



NEET TEST -13 (2023 - 25)

Time: 200 Minutes.

Date: 08-01-2023

Max. Marks: 720

GENERAL INSTRUCTIONS

- Topic:-** Physics - Kinematics- Motion in one Dimension, Motion in Plane, NLM With Friction, Circular Motion, WPE, COM, Linear Momentum & Collision, Rotational motion, Gravitation, properties of solid.
- Chemistry** - Some basic concepts of chemistry Structure of atom Periodicity Chemical bonding Chemical Equilibrium, Ionic Equilibrium, Redox Reaction, Organic Chemistry (Nomenclature of organic compounds)
- Zoology** - Animal Kingdom, Frog Biomolecules, Breathing and Exchange of gases, Body fluids and Circulation Excretory Products and their Elimination, Locomotion and Movement (complete chapter)
- Botany** - 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, Photosynthesis

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/markings 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.

Signature of the Candidate

Signature of the Invigilator

Physics Section- A
Attempt all 35 Questions

1. A football player is moving southward and suddenly turns eastward with the same speed to avoid an opponent. The force that acts on the player while turning is
(A) Along eastward (B) Along northward
(C) Along north-east (D) Along south-west
2. 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 of:
(A) 2 : 1 (B) 4 : 1 (C) 1 : 1 (D) 1 : 2
3. In a gravitational field, the gravitational potential is given by, $V = -\frac{K}{x}$ (J/kg) The gravitational field intensity at point (2, 0, 3)m is:
(A) $+\frac{K}{4}$ (B) $+\frac{K}{2}$
(C) $-\frac{K}{2}$ (D) $-\frac{K}{4}$
4. A ball of mass 0.15 kg is dropped from a height 10 m, strikes the ground and rebounds to the same height. The magnitude of impulse imparted to the ball is ($g = 10 \text{ m/s}^2$) nearly
(A) 1.4 kg m/s (B) 0 kg m/s
(C) 4.2 kg m/s (D) 2.1 kg m/s
5. Two spheres of masses m and M are situated in air and the gravitational force between them is F . The space around the masses is now filled with a liquid of specific gravity 3. The gravitational force will now be
(A) $\frac{F}{9}$ (B) $3F$ (C) F (D) 0
6. 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 $\frac{1}{l}$ (B) Δl versus l^2
(C) Δl versus $\frac{1}{l^2}$ (D) Δl versus l
7. The height at which the weight of a body becomes 1/16th, its weight on the surface of earth (radius R), is:
(A) 5R (B) 15R
(C) 3R (D) 4R
8. Two wires are made of the same material and have the same volume. The first wire has cross-sectional area A and the second wire has cross-sectional area 3A. If the length of the first wire is increased by Δl on applying a force F, how much force is needed to stretch the second wire by the same amount?
(A) 9F (B) 6F
(C) F (D) 4F
9. A ring of mass m and radius r rotates about an axis passing through its centre and perpendicular to its plane with angular velocity ω . Its kinetic energy is
(A) $\frac{1}{2}mr^2\omega^2$ (B) $mr^2\omega^2$
(C) $mr\omega^2$ (D) $\frac{1}{2}mr\omega^2$
10. A roller coaster is designed such that riders experience "weightlessness" as they go round the top of a hill whose radius of curvature is 20 m. The speed of the car at the top of the hill is between:
(A) 14 m/s and 15 m/s (B) 15 m/s and 16 m/s
(C) 16 m/s and 17 m/s (D) 13 m/s and 14 m/s
11. The stress-strain curves are drawn for two different materials X and Y. It is observed that the ultimate strength point and the fracture point are close to each other for material X but are far apart for material Y. We can say that materials X and Y are likely to be (respectively)
(A) Plastic and ductile (B) Ductile and brittle
(C) Brittle and ductile (D) Brittle and plastic
12. Two bodies of mass m and $9m$ are placed at a distance R. The gravitational potential on the line joining the bodies where the gravitational field equals zero, will be ($G =$ gravitational constant)
(A) $-\frac{8Gm}{R}$ (B) $-\frac{12Gm}{R}$
(C) $-\frac{16Gm}{R}$ (D) $-\frac{20Gm}{R}$

13. A bullet from a gun is fired on a rectangular wooden block with velocity u . When bullet travels 24 cm through the block along its length horizontally, velocity of bullet becomes $u/3$. Then it further penetrates into the block in the same direction before coming to rest exactly at the other end of the block. The total length of the block is

- (A) 27 cm (B) 24 cm
(C) 28 cm (D) 30 cm

14. Which one of the following statements is incorrect?

- (A) Rolling friction is smaller than sliding friction.
(B) Limiting value of static friction is directly proportional to normal reaction.
(C) Coefficient of sliding friction has dimensions of length.
(D) Frictional force opposes the relative motion.

