:**

Class 12<sup>th</sup> NCERT Page No. 165

**111.**

**Answer:** 1

**Sol:**

12th NCERT, Page No.- 27

**112.**

**Answer:** 2

**Sol:**

Most important factor is temperature which directly affects the organisms by affecting their enzymes hence also affects the geographical distribution.

**113.**

**Answer:** 2

**Sol:**

Archaeabacteria is called Living Fossils because they are the simplest and oldest living species available on the earth.

**114.**

**Answer:** 3

**Sol:**

Statement I is incorrect but statement II is correct

11th OLD NCERT, PAGE NO.- 283

**115.**

**Answer:** 2

**Sol:**

11th Old NCERT PAGE NO. 84

**Incorrect Statement:** Tissues in plants are classified into meristematic tissues (responsible for growth) and permanent tissues (which do not divide). Permanent tissues are further classified into simple (made of one type of cell) and complex (made of more than one type of cell).

**Correct statements:**

A plant is indeed made up of different kinds of tissues, such as meristematic and permanent tissues.

Different organs in a plant (e.g., roots, stems, leaves) show differences in their internal structure.

Monocots and dicots within angiosperms are anatomically different (e.g., vascular bundle arrangement, root structure).

**116.**

**Answer:** 1

**Sol:**

Class 11th New NCERT Page No. 236

**117.**

**Answer:** 3

**Sol:**

During aerobic respiration, O<sub>2</sub> is consumed and CO<sub>2</sub> is released. The ratio of the volume of CO<sub>2</sub> evolved to the volume of O<sub>2</sub> consumed in respiration is called the respiratory quotient (RQ). The respiratory quotient depends upon the type of respiratory substrate used during respiration. When carbohydrates are used as substrate and are completely oxidised, the RQ will be 1, because equal amounts of CO<sub>2</sub> and O<sub>2</sub> are evolved and consumed, respectively.

Though pure fats or proteins cannot be directly used as substrates, they can enter as intermediary substrates of glycolysis and the Krebs' Cycle. Proteins and fats have to undergo a series of chemical reactions to form simple compound and then only they can enter Krebs Cycle. After forming simple compounds only then they can enter the cycle and help to produce energy which takes a lot of time. Due to these reasons pure proteins and fats are not used as respiratory substrates.

**118.**

**Answer:** 4

**Sol:**

Class 12<sup>th</sup> NCERT Page No. 169

**119.**

**Answer:** 2

**Sol:**

**12th NCERT, Page No.- 44**

**120.**

**Answer:** 2

**Sol:**

Control of Opuntia by a predator (moth), a type of insect

**121.**

**Answer:** 3

**Sol:**

Among the following:

1) *Paramecium* resembles the shape of shoe and its habitat is freshwater. It is a unicellular organism. It belongs to the Protista kingdom and the genus is ciliated protozoa.

2) *Plasmodium* is the causative organism for malaria. It belongs to the sporozoan subclass of the genus of parasitic protozoans.

3) *Amoeba* belongs to the Amoeboid protozoa.

4) *Trypanosoma* is the causative organism responsible for sleeping sickness. It is a flagellated protozoan.

**Hence, the correct option is "3" - A - iii, B - iv, C - i, D - ii.**

**122.**

**Answer:** 4

**Sol:**

For safe transfusion, recipient's RBC **should not contain antibodies** against donor's antigens.

Reptiles and amphibia have **incomplete double circulation**.

**Eosinophils** (2-3 per cent) resist infections and are also associated with **allergic reactions**.

The **hepatic portal system** is the venous system that returns blood from the digestive tract and spleen to the liver.

**123.**

**Answer:** 3

**Sol:**

11th Old NCERT PAGE NO. 85

**124.**

**Answer:** 2

**Sol:**

The antidiuretic hormone released by the pituitary gland stimulates reabsorption of water by the kidneys. The deficiency of this hormone causes increased urine production, a condition called diabetes insipidus.

Graves disease is an immune system disorder that results in the overproduction of thyroid hormones.

Addison's disease is caused by a deficiency of the hormones secreted by the adrenal cortex.

