CAREER PLUS
BRIDGE TO SUCCESS

NEET TEST -14 (2023 - 25)

Time: 200 Minutes.   **Date: 05-02-2024**   **Max. Marks: 720**

GENERAL INSTRUCTIONS

Topic:- **Physics** -   Kinematics- Motion in one dimension and motion in plane, NLM With Friction, Circular Motion, WPE, COM, Linear Momentum & Collision, Rotational motion, Gravitation, Mechanical properties of solid and Fluids

Chemistry -   Some basic concepts of chemistry, Structure of atom, Periodicity, Chemical bonding Chemical Equilibrium, Ionic Equilibrium, Redox Reaction, Organic Chemistry, (nomenclature of organic compounds) Isomerism of organic compounds (structural isomerism only)

Zoology -   Animal Kingdom, Frog, Biomolecules, Breathing and exchange of gases, Body fluids and Circulation, Excretory Products and their elimination, Locomotion and movement , Nervous control and coordination

Botany -   Previous Topic - 40%, The Living World, Biological Classification, Plant Kingdom, Morphology of flowering plants, Anatomy of flowering plants, Cell : The Fundamental Unit of Life, Cell Division & Cell Cycle, Current Topic - 60%, Photosynthesis (complete chapter)

Important Instructions :

1. The question paper consists of '**200**' objective type questions. There are '**50**' questions each in Zoology, Botany, Physics and Chemistry respectively in **2 Sections (A) & (B)**. **Section 'A' contains 35 questions and all are mandatory. Section 'B' contains 15 questions, only '10' is to be attempted**.
2. On the Answer Sheet, fill in the particulars carefully with **blue/black** ball point pen only.
3. The test is of **3 hours** duration and this Test Booklet contains **200** questions. 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 scores. The maximum marks are **720**.
4. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses.
5. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
6. **On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.**
7. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else exception the specified space in the Test Booklet/ Answer Sheet.
8. Use of white fluid for correction is *not* permissible on the Answer Sheet.
9. If you want to attempt any question then circle should be properly darkened, otherwise leave blank.

NAME OF THE CANDIDATE: …………….……….…………………………..…………………

ROLL NO. : …………………….…

I have read all the instructions shall abide by them

I have verified the identity, name and roll number and of the candidate.

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Signature of the Candidate   *Signature of the Invigilator*

DO NOT BREAK THE SEALS WITHOUT BEING INSTRUCTED TO DO SO BY THE

Physics Section - A
Attempt all 35 Questions

1. Two copper vessels A and B have the same base area but of different shapes. A take twice the volume of water as that B requires to fill upto a particular common height. Then the correct statement among the following is:
   (A) Vessel B weighs twice that of A.
   (B) Pressure on the base area of vessels A and B is same.
   (C) Pressure on the base area of A and B is not same.
   (D) Both vessels A and B weigh the same.

2. A rod PQ of mass M and length L is hinged at end P. The rod is kept horizontal by a massless string tied to point Q as shown in figure. When string is cut, the initial angular acceleration of the rod is

   (A) $\dfrac{g}{L}$
   (B) $\dfrac{2g}{L}$

   (C) $\dfrac{2g}{3L}$
   (D) $\dfrac{3g}{2L}$

3. The potential energy of a long spring when stretched by 2 cm is U. If the spring is stretched by 8 cm, potential energy stored in it will be
   (A) 2 U
   (B) 4 U
   (C) 8 U
   (D) 16 U

4. A body of mass m is kept on a rough horizontal surface (coefficient of friction = μ). A horizontal force is applied on the body, but it does not move. The resultant of normal reaction and the frictional force acting on the object is given by F, where F is

   (A) $\left|\vec{F}\right| = mg$
   (B) $\left|\vec{F}\right| = mg + \mu\, mg$

   (C) $\left|\vec{F}\right| = \mu\, mg$
   (D) $\left|\vec{F}\right| \leq mg\sqrt{1+\mu^2}$

5. A U tube with both ends open to the atmosphere, is partially filled with water. Oil, which is immiscible with water, is poured into one side until it stands at a distance of 10 mm above the water level on the other side. Meanwhile the water rises by 65 mm from its original level (see diagram). The density of the oil is

   (A) 425 kg m⁻³
   (B) 800 kg m⁻³

   (C) 928 kg m⁻³
   (D) 650 kg m⁻³

6. A particle of mass m moves in the XY plane with a velocity v along the straight line AB. If the angular momentum of the particle with respect to origin O is L_A when it is at A and L_B when it is at B, then

   (A) $L_A = L_B$
   (B) the relationship between LA and LB depends upon the slope of the line AB
   (C) $L_A < L_B$
   (D) $L_A > L_B$

7. The vectors $\vec{A}$ and $\vec{B}$ are such that
   $\left|\vec{A}+\vec{B}\right| = \left|\vec{A}-\vec{B}\right|$ The angle between the two vectors is
   (A) 60º
   (B) 75º
   (C) 45º
   (D) 90º

8. Calculate the maximum acceleration of a moving car so that a body lying on the floor of the car remains stationary. The coefficient of static friction between the body and the floor is 0.15 (g = 10 ms⁻²)
   (A) 1.2 ms⁻²
   (B) 150 m s⁻²
   (C) 1.5 m s⁻²
   (D) 50 m s⁻²

9. The cylindrical tube of a spray pump has radius, R, one end of which has n fine holes, each of radius r. If the speed of the liquid in the tube is V, the speed of the ejection of the liquid through the holes is:

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(A) $\dfrac{VR^2}{nr^2}$ (B) $\dfrac{VR^2}{n^3r^2}$

(C) $\dfrac{V^2R}{nr}$ (D) $\dfrac{VR^2}{n^2r^2}$

10. When a force F acts on a particle of mass m, the acceleration of particle becomes a. Now if two forces of magnitude 3F and 4F acts on the particle simultaneously as shown in figure, then the acceleration of the particle is
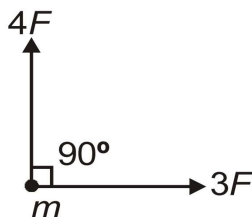
(A) a (B) 2a
(C) 5a (D) 8a

11. A mass of 0.5 kg moving with a speed of 1.5m/s on a horizontal smooth surface, collides with a nearly weightless spring of force constant k = 50 N/m. The maximum compression of the spring would be
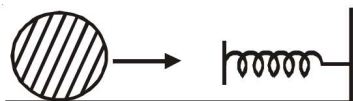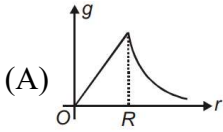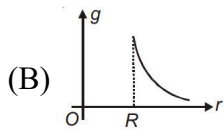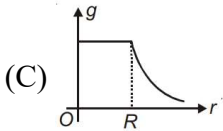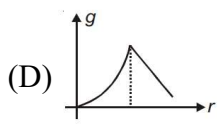
(A) 0.15 m (B) 0.12 m
(C) 1.5 m (D) 0.5 m

12. The venturi-meter works on
(A) Huygen's principle
(B) Bernoulli's principle
(C) The principle of parallel axes
(D) The principle of perpendicular axes

13. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): When a fire cracker (rocket) explodes in mid air, its fragments fly in such a way that they continue moving in the same path, which the fire cracker would have followed, had it not exploded.
Reason (R) : Explosion of cracker (rocket) occurs due to internal forces only and no external force acts for this explosion.
In the light of the above statements, choose the most appropriate answer from the options given below
(A) (A) is not correct but (R) is correct
(B) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(C) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
(D) (A) is correct but (R) is not correct

14. Given below are two statements: One is labelled as assertion (A) and the other is labelled as Reason (R).
Assertion (A): The stretching of a spring is determined by the shear modulus of the material of the spring.
Reason (R): A coil spring of copper has more tensile strength than a steel spring of same dimensions.
In the light of the above statements, choose the most appropriate answer from the options given below:
(A) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(B) (A) is true but (R) is false
(C) (A) is false but (R) is true
(D) Both (A) and (R) are true and (R) is the correct explanation of (A).