15. 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

16. 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 ($g = 10 \text{ ms}^{-2}$).

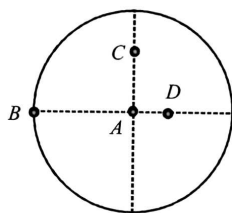
- (A) 1.2 ms^{-2} (B) 1.5 ms^{-2}
(C) 150 ms^{-2} (D) 50 ms^{-2}

17. What will be the formula of the mass in terms of g , R and G ($R =$ radius of earth)

- (A) $g^2 \frac{R}{G}$ (B) $G \frac{R^2}{g}$

- (C) $G \frac{R}{g}$ (D) $g \frac{R^2}{G}$

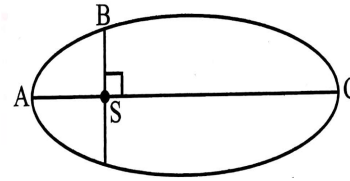
18. The moment of inertia of a uniform circular disc is maximum about an axis perpendicular to the disc and passing through:



- (A) A (B) D (C) B (D) C

19. The kinetic energies of a planet in an elliptical

orbit about the Sun, at positions A, B and C are K_A , K_B and K_C , respectively. AC is the major axis and SB is perpendicular to AC at the position of the Sun S as shown in the figure. Then



- (A) $K_A > K_B < K_C$ (B) $K_A > K_B > K_C$
(C) $K_B > K_A > K_C$ (D) $K_B < K_A < K_C$

20. A point mass ' m ' is moved in a vertical circle of radius ' r ' with the help of a string. The velocity of the mass $\sqrt{7gr}$ at the lowest point. The tension in the string at the lowest point is

- (A) 1 mg (B) 6 mg
(C) 7 mg (D) 8 mg

21. 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

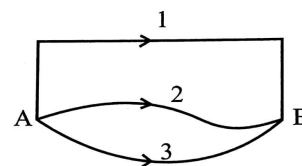
- (A) $2U$ (B) $4U$ (C) $8U$ (D) $16U$

22. Which of the following statements are correct?
(A) Centre of mass of a body always coincides with the centre of gravity of the body
(B) Centre of mass of a body is the point at which the total gravitational torque on the body is zero

- (C) A couple on a body produce both translational and rotation motion in a body
(D) Mechanical advantage greater than one means that small effort can be used to lift a large load

- (A) (A) and (B) (B) (B) and (C)
(C) (C) and (D) (D) (B) and (D)

23. A gravitational field is present in a region and a mass is shifted from A to B through different paths as shown. If W_1 , W_2 and W_3 represent the work done by the gravitational force along the respective paths, then:



- (A) $W_1 < W_2 < W_3$ (B) $W_1 = W_2 = W_3$
(C) $W_1 < W_2 > W_3$ (D) $W_1 > W_2 > W_3$

24. At what height above the surface of earth the

value of "g" decreases by 2%?

[radius of the earth is 6400 km]

- (A) 32 km (B) 64 km
(C) 128 km (D) 1600 km

25. A disc of radius 2 m and mass 100 kg rolls on a horizontal floor. Its centre of mass has speed of 20 cm/s. How much work is needed to stop it?

- (A) 3 J (B) 30 kJ
(C) 2J (D) 1J

26. Two objects of mass 10 kg and 20 kg respectively are connected to the two ends of a rigid rod of length 10 m with negligible mass.

The distance of the center of mass of the system from the 10 kg mass is:

- (A) $\frac{20}{3}m$ (B) 10 m
(C) 5m (D) $\frac{10}{3}m$

27. Two astronauts are floating in gravitation free space after having lost contact with their spaceship. The two will

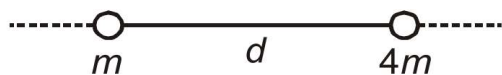
- (A) move towards each other
(B) move away from each other
(C) become stationary
(D) keep floating at the same distance between them

28. Consider a drop of rain water having mass 1 g falling from a height of 1 km. It hits the ground with a speed of 50 m/s. Take 'g' constant with a value 10 m/s². The work done by the

- (i) gravitational force and the
(ii) resistive force of air is

- (A) (i) 1.25 J (ii) -8.25 J
(B) (i) 100 J (ii) 8.75 J
(C) (i) 10 J (ii) -8.75 J
(D) (i) -10 J (ii) -8.25 J

29. Two point masses m and 4m are separated by a distance d on a line. A third point mass m₀ is to be placed at a point on the line such that the net gravitational force on it is zero.