Pancreas is a composite gland which acts as both exocrine and endocrine gland. The deficiency of insulin, a hormone secreted by the pancreas, causes a complex disorder called diabetes mellitus which is associated with loss of glucose through urine and formation of harmful compounds known as ketone bodies.

**125.**

**Answer:** 4

**Sol:**

Human mitochondrial ATP synthase has two functional domains:

- 1) One domain situated in a mitochondrial matrix known as  $F_1$
- 2)  $F_o$  is located in the inner mitochondrial membrane.

Hence, the correct answer is option "4" - Peripheral membrane protein with ATP synthetase activity.

**126.**

**Answer:** 1

**Sol:**

**Adenosine deaminase enzymes** are crucial for the **immune system to function**, and their absence is caused by the **deletion of a gene**. It is cured by **gene therapy**.

**Insulin** consists of **chains A and B** that are linked together by **disulfide bridges**.

**Transgenic mice** are being used to test the safety of the **polio vaccine**.

**RNAi** involves the **silencing of a specific mRNA** due to a **complementary dsRNA** molecule that binds to and prevents **translation** of the mRNA.

**127.**

**Answer:** 3

**Sol:**

12th NCERT, Page No.- 119

**128.**

**Answer:** 3

**Sol:**

Flow of energy declines as it passes from lower to higher trophic level. The energy decreases from one trophic level to the next trophic level because energy is lost as metabolic heat during transfer of energy. Hence, the pyramid of energy is always upright in any ecosystem and it cannot be inverted in a stable ecosystem. When food energy passes from producers to herbivores to carnivores, only 10% of energy is transferred from one trophic level to another trophic level.

**129.**

**Answer:** 1

**Sol:**

Cell of diatoms are surrounded by cell wall, frustules, which has silica deposits. Shells of diatoms are highly resistant to decomposition due to presence of silica and are deposited in ocean beds leading to formation of diatomaceous earth. Extraction, grounding, sieving and sinteration of diatomaceous earth obtain keiselguhr which is used in filtration techniques.

Diatoms are placed in class Bacillariophyceae which makes Myxophyceae includes slime molds which are characterized by presence of different morphology at different life stages and absence of cell wall. Pheophyceae includes brown algae which are characterized by presence of alginic acid with cellulose in cell wall and obtains algin, it is used as emulsifying agent and a stabilizer. Rhodophyceae includes red algae which have calcium carbonate in cell wall, it makes the cell permeable to small molecules but impermeable to macromolecules. Red algae secrete calcium carbonate shells which are accumulated in sea bottom and forms red corals. "Diatomite" (Kieselguhr) is obtained from.

**130.**

**Answer:** 1

**Sol:**

In mechanism of concentration of the filtrate, the proximity between the Henle's loop and vasa recta, as well as the counter current in them help in maintaining an increasing osmolarity towards the inner medullary interstitium, i.e., from  $300 \text{ mOsmolL}^{-1}$  in the cortex to about  $1200 \text{ mOsmolL}^{-1}$  in the inner medulla.

**131.**

**Answer:** 2

**Sol:**

Endodermis is the innermost layer of dicot stem of cortex and consists of barrel shaped parenchyma cells containing abundant starch grains-known as starch sheath.

**132.**

**Answer:** 2

**Sol:**

Diabetes mellitus leads to a complex disorder called prolonged hyperglycemia, which is associated with the loss of glucose through urine known as **glycosuria**.

When the cell are unable to utilize carbohydrates for energy instead they use fats & proteins. This fat degradation produces ketone bodies. The presence of these ketone bodies in urine is known as **ketonuria**.

Thus, presence of **Ketonuria and Glycosuria** in urine are indicative of Diabetes Mellitus.

**133.**

**Answer:** 2

**Sol:**

**264 g of  $\text{CO}_2$  and 108 g of water** are formed from **180 g sugar and 192 g oxygen** during **respiration**. In this process, **686 kcal of energy are released**.

Hence, the correct answer is **option (B): 264 g of  $\text{CO}_2$ , 108 g of water, and 686 cal of energy**.