15. If radius of an orbiting satellite is decreased, then its kinetic energy
(A) And potential energy decrease
(B) And potential energy increase
(C) Decreases and potential energy increases
(D) Increases and potential energy decreases

16. A ball is thrown at an angle θ with the horizontal. Its horizontal range is equal to its maximum height. This is possible only when the value of $\tan\theta$ is
(A) 4 (B) 2
(C) 1 (D) 0.5

17. A small sphere of radius 'r' falls from rest in a viscous liquid. As a result, heat is produced due to viscous force. The rate of production of heat when the sphere attains its terminal velocity, is proportional to
(A) r^3 (B) r^2
(C) r^4 (D) r^5

18. Out of the two cars A and B, car A is moving towards east with a velocity of 10m/s whereas B is moving towards north with a velocity 20m/s, then velocity of A w.r.t. B is (nearly)
(A) 30m/s (B) 10m/s
(C) 22m/s (D) 42m/s

19. The bulk modulus of a spherical object is 'B'. If it is subjected to uniform pressure 'p', the fractional decrease in radius is

(A) $\dfrac{B}{3p}$ (B) $\dfrac{3p}{B}$

(C) $\dfrac{p}{3B}$ (D) $\dfrac{p}{B}$

20. A liquid does not wet the solid surface if angle of contact is
(A) zero   (B) equal to 45°
(C) equal to 60°   (D) greater than 90°

21. When an elastic material with Young's modulus Y is subjected to stretching stress S, elastic energy stored per unit volume of the material is
(A) YS/2   (B) $S^2Y/2$
(C) $S^2/2Y$ (D) S/2Y

22. A stone is tied to a string of length 'l' and is whirled in a vertical circle with the other end of the string as the centre. At a certain instant of time, the stone is at its lowest position and has a speed 'u'. The magnitude of the change in velocity as it reaches a position where the string is horizontal (g being acceleration due to gravity) is

(A) $\sqrt{2(u^2 - gl)}$ (B) $\sqrt{u^2 - gl}$

(C) $u - \sqrt{u^2 - 2gl}$ (D) $\sqrt{2gl}$

23. A projectile is fired from the surface of the earth with a velocity of 5 ms⁻¹ and angle θ with the horizontal. Another projectile fired from another planet with a velocity of 3 ms⁻¹ at the same angle follows a trajectory which is identical with the trajectory of the projectile fired from the earth. The value of the acceleration due to gravity on the planet is (in ms⁻²) is (Given g = 9.8 ms⁻²)
(A) 3.5   (B) 5.9
(C) 16.3   (D) 110.8

24. An object is taken to height 2R above the surface of earth, the increase in potential energy is [R is radius of earth]

(A) $\dfrac{mgR}{2}$ (B) $\dfrac{mgR}{3}$

(C) $\dfrac{2mgR}{3}$ (D) $2mgR$

25. The amount of energy required to form a soap bubble of radius 2 cm from a soap solution is nearly (surface tension of soap solution = 0.03 J m⁻¹)
(A) 30.16×10^{-4} J   (B) 5.06×10^{-4} J
(C) 3.01×10^{-4} J   (D) 50.1×10^{-4} J

26. A wire of length L, area of cross section A is hanging from a fixed support. The length of the wire changes to L_1 when mass M is suspended from its free end. The expression for Young's modulus is:

(A) $\dfrac{Mg(L_1 - L)}{AL}$ (B) $\dfrac{MgL}{AL_1}$

(C) $\dfrac{MgL}{A(L_1 - L)}$ (D) $\dfrac{MgL_1}{AL}$

27. Which of the following graph represents the variations of acceleration due to gravity(g) with distance r from the centre of earth?

(A)
(B)

(C)
(D)

28. A stationary particle explodes into two particles of masses m_1 and m_2 which move in opposite directions with velocities v_1 and v_2. The ratio of their kinetic energies $\dfrac{E_1}{E_2}$ is

(A) $\dfrac{m_2}{m_1}$ (B) $\dfrac{m_1}{m_2}$

(C) 1   (D) $\dfrac{m_1 v_2}{m_2 v_1}$

29. Let a wire be suspended from the ceiling (rigid support) and stretched by a weight W attached at its free end. The longitudinal stress at any point of cross-sectional area A of the wire is
(A) 2W/A   (B) W/A
(C) W/2A   (D) Zero

30. The acceleration due to gravity on a planet is 1.96 m/s². If it is safe to jump from a height of 3 m on the earth, the corresponding height on the planet will be
(A) 3 m   (B) 6 m
(C) 9 m   (D) 15 m

31. A body moves a distance of 10 m along a straight line under the action of a 5 N force. If the work done is 25 J, then angle between the force and direction of motion of the body is
(A) 60º   (B) 75º
(C) 30º   (D) 45º

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32. When energy of a satellite-planet system is positive then satellite will
    (A) Move around planet in circular orbit
    (B) Move around planet in elliptical orbit
    (C) Escape out with minimum speed
    (D) Escape out with speed greater than escape velocity

33. From a disc of radius R and mass M, a circular hole of diameter R, whose rim passes through the centre is cut. What is the moment of inertia of the remaining part of the disc about a perpendicular axis, passing through the centre?
    (A) $15\,MR^2/32$ (B) $13\,MR^2/32$
    (C) $11\,MR^2/32$ (D) $9\,MR^2/32$

34. The terminal velocity of a copper ball of radius 5 mm falling through a tank of oil at room temperature is 10 cm s^{-1} . If the viscosity of oil at room temperature is 0.9 kg m^{-1}s^{-1} the viscous drag force is:
    (A) 4.23×10^{-6} N   (B) 8.48×10^{-3} N
    (C) 8.48×10^{-5} N   (D) 4.23×10^{-3} N

35. A small mass attached to a string rotates on frictionless table top as shown. If the tension in the string is increased by pulling the string causing the radius of the circular motion to decrease by a factor of 2, the kinetic energy of the mass will
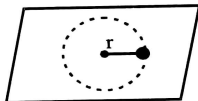
    (A) remain constant
    (B) increase by a factor of 2
    (C) increase by a factor of 4
    (D) decrease by a factor of 2

Physics Section-B
Attempt any 10 Questions

36. Two particles A and B are connected by a rigid rod AB. The rod slides along perpendicular rails as shown here. The velocity of A to the left is 10 m/s. What is the velocity of B when angle θ = 60°?
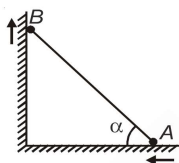
    (A) 10 m/s   (B) 9.8 m/s
    (C) 5.8 m/s   (D) 17.3 m/s

37. Figure shows a container filled with a liquid of density ρ . Four points A, B, C and D lie on the diametrically opposite points of a circle as shown. Points A and C lie on vertical line and points B and D lie on horizontal line. The incorrect statement is (p_A, p_B, p_C, p_D are absolute pressure at the respective points)
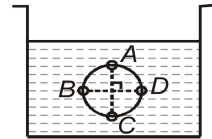
    (A) $p_D = p_B$
    (B) $p_A < p_B = p_D < p_C$

    (C) $p_D = p_B = \dfrac{p_C - p_A}{2}$

    (D) $p_D = p_B = \dfrac{p_C + p_A}{2}$

38. A : Bulk modulus for a perfectly plastic body is zero.
    R : For perfect plastic material, there is no restoring force.
    (A) Both (A) and (R) are true and (R) is not the correct explanation of (A)
    (B) (A) is true but (R) is false
    (C) (A) is false but (R) is true
    (D) Both (A) and (R) are true and (R) is the correct explanation of (A).

39. A : Centre of mass of a system may or may not lie inside the system.
    R : The position of centre of mass depends on distribution of mass within the system.
    (A) Both (A) and (R) are true and (R) is not the correct explanation of (A)
    (B) (A) is true but (R) is false
    (C) (A) is false but (R) is true
    (D) Both (A) and (R) are true and (R) is the correct explanation of (A).