**134.**

**Answer:** 1

**Sol:**

Bacillus thuringiensis is biopesticide, commonly known as Bt, is a naturally occurring, gram-positive, spore-forming soil bacterium. Bt has been known to be reservoir of several insecticidal proteins, such as endotoxins, cytolytic proteins, vegetative insecticidal proteins, etc.

During sporulation, it synthesizes a cytoplasmic inclusion containing one or more proteins that are toxic to insect larvae. Upon completion of sporulation the parent bacterium lyses to release the spore and the inclusion. In these inclusions, the toxins exist as inactive protoxins. When the inclusions are ingested by insect larvae, the alkaline pH solubilizes the crystal. The protoxin is then converted in to an active toxin after processing by the host proteases present in the midgut.

**135.**

**Answer:** 1

**Sol:**

12th NCERT, Page No.- 111

**136.**

**Answer:** 1

**Sol:**

Up right

12th NCERT PAGE NO.- 212

**137.**

**Answer:** 2

**Sol:**

Pteridophytes are developed plants which can survive on land as they have well developed vascular tissues. The main plant body of these plants is diploid, called sporophyte which produces spores after meiosis. These spores on germination give rise to gametophytic plants which produce gametes. The spores do not develop a hard coating around them and thus are unable to form seeds.

**138.**

**Answer:** 1

**Sol:**

It is initiated by stretch receptors in the ureters

**139.**

**Answer:** 3

**Sol:**

Type of pyramid	Ecosystem
Pyramid of energy	Grassland ecosystem

**140.**

**Answer:** 1

**Sol:**

Mendelism is related to heredity. The three prominent law given by Mendel proved its relationship with inheritance. The law of segregation states that each character is regulated by a gene which exists in two forms for a particular character known as allele which segregates into different gametes. The law of independent assortment states that alleles for separate traits are passed independently of one another from parents to offspring. Law of dominance states that the dominant characters mask the effect of the recessive allele.

**141.**

**Answer:** 3

**Sol:**

11th NCERT, PAGE NO.- 172

**142.**

**Answer:** 1

**Sol:**

Class 12<sup>th</sup> NCERT Page No. 181, 185

**143.**

**Answer:** 2

**Sol:**

Algae are surrounded by mucilagenous sheath and below the sheath, cell wall is present which is made up of cellulose and pectin, but galactans, mannans and mineral like calcium carbonate are present in cell wall also.

**144.**

**Answer:** 2

**Sol:**

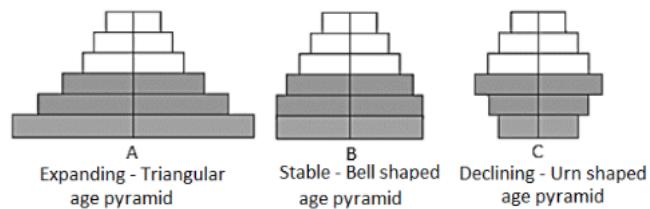
Class XI<sup>th</sup> NCERT Page No. 213

**145.**

**Answer:** 3

**Sol:**

The age pyramids for human population generally shows age distribution of males and females in a combined diagram. The shape reflects the growth status of the population as shown below.



The given age pyramid represents the declining population. A population can shrink due to declining birth rate.

**146.**

**Answer:** 3

**Sol:**

**Class 12<sup>th</sup> NCERT Page No. 67**

**147.**

**Answer:** 3

**Sol:**

If assertion is true but reason is false.

11th NCERT, PAGE NO.- 169

**148.**

**Answer:** 2

**Sol:**

Class 12<sup>th</sup> NCERT Page No. 170, 171

**149.**

**Answer:** 3

**Sol:**

Naked seeds of gymnosperms mean the seeds are not covered inside in an ovary but are present on megasporophyll, the leaf like structures.

**150.**

**Answer:** 2

**Sol:**

Class 12<sup>th</sup> NCERT Page No. 260

**151.**

**Answer:** 2

**Sol:**

Sickle cell disease (SCD) is a group of blood disorders typically inherited from a person's parents. The most common type is known as sickle cell anaemia (SCA). It results in an abnormality in the oxygen-carrying protein haemoglobin found in red blood cells. Sickle cell disease occurs when a person inherits two abnormal copies of the  $\beta$ -globin gene (HBB) that makes haemoglobin, one from each parent. This gene occurs in chromosome 11. Several subtypes exist, depending on the exact mutation in each haemoglobin gene. An attack can be set off by temperature changes, stress, dehydration, and high altitude. A person with a single abnormal copy does not usually have symptoms and is said to have sickle cell trait.

Hence, the correct answer is  **$\beta$  chain of haemoglobin.**

**152.**

**Answer:** 3

**Sol:**

**Gibberellins (Gibberellic Acids)** are plant hormones that control, among other things, **stem elongation, germination, dormancy, flowering, floral development, and leaf and fruit senescence.** Gibberellin spraying on juvenile conifers **accelerates maturity, resulting in early seed production.**

**153.**

**Answer:** 1

**Sol:**

In Aschelminthes, the body cavity is not lined by mesoderm, instead, the mesoderm is present as scattered pouches in between the ectoderm and endoderm. Hence, they are called pseudocoelomates.

**154.**

**Answer:** 3

**Sol:**

Class 12th NCERT (New) Page No.157

**155.**

**Answer:** 3

**Sol:**

**Class 12<sup>th</sup> NCERT Page No. 74**

**156.**

**Answer:** 2

**Sol:**

Haploid plant cultures can be obtained by pollen grains by the technique of pollen culture. Pollen culture is a technique of production of haploid plants by culture of pollen grains obtained from anther of a plant under aseptic condition on artificial media of known composition. When the anther is used as the explant material for the cultivation of new plants by the tissue culture technique, then there are some plants which are developed as haploid and the other plants are developed as the diploid plants. There are different types of tissues which are present in the anther. The pollen grains and the respective cells like the vegetative cell and generative cell will give rise to the plants which are haploid because they are formed through microsporogenesis. The other cells like the cells of anther wall, endothecium, middle layers are diploid in nature and give rise to diploid plants.

**157.**

**Answer:** 2

**Sol:**

Cephalochordates and vertebrates have a hollow, dorsal nerve cord, pharyngeal gill slits, and a notochord. In most vertebrates, the embryonic notochord is eventually replaced by bony vertebrae or cartilaginous tissue; among cephalochordates, the notochord is retained into adulthood and is never replaced by vertebrae. But urochordates have notochord in the tail region in their larval stage only.

**158.**

**Answer:** 4

**Sol:**

Xerophytes desert plants grow in physical or physiological dryness. The water is not easily available and they need to conserve water. These plants have well developed roots to absorb water. They have other adaptations to reduce transpiration loss of water, like multilayered epidermis, sunken stomata, thick waxy cuticle, stomata are present in lower epidermis sunken in substomatal chambers, which has hairs.

**159.**

**Answer:** 1

**Sol:**

Mutagen is a physical or chemical agent that changes the genetic material, usually DNA, of an organism and thus increases the frequency of mutations above the natural background level. As many mutations can cause cancer, mutagens are therefore also likely to be carcinogens, although not always necessarily so. Due to mutation phenotype and genotype of offspring affect.

**Toxin** - A toxin is a harmful substance produced within living cells or organism

**Cytotoxin** - Cytotoxic agents are known as all the elements that are toxic to the cells, which include the factors that prevent their growth and sometimes cause death, and are also used to treat certain disorders.

**Alkaloid** - Alkaloids are a class of basic, naturally occurring organic compounds that contain at least one nitrogen atom. Alkaloids stimulate human organisms, for example, central nervous system, or directly work on the human brain.

**160.**

**Answer:** 4

**Sol:**

In cleistogamous flowers, the anthers and stigma lie close to each other. When anthers dehisce in the flower buds, pollen grains come in contact with the stigma to effect pollination. Thus, cleistogamous flowers are **invariably autogamous** as there is **no chance of cross-pollen** landing on the stigma. **Cleistogamous flowers produce assured seed-set even in the absence of pollinators. eg- viola, oxalis etc.** While in chasmogamous flowers are similar to flowers of other species with exposed anthers and stigma. Their flower are coloured contain aroma and nectar.