40. If the angle between the vectors $\vec{A}$ and $\vec{B}$ is θ, the value of the product $(\vec{B}\times\vec{A}).\vec{A}$ is equal to
    (A) $BA^2\cos\theta$ (B) $BA^2\sin\theta$
    (C) $BA^2\sin\theta\cos\theta$ (D) Zero

41. A beaker containing a liquid of density ρ moves up with an acceleration 'a'. The pressure due to the liquid at a depth h below free surface of the liquid is
    (A) $h\rho g$ (B) $h\rho(g-a)$

(C) $h\rho(g+a)$ (D) $2h\rho g\left(\dfrac{g+a}{g-a}\right)$

42. The following four wires of length L and radius r are made of the same material. Which of these will have the largest extension, when the same tension is applied?
(A) L = 400 cm, r = 0.8 mm
(B) L = 300 cm, r = 0.6 mm
(C) L = 200 cm, r = 0.4 mm
(D) L = 100 cm, r = 0.2 mm

43. A disc is rotating with angular speed ω. If a child sits on it, what is conserved?
(A) Linear momentum   (B) Angular momentum
(C) Kinetic energy   (D) Potential energy

44. The Young's modulus of steel is twice that of brass. Two wires of same length and of same area of cross section, one of steel and another of brass are suspended from the same roof. If we want the lower ends of the wires to be at the same level, then the weights added to the steel and brass wires must be in the ratio
(A) 1 : 1   (B) 1 : 2
(C) 2 : 1   (D) 4 : 1

45. In a hydraulic jack as shown, mass of the car W = 800 kg, A1 = 10 cm², A² = 10 m². The minimum force F required to lift the car is
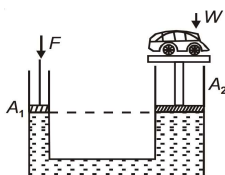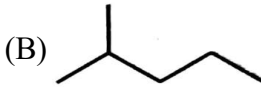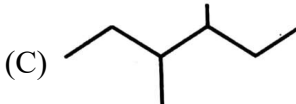
(A) 1 N   (B) 0.8 N
(C) 8 N   (D) 16 N

46. What is the value of linear velocity, if
$\vec{\omega}=3\hat{i}-4\hat{j}+\hat{k}$ and $\vec{r}=5\hat{i}-6\hat{j}+6\hat{k}$

(A) $4\hat{i}-13\hat{j}+6\hat{k}$ (B) $-18\hat{i}-13\hat{j}+2\hat{k}$

(C) $6\hat{i}+2\hat{j}+3\hat{k}$ (D) $6\hat{i}-2\hat{j}+8\hat{k}$

47. A wooden cube just floats inside water with a 200 gm mass placed on it. When the mass is removed, the cube floats with its top surface 2 cm above the water level. What is the side of the cube ?
(A) 6 cm   (B) 8 cm
(C) 10 cm   (D) 12 cm

48. Copper of fixed volume V is drawn into wire of length l. When this wire is subjected to a constant force F, the extension produced in the wire is Δl. Which of the following graphs is a straight line?

(A) Δl versus $\dfrac{1}{l}$ (B) Δl versus l^2

(C) Δl versus $\dfrac{1}{l^2}$ (D) Δl versus l

49. Viscous drag force depends on
(A) Size of body
(B) Velocity with which it moves
(C) Viscosity of fluid
(D) All of these

50. A : The apparent weight of a body floating on the surface of a liquid is zero.
R : The net force on a body floating on the surface of a liquid is zero.
(A) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(B) (A) is true but (R) is false
(C) (A) is false but (R) is true
(D) Both (A) and (R) are true and (R) is the correct explanation of (A).

Chemistry Section - A
Attempt all 35 Questions

51. 25.3 g sodium carbonate, Na_2CO_3, was dissolved in enough water to make 250 mL of solution. If sodium carbonate dissociates completely, molar concentration of Na and carbonate ions are respectively:
(Molar mass of Na_2CO_3=106 g mol^{-1})
(A) 0.9555 M and 1.910M
(B) 1.910 M and 0.955 M
(C) 1.90 M and 1.090 M
(D) 0.477 M and 0.477 M

52. Which compound is not the isomer of 3-Ethyl-2-methylpentane?
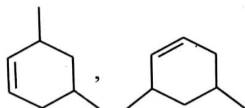
(A)

(B)

(C)

(D)

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53. MnO_2- in neutral aqueous medium is disproportionate to
(A) 2/3 mole of MnO_4^- and 1/3 mole of MnO_2
(B) 1/3 mole of MnO_4^- and 2/3 mole of MnO_2
(C) 1/3 mole of Mn_2O_7 and 1/3 mole of MnO_2
(D) 2/3 mole of Mn_2O_7 and 1/3 mole of MnO_2

54. For which reaction $K_p \neq K_c$?
(A) $2NO(g) \rightleftharpoons N_2(g) + O_2(g)$
(B) $SO_2(g) + NO_2 \rightleftharpoons SO_3(g) + NO(g)$
(C) $I_2(g) + H_2(g) \rightleftharpoons 2HI(g)$
(D) $2C(s) + O_2(g) \rightarrow 2CO(g)$

55. The number of atoms in 0.1 mol of a triatomic gas is:
(A) 6.026×10^{23} (B) 1.806×10^{23}
(C) 3.600×10^{23} (D) 1.80×10^{23}

56. The IUPAC name for

is
(A) (1-Methylpropyl)cyclobutane
(B) 2-(n-butyl)cyclobutane
(C) 2-Cyclobutylbutane
(D) 1-Cyclobutylbutane

57.

Relation between the above compounds is:
(A) Position isomers (B) Chain isomers
(C) Identical (D) Functional isomer

58. Which of the following has largest ionic radius?
(A) Cs^+ (B) Li^+
(C) Na^+ (D) K^+

59. The pair in which the two species are isostructural
(A) SiF_4 and SF_4 (B) IO_3^- and XeO_3
(C) BH_4^- and NH_4^+ (D) PF_6^- and SF_6

60. What is the correct IUPAC name of the compound?
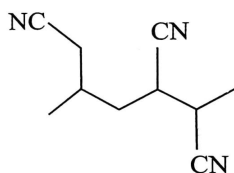
(A) 3-cyano-2, 5-dimethyl heptanedinitrile
(B) 2-methyl hexane-1, 4, 5-tricarbonitrile
(C) 2, 5-dimethyl-1, 3, 7-heptanedinitrile
(D) 5-cyano-3, 6-dimethyl heptanedinitrile

61. Which of the following statements concerning 3, 4-dibromo- 1-pentene and 3, 5-dibromo-2-pentene are correct?
(I) They have same molecular formula $C_5H_8Br_2$
(II) They are positional isomers.
(III) They have similar chemical properties.
(A) I and III (B) I and II
(C) II and III (D) I, II and III

62. Assertion: The solubility of gases always increases with increase in pressure.
Reason: High pressure favours the change where volume decreases.
(A) If both the assertion and reason are true and reason is the true explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not the correct explanation of assertion.
(C) If the assertion is true but reason is false.
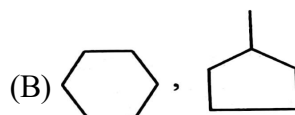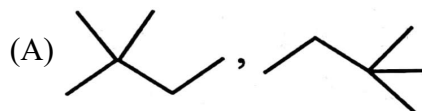(D) If assertion is false but reason is true.