**161.**

**Answer:** 2

**Sol:**

Physalia - Portuguese man of war, Pennatula - Sea pen, Gorgia - Sea fan, and Menandrina - Brain coral.

**162.**

**Answer:** 2

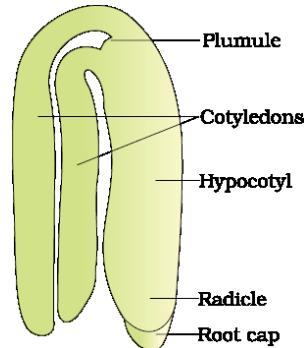
**Sol:**

In kingdom Animalia, the outer covering of the cell is known as a cell membrane, while the cell wall is the outer covering of the plant cell, fungal cell, and some bacterial cells.

**163.**

**Answer:** 2

**Sol:**



A is plumule which helps in shoot system formation.

B is Radicle which helps in root system formation.

C is Cotyledon which helps in food storage.

**164.**

**Answer:** 2

**Sol:**

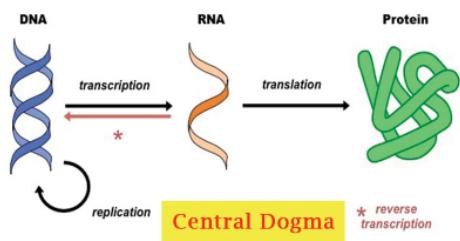
The **central dogma** is the process by which the instruction in the DNA is converted into proteins.

Central dogma was proposed by **Francis Crick**.

The formation of DNA from DNA is called **replication**.

The formation of RNA from DNA is known as **transcription**.

The conversion of RNA into proteins is called **translation**.



**165.**

**Answer:** 2

**Sol:**

Fasciola hepatica, also known as the sheep liver fluke, is a triploblastic organism(first in platyhelminthes to chordates).

Nereis (Annelida) is the first true coelomate, which is a fluid-filled body cavity lined by mesoderm.

Antedon, also known as the sea lily is a member of the phylum Echinodermata is First enterocoelomate.

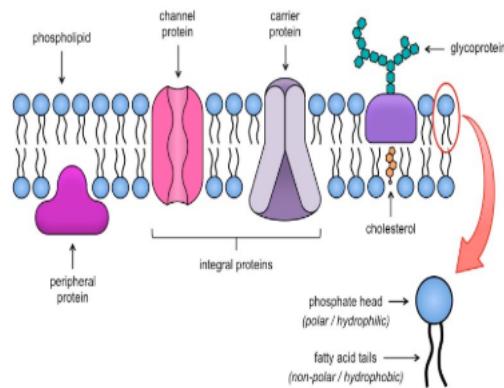
Adamsia (Cnidarians) are the first organisms to have tissue-level organization, and are considered to be at the tissue grade of organization.

**166.**

**Answer:** 3

**Sol:**

The fluid mosaic model was first proposed by S.J. Singer and Garth L. Nicolson in 1972 to explain the structure of the plasma membrane. The model has evolved somewhat over time, but it still best accounts for the structure and functions of the plasma membrane as we now understand them.



**167.**

**Answer:** 2

**Sol:**

The theory that each gene is responsible for the synthesis of a single polypeptide. It was originally stated as the "one gene, one enzyme hypothesis" by George Beadle, but was later modified when it was realized that genes also encoded non-enzyme proteins and individual polypeptide chains. It is now known that some genes code for various types of RNA involved in protein synthesis.

**168.**

**Answer:** 2

**Sol:**

Biomolecules with molecular weights more than one thousand Dalton are called biomacromolecules. These are found in the acid-insoluble fraction. Lipids are not strictly macromolecules as their molecular weights do not exceed 800 Da but form a part of the acid insoluble pool. The molecules in the insoluble fraction with the exception of lipids are polymeric substances. Lipids are indeed small molecular weight compounds and are present not only as such but also arranged into structures like cell membrane and other membranes. So the acid insoluble fraction has only four types of organic compounds, proteins, polysaccharides nucleic acids and lipids but except for lipids none of them are micromolecules.