163. Which of the following is correct structure of 3, 3-dibromo-2-chlorobutyl 2-methyl propanoate?

(A)

(B)

(C)

(D)
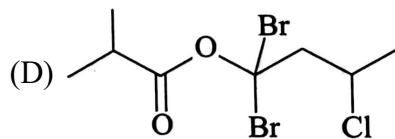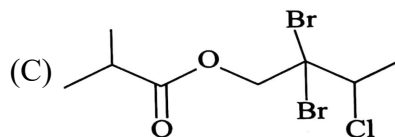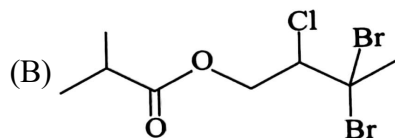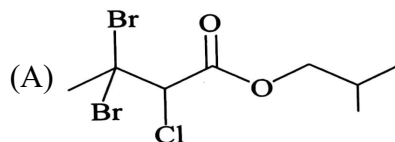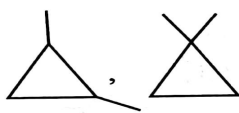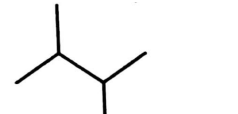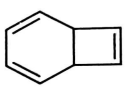

64. Which of the following ion is the smallest ion?
(a O_2^+ (B) O_2^-
(C) O_2 (D) O_2^{-2}

65. Which of the following pair is the chain isomer?

(A)

(B)

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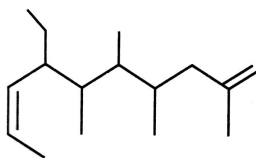Page No. : 7

(C)

(D)

66. 10^{-2} mole of NaOH was added to 10 litres of water. The pH will change by
(A) 4   (B) 3
(C) 11   (D) 7

67. The correct IUPAC name of $(C_2H_3)_4C$ is
(A) Tetraethyl methane   (B) 2-Ethylpentane
(C) 3, 3-Diethylpentane   (D) None of these

68. Following solutions were prepared by mixing different volumes of NaOH and HCl of different concentrations:

(A) $60 \text{ mL } \frac{M}{10} \text{HCl} + 40\text{mL } \frac{M}{10} \text{NaOH}$

(B) $55 \text{ mL } \frac{M}{5} \text{HCl} + 45\text{mL } \frac{M}{10} \text{NaOH}$

(C) $75 \text{ mL } \frac{M}{5} \text{HCl} + 25\text{mL } \frac{M}{10} \text{NaOH}$

(D) $100 \text{ mL } \frac{M}{10} \text{HCl} + 100\text{mL } \frac{M}{10} \text{NaOH}$

69. The radii of F, F⁻, O and O⁻² are in the order of
(A) $O^{2-} > F^- > O > F$ (B) $O^{2-} > F^- > F > O$
(C) $F^- > O^{2-} > F > 0$ (D) $O^{2-} > O > F^- > F$

70. The oxidation states of sulphur in the anions SO_4^{2-}, $S_2O_4^{2-}$ and $S_2O_6^{2-}$ follow the order
(A) $S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-}$
(B) $SO_3^{2-} < S_2O_4^{2-} < S_2O_6^{2-}$
(C) $S_2O_4^{2-} < S_2O_6^{2-} < S_2O_3^{2-}$
(D) $S_2O_6^{2-} < S_2O_4^{2-} < S_2O_3^{2-}$

71. Which among the following is the correct IUPAC name of isoamylene?
(A) 1-Pentene
(B) 2-Methyl-2-butene
(C) 3-Methyl but-1-ene
(D) 2-Methyl but-1-ene

72. Which of the following molecules acts as a Lewis acid?
(A) $(CH_3)_3 N$ (B) $(CH_3)_3 B$

(C) $(CH_3)_2 O$ (D) $(CH_3)_3 P$

73. Which of the following statements regarding ethanoic acid and methyl methanoate are correct?
(1) They are functional group isomers with molecular formula $C_2H_4O_2$.
(II) They belong to different homologous series.
(III) They have different chemical properties.
(A) I and II   (B) I, II and III
(C) II and III   (D) I and III

74. What is the $[OH]^-$ in the final solution prepared by mixing 20.0 mL of 0.050 M HCl with 30.0 mL of 0.10 M $Ba(OH)_2$?
(A) 0.10 M   (B) 0.40 M
(C) 0.0050 M   (D) 0.12 M

75. Which has the maximum atomic radius?
(A) Al   (B) Si
(C) P   (D) Mg

76. Number of sp^2-sp^2 sigma bonds in the given compound is

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

77. Assertion: The dissociation constant of water at 60°C is 10^{-13}.
Reason: The pH of water is 6.5 and that it behaves as acid at 60ºC.
(A) Both statement I and statement II are true.
(B) Both statement I and statement II are false.
(C) Statement I is true but statement II is false.
(D) Statement I is false but statement II is true.

78. In which of the following $p\pi$-$d\pi$ bonding is observed?
(A) NO_3^- (B) SO_3^{2-}
(C) BO_3^{3-} (D) CO_3^{2-}

79. Which of the following statements are correct?
(I). A pair of positional isomers differs in the position of the same functional group.
(II). A pair of structural isomers have the same relative molar mass.
(III). A pair of functional group isomers belongs to different homologous series.
(A) II and III   (B) I and III
(C) I and II   (D) I, II and III

80. For the reactions, $C + O_2, CO_2; \rightarrow \Delta H - 393 \text{ J}$
$2Zn + O_2 \rightarrow 2ZnO; \Delta H = -412 \text{ J}$
(A) Carbon can oxidise Zn
(B) Oxidation of carbon is not feasible

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(C) Oxidation of Zn is not feasible

(D) Zn can oxidise carbon

81. In a regular octahedral molecule MX_6, the number of X-M-X bonds at 180° is

(A) 3   (B) 2

(C) 6   (D) 4

82. The reaction, $2A(g)+B(g) \rightleftharpoons 3C(g)+D(g)$ is begun with the concentration of A and B both at an initial value of 1.00 M. When equilibrium is reached, the concentration of D is measured and found to be 0.25 M. The value for the equilibrium constant for this reaction is given by the expression:

(A) $[(0.75)^3 \ (0.25)] \div [(1.00)^2 \ (1.00)]$

(B) $[(0.75)^3 \ (0.25)] \div [(0.50)^2 \ (0.75)]$

(C) $[(0.75)^3 \ (0.25)] \div [(0.50)^2 \ (0.25)]$

(D) $[(0.75)^3 \ (0.25)] \div [(0.75)^2 \ (0.25)]$

83. Among the following the pair in which the two species are not isostructural is

(A) SiF_4 and SF_4 (B) IO_3^- and XeO_3

(C) BH_4^+ and NH_4^+ (D) PF_6^- and SF_6

84. Based on the following reaction,

$$XeO_6^{4-}(aq) + 2F-(aq) + 6H^+(aq) \rightarrow XeO_3(g) + F_2(g)$$
$$+ 3H_2O(\ell)(\Delta G^o < 0)$$

It can be concluded that

(A) oxidising power of F^- is greater than that of XeO_6^{4-}

(B) it is not a redox reaction

(C) it is a disproportionation reaction

(D) oxidising power of Xe_6^{4-} is greater than that of F^-

85. The IUPAC name of

is

(A) 7-Ethyl-2,4,5,6-tetramethyldeca-1,8-diene

(B) 7-Ethyl-2,4,5,6-tetramethyldeca-1,7-diene

(C) 7-(1-Propenyl)-2,3,4,5-tetramethyl-non-1-ene

(D) 4-Ethyl-5,6,7,9-tetramethyldeca-2,9-diene

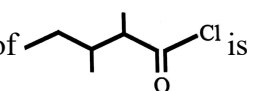## Chemistry Section - B
Attempt any 10 Questions

86. The compound which shows metamerism is :

(A) $C_4H_{10}O$ (B) C_5H_{12}

(C) C_3H_8O (D) C_3H_6O

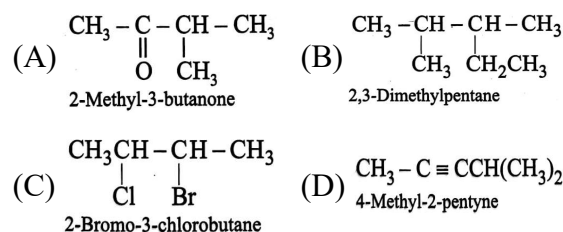87. The state of hybridization of C_2, C_3 C_5 and C_6 of the hydrocarbon,
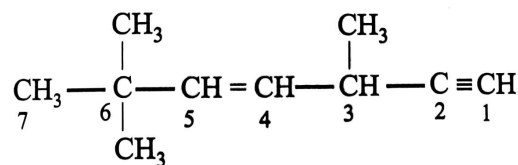
is in the following sequence:

(A) sp^3 sp^2, sp^2 and sp (B) sp, sp^2, sp^2 and sp^3

(C) sp, sp^2 sp^3 and sp^2 (D) sp, sp^3 sp^2 and sp^3

88. The molecular formula of diphenylmethane, How many structural isomers are possible when one of the hydrogens is replaced by a chlorine atom?

 is $C_{13}H_{12}$
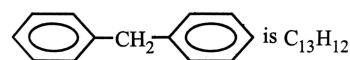
(A) 6   (B) 4

(C) 8   (D) 7

89. The IUPAC name of is

(A) 1-chloro-1-oxo - 2, 3-dimethyl pentane

(B) 2-ethyl-3-methylbutanoyl chloride

(C) 2, 3-dimethylpentanoyl chloride

(D) 3, 4-dimethyl pentanoyl chloride

90. Tautomerism will be exhibited by

(A) $(CH_3)_2NH$ (B) $(CH_3)_3CNO$

(C) R_3CNO_2 (D) RCH_2NO_2

91. The incorrect IUPAC name is

(A) 2-Methyl-3-butanone

(B) 2,3-Dimethylpentane

(C) 2-Bromo-3-chlorobutane

(D) 4-Methyl-2-pentyne

92. The number of possible isomers of the compound with molecular formula C_7H_8O is

(A) 3   (B) 5

(C) 7   (D) 9

93. are

(A) Resonating structures

(B) Tautomers

(C) Geometrical isomers

(D) Optical isomers

94. On balancing the given redox reaction,

$$aCr_2O_7^{2-} + bSO_3^{2-}(aq) + H^+(aq) \rightarrow$$

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$$2aCr^{3+}(aq) + bSO_4^{2-}(aq) + \frac{c}{2}H_2O(l)$$
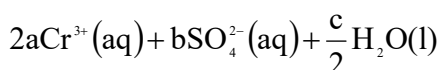
the coefficients a, b and c are found to be, respectively-
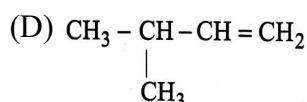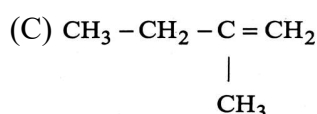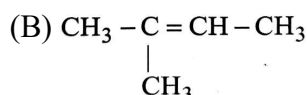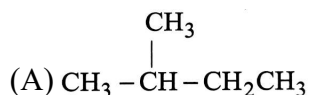(A) 1,3,8   (B) 3, 8, 1
(C) 1, 8, 3   (D) 8, 1, 3

95. 2-Methyl-2-butene will be represented as

(A) $CH_3 - \overset{\overset{\displaystyle CH_3}{|}}{CH} - CH_2CH_3$

(B) $CH_3 - \underset{\underset{\displaystyle CH_3}{|}}{C} = CH - CH_3$

(C) $CH_3 - CH_2 - \underset{\underset{\displaystyle CH_3}{|}}{C} = CH_2$

(D) $CH_3 - \underset{\underset{\displaystyle CH_3}{|}}{CH} - CH = CH_2$

96. The pH of the solution containing 50 mL each of 0.10 M sodium acetate and 0.01 M acetic acid is [Given pK_a of $CH_3COOH = 4.57$]
(A) 3.57   (B) 4.57
(C) 2.57   (D) 5.57

97. In which of the following ionisation processes the bond energy increases and the magnetic behaviour changes from paramagnetic to diamagnetic?
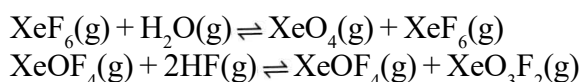(A) $N_2 \rightarrow N_2^+$ (B) $O_2 \rightarrow O_2^+$
(C) $C_2 \rightarrow C_2^+$ (D) $NO_2 \rightarrow NO_2^+$

98. Na^+, Mg^{2+}, Al^{3+} and Si^{4+} are isoelectronic. The order of their ionic size is
(A) $Na^+ > Mg^{2+} < Al^{3+} < Si^{4+}$
(B) $Na^+ < Mg^{2+} > Al^{3+} > Si^{4+}$
(C) $Na^+ > Mg^{2+} > Al^{3+} > Si^{4+}$
(D) $Na^+ < Mg^{2+} > Al^{3+} < Si^{4+}$

99. If K_1 and K_2 are the respective equilibrium constants for the two reactions
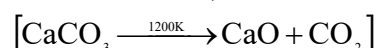$XeF_6(g) + H_2O(g) \rightleftharpoons XeO_4(g) + XeF_6(g)$
$XeOF_4(g) + 2HF(g) \rightleftharpoons XeOF_4(g) + XeO_3F_2(g)$
the equilibrium constant of the reaction
$XeO_4(g) + 2HF(g) \rightleftharpoons XeO_3F_2(g) + H_2O(g)$
will be
(A) $K_1/(K_2)^2$ (B) $K_1 \cdot K_2$
(C) K_1/K_2 (D) K_2/K_1
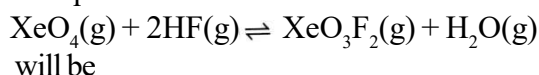
100. The right option for the mass of CO_2 produced by heating 20 g of 20% pure limestone is (Atomic mass of Ca = 40)
$$\left[CaCO_3 \xrightarrow{1200K} CaO + CO_2\right]$$
(A) 1.12 g   (B) 1.76 g
(C) 2.64 g   (D) 1.32 g

Zoology Section - A
Attempt all 35 Questions

101. What is meant by coordination?
(A) Only two organs interact
(B) Only three organs interact
(C) Only two organs systems interact
(D) Two or more organs interact

102. Which of the following functions is not performed by neurons?
(A) Detect the stimuli   (B) Receive the stimuli
(C) Transmit the stimuli   (D) Secrete the stimuli

103. Somatic neural system carries impulses from:
(A) Central nervous system to skeletal muscles
(B) Effectors to cranial nerves
(C) Effectors to central nervous system
(D) Cranial nerves to effectors

104. Afferent nerve fibres transmit impulses from:
(A) Tissues/Organs $\rightarrow$ CNS
(B) CNS $\rightarrow$ Peripheral tissues/Organs
(C) One reflex arc $\rightarrow$ Another reflex arc
(D) CNS $\rightarrow$ Sensory receptors

105. Sympathetic nervous system is a part of
(A) Visceral
(B) ANS
(C) Somatic Nervous System
(D) Spinal cord

106. ANS conveys impulses from CNS to all these except
(A) Smooth muscle   (B) Cardiac muscle
(C) Skeletal muscle   (D) Glands

107. Action potential of a nerve cell is created by
(A) Ca^{2+} (B) K^+
(C) Na^+ (D) Cl^-

108. Based on which of the following, the neurons are divided into three major types?
(A) Based on the size of neurons
(B) Based on the length of neurons
(C) Based on the number of axons and dendrites
(D) Based on the power of their division

109. Nerve transmission is
(A) Mechanical process
(B) Chemical process
(C) Biological process
(D) Physical process

110. Which of the following cells secrete a myelin sheath?

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(A) Schwann cells.　　(B) Satellite cells

(C) Microglial cells　　(D) Ependymal cells

111. Where are the myelinated neurons found?

(A) Only in the embryonic condition

(B) In spinal and cranial nerves

(C) Autonomous neural system

(D) Somatic neural system

112. The junction between pre-synaptic and post-synaptic neuron

(A) Synapse　　　　(B) Synapsis

(C) End plate　　　　(D) Fasciculus

113. Nerve impulse through a synapse is

(A) Unidirectional　　(B) Bidirectional

(C) Multidirectional　　(D) None of the above

114. Depolarisation of the nerve cell involves

(A) Influx of K^+

(B) Influx of Na^+

(C) Influx of Ca^{2+} and Cl^-

(D) Efflux of Ca^{2+} and Cl^-

115. Which of the following is not a feature of the chemical synapse?

(A) Slow　　　　　　(B) Common

(C) Neurotransmitters　(D) Multidirectional

116. A polarised neuron is the one that is:

(A) Conducting stimulus

(B) Having action potential

(C) At resting potential

(D) None of the above

117. In axon of a neuron, the impulse is generated by exchange of.

(A) Sodium and potassium

(B) Magnesium and chlorine

(C) Calcium and potassium

(D) Sodium and chlorine

118. Which one of the following is incorrect regarding bipolar neurons?

(A) Bipolar neurons are found in the retina of the eye.

(B) These neurons have only one axon and one dendrite.

(C) All motor neurons are of this types (i.e., bipolar).

(D) Bipolar neurons is one of three categories of neurons which are classified on the basis of number of processes.

119. During resting membrane potential, the axonal membrane is more permeable to:

(A) Ca^{2+}　　　　　　(B) Cl^-

(C) Na^+　　　　　　(D) K^+

120. In a nerve if sodium pump is blocked, which of the following is most likely to happen?

(A) Na^+ inside the nerve will increase

(B) Na^+ outside the nerve will increase

(C) Na^+ and K^+ will increase outside the cell

(D) K^+ inside the nerve will increase

121. Function of hypothalamus is/are

(A) Helpful in sleep

(B) Has centres for thirst and hunger

(C) Controls body temperature

(D) All of the above

122. White matter is composed primarily of

(A) Neuronal cell bodies

(B) Myelinated axons

(C) Ependymal cells

(D) Dendrites

123. The correct sequence of meninges from inner to outer side is

(A) Arachnoid membrane, dura mater, pia mater

(B) Dura mater, arachnoid membrane, pia mater

(C) Pia mater, arachnoid membrane, dura mater

(D) Dura mater, pia mater, arachnoid membrane

124. Midbrain contain

(A) Corpora quadrigemina

(B) Diencephalon

(D) None of above

(C) Cerebrum

125. Brain stem includes

(A) Medulla oblongata, pons varolii, and mid brain

(B) Medulla oblongata, pons varolii, mid brain and olfactory lobes

(C) Medulla oblongata, pons varolii and cerebellum

(D) Medulla oblongata, pons varolii and cerebrum.

126. What is true for corpus callosum?

(A) It connects forebrain and midbrain

(B) It is a strip of nerves from midbrain to medulla oblongata

(C) It is a strip of nerve fibres which connects two cerebral hemispheres

(D) It connects thalamus and hypothalamus

127. Main function of cerebellum is:

(A) Balancing　　　　(B) Sight

(C) Hearing　　　　　(D) Remembering

128. Amygdala and hippocampus are components of

(A) Hypothalamus　　(B) Medulla oblongata

(C) Midbrain　　　　(D) Limbic system

129. Like the cerebrum, a part of brain that has highly convoluted surface in order to provide additional space for a greater number of neurons is

(A) Medulla   (B) Thalamus
(C) Cerebellum   (D) Pons

130. Which of these is not true about the hypothalamus?
    (A) It contains neurosecretory cells
    (B) It regulates body temperature
    (C) It lies beside the thalamus
    (D) It controls hunger

131. Identify the organism X and select the characteristic which is not true for the given organism.

X
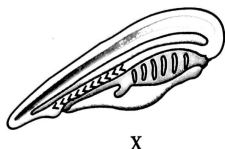
    (A) Possess dorsal hollow nerve cord
    (B) Heart is dorsal
    (C) Post anal tail is present
    (D) Pharynx perforated by gill slits

132. Identity the following animals and the classes to which they belong.
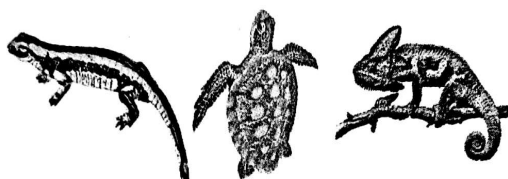
	A	B	C
(A)	*Salamandra*, Amphibia	*Chelone,* Reptilia	*Chameleon*, Reptilia
(B)	*Salamandra*, Reptilia	*Chelone,* Reptilia	*Chameleon*, Reptilia
(C)	*Salamandra*, Amphibia	*Chelone,* Amphibia	*Chameleon*, Amphibia
(D)	*Salamandra*, Urochordata	*Chelone,* Cephalochordata	*Chameleon*, Hemichordata

133. How many ova are laid by a female frog at a time?
    (A) 100-200   (B) 500-1000
    (C) 2500-3000   (D) 5000-6000

134. Frog is
    (A) Oviparous   (B) Ovoviviparous
    (C) Viviparous   (D) None

135. Respiratory organs of frog are:
    (A) Skin   (B) Lungs
    (C) Both (A) and (B)   (D) Flame cells

Zoology Section - B
Attempt any 10 Questions

136. Match the columns and find out the correct combination:

	Column-I		Column-II
(a)	Morphine	(i)	Toxin
(b)	GLUT-4	(ii)	Drug
(c)	Curcumin	(iii)	Alkaloid
(d)	Ricin	(iv)	Sensory receptor
		(v)	Glucose transport (Protein)

    (A) (a) - (iii) (b) - (v) (c) - (ii) (d) - (iv)
    (B) (a) - (iii) (b) - (v) (c) - (ii) (d) - (i)
    (C) (a) - (ii) (b) - (iii) (c) - (i) (d) - (iv)
    (D) (a) - (iii) (b) - (i) (c) - (ii) (d) - (iv)

137. Match the columns and find out the correct combination:

	Column-I (Protein)		Column-II (Function)
(a)	Insulin	(i)	Sensory reception
(b)	Collagen	(ii)	Hormone
(c)	Receptor	(iii)	Biocatalyst
(d)	Trypsin	(iv)	Enzyme
		(v)	Intercellular Ground substance

    (A) (a) - (ii) (b) - (v) (c) - (iii) (d) - (iv)
    (B) (a) - (ii) (b) - (iv) (c) - (i) (d) - (v)
    (C) (a) - (iii) (b) - (v) (c) - (i) (d) - (iv)
    (D) (a) - (ii) (b) - (v) (c) - ((A) (d) - (iv)

138. Match the columns and find out the correct combination:

	Column-I (Component)		Column-II (Types)
(a)	Amino acids	(i)	8
(b)	Nitrogen bases	(ii)	5
(c)	Purines	(iii)	3
(d)	Pyrimidines	(iv)	20
		(v)	2

    (A) (a) - (ii) (b) - (i) (c) - (iv) (d) - (v)
    (B) (a) - (ii) (b) - (iv) (c) - (i) (d) - (iii)
    (C) (a) - (iv) (b) - (ii) (c) - (v) (d) - (iii)
    (D) (a) - (iv) (b) - (ii) (c) - (i) (d) - (v)

139. Statement-I: Even during expiration, the gaseous exchange can take place in lungs, without interruption.
    Statement-II: Residual volume cannot be expelled out.
    (A) Both Statement-I and Statement-II are correct.

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(B) Both Statement-I and Statement-II are incorrect.

(C) Statement-I is correct & Statement-II is incorrect.

(D) Statement-I is incorrect & Statement-II is correct.

140. Statement-I: Same mechanisms of breathing are adopted by different organisms.

Statement-II: Mechanisms of breathing do not vary among organisms depending upon their habitats.

(A) Both Statement-I and Statement-II are correct.

(B) Both Statement-I and Statement-II are incorrect.

(C) Statement-I is correct & Statement-II is incorrect.

(D) Statement-I is incorrect & Statement-II is correct.

141. Statement-I: Larynx is called a drum box.

Statement-II: Larynx is a cartilaginous box which helps in sound production.

(A) Both Statement-I and Statement-II are correct.

(B) Both Statement-I and Statement-II are incorrect.

(C) Statement-I is correct & Statement-II is incorrect.

(D) Statement-I is incorrect & Statement-II is correct.

142. Incorrect statement is/are

(A) In amphibians, incomplete double circulation present.

(B) Human heart is a myogenic heart.

(C) Small mammals have lower energy needs.

(D) RBCs lack mitochondria.

143. Which of the following statements are incorrect?

(a) Closed circulatory system is present in arthropods and molluscs.

(b) Annelids and chordates also have a closed circulatory system.

(c) Fishes have a 2-chambered heart with an atrium and a ventricle.

(d) Crocodiles, birds and mammals possess a 4-chambered heart.