**169.**

**Answer:** 4

**Sol:**

Inside the primary cell wall.

**170.**

**Answer:** 1

**Sol:**

Class 12th NCERT Page No. 102

**171.**

**Answer:** 2

**Sol:**

Different types of epithelial cell junctions are:-

- 1) Desmosomes ( Semi or full).
- 2) Gap junctions
- 3) Tight junctions
- 4) Adheren points.

**GAP JUNCTION:-** These junctions connect cells with one another for transporting molecules directly into the other cell without moving from the extracellular fluid. These gap junctions are useful at the time of embryonic development, this is the time when every cell should communicate with each other in order to develop fully at the right time. If these are blocked, embryos will not develop normally.

**TIGHT JUNCTION -** These junctions are narrow junctions that prevent solute leakage and seal the epithelial cells in between.

**ADHERING JUNCTION -** These are cell adhesion complexes that help in maintaining the structural support against harsh and changing environments against the biogeochemical changes.

**172.**

**Answer:** 3

**Sol:**

Pectate Ca & Mg

11th NCERT PAGE NO.- 94

**173.**

**Answer:** 3

**Sol:**

- **Polymines** maintained DNA coiled in prokaryotes, they did this by binding to the minor groove of DNA.

- Eukaryotes wrap their DNA around the protein called **histone**. It helps in packaging the DNA into smaller pieces.

- **Prokaryotes** do not have histone proteins, they have non-histone protein and they compress their DNA by **supercoiling**.

**Hence, the correct option is "3" - Polyamines.**

**174.**

**Answer:** 1

**Sol:**

Mushroom glands- 6th 7th abdominal segment.  
Testes- 4th 6th abdominal segment.  
Spermathecal- 6th abdominal segment.  
Anal cerci- 10th abdominal segment.

Mushroomshaped gland is present in the 6th-7th abdominal segments which functions as an accessory reproductive gland. The external genitalia are represented. Male reproductive system consists of a pair of testes lying one on each lateral side in the 4th -6th abdominal segments. From each testis arises a thin vas deferens, which opens into ejaculatory duct through seminal vesicle. A pair of spermatheca is present in the 6th segment which opens into the genital chamber. Anal cerci are a pair of appendages at the end of the abdomen arising from the 10th segment of the body of the cockroaches in both sexes males and females. Cerci are pincer-shaped.

**175.**

**Answer:** 2

**Sol:**

G<sub>1</sub> phase is also known as the first gap. It is usually the longest period of the cell cycle. However in some embryonic cells that are rapidly dividing G<sub>1</sub> might only last a few minutes. It synthesizes mRNA and proteins.

**176.**

**Answer:** 3

**Sol:**

1. **Acquired immunity** is a specific type of defence which is not present at the **time of birth**.
2. **Anamnestic** response or **secondary** immune response is a **highly intensified response due to memory of first encounter**.
3. When our body **encounters a pathogen** for the first time then the body **elicits the primary immune response**.
4. When there is a **subsequent encounter** with the same pathogen, secondary or **anamnestic immune** response is elicited.

**177.**

**Answer:** 3

**Sol:**

Mitosis is the process of cell division where a haploid cell has the ability to divide and form two daughter cells. In mitosis, the cell phases are interphase, prophase, metaphase, anaphase, and telophase. Mitosis occurs in all types of cells that are somatic cells but doesn't occur in gamete cells.

It also occur in haploid male honey bee not in female.

**178.**

**Answer:** 3

**Sol:**

- (a) Filariasis - (iii) Wuchereria bancrofti  
 (b) Amoebiasis - (iv) Entamoeba histolytica  
 (c) Pneumonia - (i) Haemophilus influenzae  
 (d) Ringworm - (ii) Trichophyton

**179.**

**Answer:** 3

**Sol:**

Karyokinesis has 4 stages

- (i) Prophase
- (ii) Metaphase
- (iii) Anaphase
- (iv) Telophase

**180.**

**Answer:** 3

**Sol:**

12th NCERT, PAGE NO.- 157