(A) (a), (b) and (c)   (B) (b), (c) and (d)

(C) Only (a)   (D) Only (d)

144. How many statements are incorrect?

(a) During diastole, auricles receives blood from ventricles.

(b) Openings between atria and ventricles are guarded by valves.

(c) Cardiac muscles are voluntary.

(d) Dub is associated with the closure of the tricuspid and bicuspid valves

(A) One   (B) Three

(C) Two   (D) Four

145. Haemodialysis is done in the condition when person is suffering from:

(A) Diabetes   (B) Uremia

(C) Anaemia   (D) Goitre

146. Presence of which substance in urine are indicative of diabetes mellitus?

(A) Protein and ketone bodies

(B) Glucose and amino acids

(C) RBC and proteins

(D) Glucose and ketone bodies

147. Dialysis fluid is formulated in such a way that

(A) It allows its use in homes rather than hospitals.

(B) It allows diffusion of molecules based on concentration gradient.

(C) It allows transport of blood back to the patient.

(D) It allows clotting of blood.

148. Match the following columns and select the correct option:

Column-I		Column-II	
A.	Gout	(i)	Decreased levels of estrogen
B.	Osteoporosis	(ii)	Low Ca^{++} ions in the blood
C.	Tetany	(iii)	Accumulation of uric acid crystals
D.	Muscular dystrophy	(iv)	Auto immune disorder
		(v)	Genetic disorder

(A) A-(iii), B-(i), C-(ii), D-(v)

(B) A-(iv), B-(v), C-(i), D-(ii)

(C) A-(i), B-(ii), C-(iii), D-(iv)

(D) A-(ii), B-(i), C-(iii), D-(iv)

149. Which of the following muscular disorder is inherited?

(A) Tetany   (B) Muscular dystrophy

(C) Myasthenia gravis   (D) Botulism

150. Calcium is important in skeletal muscle contraction because it:

(A) Binds to troponin to remove the masking of active sites on actin for myosin.

(B) Activates the myosin ATPase by binding to it.

(C) Detaches the myosin head from the actin filament.

(D) Prevents the formation of bonds between the myosin cross bridges and the actin filament.

Botany Section - A
Attempt all 35 Questions

151. Select the incorrect statement.
    (A) All living organisms on earth depend on sunlight for energy.
    (B) Photosynthesis is responsible for the release of oxygen into the atmosphere by green plants
    (C) The part of the leaf, enclosed in the test tube containing KOH soaked cotton tested positive for starch
    (D) Photosynthesis is synt hes is of organic compounds

152. C.van Niel demonstrated that hydrogen from a suitable oxidisable compound reduces CO_2 to carbohydrates in purple and green sulphur bacteria, still O_2 was not evolved because
    (A) O_2 is evolved by green parts of plants only
    (B) H_2O is the hydrogen donor in some bacteria only
    (C) H_2S is hydrogen donor for purple & green sulphur bacteria
    (D) Sulphur or Sulphate is used as e- donor

153. The universal pigment also found in reaction center P_{700} appears _____ in the chromatogram
    (A) Blue green   (B) Yellow
    (C) Yellow orange   (D) Green

154. Read the following statements and select the correct option.
    Statement A: Chlorophyll b absorbs light and transfer the energy to chlorophyll a
    Statement B: Xanthophyll and carotenoids protect chlorophyll a from photo-oxidation
    (A) Only statement A is correct
    (B) Only statement B is correct
    (C) Both statements A & B are correct
    (D) Both statements A & B are incorrect

155. Photochemical phase of photosynthesis includes all, except
    (A) Water splitting
    (B) Light absorption
    (C) ATP & NADPH consumption
    (D) Oxygen release

156. Select the incorrect statement
    (A) Transfer of electrons from PS II to primary acceptor is uphill
    (B) Excitement of electron from PS I occurs once it receives the electron from PS II in Z scheme
    (C) PS II receives the electron by splitting of water
    (D) Movement of electrons in electron transport chain is downhill

157. Cyclic flow of electrons
    (A) Happens in the grana lamellae
    (B) Occurs in stroma lamellae
    (C) Occurs in both grana and stroma lamellae
    (D) Involves both reaction centers P_{680} and P_{700}

158. Stroma lamellae lack all, except
    (A) NADP reductase enzyme
    (B) Photosystem II
    (C) Water splitting complex
    (D) Chlorophyll pigment

159. The proton gradient is broken down due to movement of protons across the membrane to the stroma. This movement is
    (A) Simple diffusion
    (B) Facilitated diffusion
    (C) Uphill transport
    (D) Active transport

160. Mark true (T) or false (F) for the following statements.
    A. Immediately after light becomes unavailable, the biosynthetic process continues for some time.
    B. Dark reaction depends on product of the light reaction

	A	B
(A)	T	F
(B)	F	T
(C)	T	T
(D)	F	F

161. RuBP, a 5 carbon Ketose sugar is found in
    (A) Only C_3 plants   (B) Only C_4 plants
    (C) Only xerophytes   (D) All green plants

162. Select the incorrect statement about carboxylation step of calvin cycle
    (A) It is most crucial step of calvin cycle
    (B) It leads to formation of a 3 C compound
    (C) Catalysed by RuBP oxygenase
    (D) CO_2 is fixed into a stable organic intermediate

163. In which of the following cells of C4 plants, molecule of glucose from six molecules of CO_2 are synthesized?
    (A) Mesophyll cells
    (B) Bundle sheath cells
    (C) Root epidermal cells

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(D) Both (B) & (C)

164. The bundle sheath cells have all, except
   (A) Large number of chloroplast
   (B) Thick walls
   (C) PEP case
   (D) No intercellular spaces

165. Kranz anatomy is seen in
   (A) Maize   (B) Wheat
   (C) Pea   (D) Rice

166. Select the incorrect statement.
   (A) C_4 plants show tolerance to higher temperatures
   (B) Productivity and yields are better in C_4 plants than C_3 plants
   (C) C_4 plants have two different types of cells for CO_2 fixation
   (D) Photorespiration is present at high light intensity in C_4 plants

167. Select the incorrect statement.
   (A) The dark reactions are temperature controlled
   (B) There is linear relationship between incident light and CO_2 fixation rates at high light intensity
   (C) Water stress reduces CO_2 availability
   (D) CO_2 is major limiting factor for photosynthesis

168. In the famous experiment of T.W. Engelmann what would most likely happen if we place Cladophora in a suspension of *Clostriduim botulinum*?
   (A) The action spectrum of photosynthesis did not resemble with absorption spectra of chl a and b
   (B) The action spectra of photosynthesis won't be deduced
   (C) *Clostridium* being poisonous would kill the *Cladophora* immediately
   (D) *Cladophora* will competitively eliminate the *Clostridium*

169. Choose the incorrect match
   (A) *Chlorobium*   - H_2S is H^+ donor
   (B) *Rhodospirillum* - H_2O is H^+ donor
   (C) Chlorophyll a   - Blue green pigment
   (D) Carotenoids   - Yellow orange pigment

170. First stable product of Calvin cycle
   a. Contains 3 carbons
   b. Is an organic acid
   c. Is produced by carboxylation of a 2C compound

Select the correct statements?
   (A) a only   (D) b only
   (C) a & b only   (D) All a, b & c

171. Mark these statements as true (T) or false (F) and select the correct option
   A - Primary acceptor of e^- from PS-II removes proton from stroma while transporting an electron.
   B - NADP reductase is located towards stroma side of membrane.
   C - In chloroplast, highest number of protons are found in stroma during chemiosmosis.
   (A) A(F), B(F), C(T)   (B) A(T), B(T), C(F)
   (C) A(F), B(T), C(F)   (D) A(F), B(F), C(F)

172. Which of the given option does differentiate correctlybetween C_3 and C_4 pathway?
   (A) Primary CO_2 acceptor   - C_3 (5C ketose sugar) / C_4 (4C organic acid)
   (B) Site of Calvin cycle   - C_4 (Mesophyll) / C_3 (Bundle sheath)
   (C) Site of RuBisCO   - C_3 (Mesophyll) / C_4 (Bundle sheath)
   (D) Total number of ATP used to fix 6 CO_2 - C_3 (12) / C_4 (18)

173. Continuous supply of electrons to PS-II is maintained by
   (A) Photons   (B) Water
   (C) Light energy   (D) $NADPH_2$

174. How many of the given features are true for bundle sheath cells?
   a. Large cells
   b. Arranged only in a single layer only around vascular bundles
   c. No intercellular spaces
   d. Seen in maize, potato and wheat
   e. Have large number of chloroplast
   (A) 5   (B) 4   (C) 2   (D) 3

175. Select the correct one for photorespiration
   (A) Due to CO_2 concentrating mechanism C_4 plants show low level of photorespiration.
   (B) There is neither synthesis of ATP nor NADH
   (C) During photorespiration oxygen is consumed in stroma of chloroplast
   (D) In first step RuBP oxidise to form a triose sugar and a 3PGA

176. Cyclic photophosphorylation does not involve
   (A) ATP synthesis   (B) NADP reductase
   (C) P700   (D) Reaction centre

177. A - Tropical plants have higher temperature optimum than plants adapted to temperate climate.
B - In tomatoes and bell pepper at high light intensity saturation occurs at 360 mlL^{-1}.
(A) Only A is true
(B) Only B is true
(C) Both A & B are true
(D) Both A & B are false

178. A described first action spectrum of photosynthesis by using B
Choose the correct option to fill in the blanks A and B
           A   B
(A) Joseph Priestley   *Hydrilla*
(B) Julius von Sachs   *Hydrilla*
(C) T.W. Engelmann   *Cladophora*
(D) Cornelius van Niel   *Cladophora*

179. Photosystem I differs from photosystem II
(A) As the former liberates O$_2$
(B) In being present on stroma lamellae
(C) In having reaction centre
(D) In synthesizing ATP

180. Select the true statement about light reaction
(A) Related to synthesis of reducing power
(B) There is conversion of CO$_2$ to carbohydrates
(C) Deals with oxidative phosphorylation
(D) Directly associated with synthesis of sugars

181. In all of the given phases, each chromosomes have two chromatids, except
(A) Metaphase I   (B) Anaphase I
(C) Metaphase II   (D) Anaphase II

182. Choose the process which does not occur in G$_1$ phase
(A) Protein synthesis
(B) Cell organelle duplication
(C) DNA replication
(D) ATP synthesis

183. The extrachromosomal DNA found in a prokaryotic cell is its
(A) Linear DNA   (B) Genome
(C) Plasmid   (D) Polysome

184. The layer of bacterial cell envelope which contains peptidoglycan, helps
(a) Bacterium to hide from host's immune system.
(b) Bacterium to maintain its shape.
(c) In adhesion of the bacterial cell.
(A) Only (a)   (B) Only (b)

(C) Only (c)   (D) Both (b) and (c)

185. Plasma membrane is composed of
(a) Phospholipid bilayer.
(b) Protein bilayer.
(c) Carbohydrate embeded in protein bilayer.
(d Phospholipids, cholesterol and phosphoglycerides.
(A) (a) and (b)   (B) (b) and (d)
(C) (a) and (d)   (D) (a) and (c)

Botany Section - B
Attempt any 10 Questions

186. The interphase nucleus has highly extended nucle-oprotein fibres called
(A) Chromatid   (B) Chromosome
(C) Chromatin   (D) Satellite

187. All of the following features are true for lipids of plasma membrane, except
(A) Tails are hydrophobic
(B) Polar heads are towards the inner sides
(C) May consist of phosphoglycerides
(D) Major lipids are phospholipids

188. Mark the following statements as true (T) or false (F) and select the correct option
A. Outer mitochondrial membrane is more permeable than inner one.
B. Inner membrane of mitochondria contains ATP synthase enzyme.
C. Mitochondrial matrix contains enzymes of Krebs cycle and 80S ribosomes.
      A   B   C
(A)   T   T   T
(B)   T   F   F
(C)   T   T   F
(D)   F   T   F

189. Both matrix of mitochondria and stroma of chloro-plast contains
(A) Linear dsDNA
(B) Enzymes of glucose synthesis
(C) Protein synthesis machinery
(D) Enzymes of TCA cycle

190. Select the wrongly matched pair
(A) Plasma membrane – Selectively permeable
(B) Algal cell wall – Contain cellulose, galactans and manans
(C) Primary cell wall – Thin, elastic and incapable of extension
(D) Middle lamella–Amorphous cementing layer

191. A tetrad is related with all, except

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(A) Seen is pachytene

(B) A bivalent appear as tetrad

(C) Contains 4 sister chromatids

(D) Not seen in meiosis II

192. In plant cells, cytokinesis
    (A) Occur by furrow formation
    (B) Occur by a cell plate
    (C) Occurs before karyokinesis
    (D) Both (A) and (C)

193. Match the columns and select the correct option

    Column I   Column II

    (i) Bivalent formation   (a) Pachytene

    (ii) Chiasmata formation   (b) Zygotene

    (iii) Recombinase activity   (c) Diplotene

         (i)   (ii)   (iii)

    (A)   (a)   (c)   (b)

    (B)   (b)   (c)   (a)

    (C)   (a)   (b)   (c)

    (D)   (c)   (b)   (a)

194. Identify the wrongly matched pair
    (A) Pili – Help in motility of bacterial cell
    (B) Polyribosome – mRNA+ many ribosomes
    (C) Gas vacuole – Found in blue green algae
    (D) *Mycoplasma* – Smallest cell

195. Synaptonemal complex forms during A stage whereas it dissolves during B stage. Complete the above statement by choosing correct option for A and B.

         A   **B**

    (A) Pachytene   Diakinesis

    (B) Diplotene   Zygotene

    (C) Pachytene   Zygotene

    (D) Zygotene   Diplotene

196. Find out the False statement from below ones
    I.   Calyx and corolla are reproductive organs of a flower.
    II.   Zygomorphic flower can be divided into two equal radial halves in any radial plane.
    III.   Flowers without bracts are termed as bracteate.
    IV.   Parthenocarpic fruit is formed after fertilization of the ovary.
    V.   In legumes seed is non-endospermic.
    VI.   Ovary is inferior in Fabaceae.
    VII.   A fertile stamen is called staminode.
    VIII.   Radical buds develop on roots.
    (A) I, II, III, IV, VI,   (B) I, II, V, VIII
    (C) III, IV, VIII   (D) IV, V, VIII

197. The stomatal apparatus includes

(A) Only stomatal aperture

(B) Stomatal aperture and guard cells

(C) Only guard cells

(D) Stomata! aperture, guard cells and surrounding subsidiary cells

198. Which of the following statements is incorrect?
    (A) Viruses are obligate parasites
    (B) Infective constituent in viruses is the protein coat
    (C) Prions consist of abnormally folded proteins
    (D) Viroids lack a protein coat

199. Given below are two statements : One labelled as Assertion A and the other labelled as Reason R :

    Assertion A : In gymnosperms the pollen grains are released from the microsporangium and carried by air currents.

    Reason R : Air currents carry the pollen grains to the mouth of the archegonia where the male gametes are discharged and pollen tube is not formed.

    (A) Both (A) and (R) are true and (R) is not the correct explanation of (A)
    (B) (A) is true but (R) is false
    (C) (A) is false but (R) is true
    (D) Both (A) and (R) are true and (R) is the correct explanation of (A).

200. Match the plant with the kind of life cycle it exhibits :

    List-I   List-II

    (A) *Spirogyr*   (i) Dominant diploid sporophyte vascular plant, with highly reduced male or female gametophyte

    (B) Fern   (ii) Dominant haploid free-living gametophyte

    (C) *Funaria*   (iii) Dominant diploid sporophyte alternating with reduced gametophyte called prothallus

    (D) *Cycas*   (iv) Dominant haploid leafy gametophyte alternating with partially dependent multicellular sporophyte

    Choose the correct Vånswer from the options given below:

    (A) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
    (B) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
    (C) (A)-(ii), (B)-(iv), (C)-(i), (D)-(iii)
    (D) (A)-(iv), (B)-(i), (C)-(ii), (D)-(iii)

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