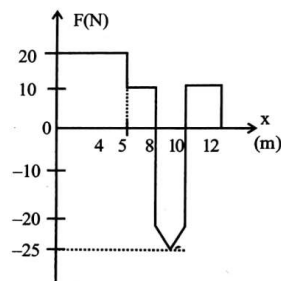


The distance of that point from the m mass is

- (A) $\frac{d}{2}$ (B) $\frac{d}{4}$
(C) $\frac{d}{3}$ (D) $\frac{d}{5}$

30. An object of mass 500 g, initially at rest, is acted

upon by a variable force whose X-component varies with X in the manner shown. The velocities of the object at the points X=8 m and X=12 m would have the respective values of (nearly)



- (A) 18 m/s and 20.6 m/s
(B) 18 m/s and 24.4 m/s
(C) 23 m/s and 24.4 m/s
(D) 23 m/s and 20.6 m/s

31. In a satellite if the time of revolution is T, then PE is proportional to

- (A) T^{1/3} (B) T³ (C) T^{-2/3} (D) T^{-4/3}

32. If $\vec{F} = 2\hat{i} + \hat{j} - \hat{k}$ and $\vec{r} = 3\hat{i} + 2\hat{j} - 2\hat{k}$ then the scalar and vector products of \vec{F} and \vec{r} have the magnitudes respectively as :

- (A) 10, 2 (B) 5, $\sqrt{3}$
(C) 4, $\sqrt{5}$ (D) 10, $\sqrt{2}$

33. The minimum and maximum distances of a planet revolving around sun are r and R. If the minimum speed of planet on its trajectory is v₀, its maximum speed will be

- (A) $\frac{v_0 R}{r}$ (B) $\frac{v_0 r}{R}$
(C) $\frac{v_0 r^2}{R}$ (D) $\frac{v_0 R^2}{r}$

34. 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.

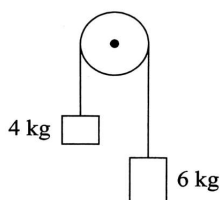
Reason (R) : Explosion of cracker (rocket) occurs due to internal forces only and no external force acts for this explosion. In the light of the above statements, choose the most

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
35. If the velocity of a particle is $v = At + Bt^2$, where A and B are constants, then the distance travelled by it between 1s and 2s is:
- (A) $\frac{3}{2}A + \frac{7}{3}B$ (B) $\frac{3}{2}A + 4B$
 (C) $3A + 4B$ (D) $\frac{3}{2}A + \frac{4}{3}B$

Physics Section - B
Attempt any 10 Questions

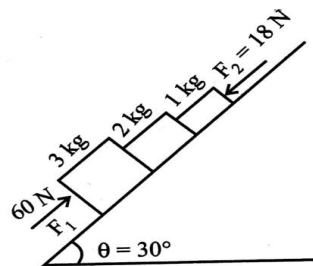
36. The following four wires are made of the same material. Which of these will have the largest extension when the same tension is applied ?
 (A) Length = 50 cm, diameter = 0.5 mm
 (B) Length = 200 cm, diameter = 2mm
 (C) Length = 300 cm, diameter = 3mm
 (D) Length 100 cm, diameter = 1 mm
37. A body weighs 72 N on the surface of the earth. What is the gravitational force on it, at a height equal to half the radius of the earth?
 (A) 32 N (B) 30 N (C) 24 N (D) 48 N
38. Two bodies of mass 4 kg and 6 kg are tied to the ends of a massless string. The string passes over a pulley which is frictionless (see figure). The acceleration of the system in terms of acceleration due to gravity (g) is:



- (A) $g/2$ (B) $g/5$ (C) $g/10$ (D) g
39. A shell is fired from a cannon, it explodes in mid air, its total
 (A) momentum increases
 (B) momentum decreases
 (C) K.E. increases
 (D) K.E. decreases
40. The speed of a homogenous solid sphere after

rolling down an inclined plane of vertical height h from rest without sliding is

- (A) $\sqrt{\frac{10}{7}gh}$ (B) \sqrt{gh}
 (C) $\sqrt{\frac{6}{5}gh}$ (D) $\sqrt{\frac{4}{3}gh}$
41. The work done to raise a mass m from the surface of the earth to a height h, which is equal to the radius of the earth, is:
 (A) mgR (B) $2mgR$
 (C) $\frac{1}{2}mgR$ (D) $\frac{3}{2}mgR$
42. 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) $S/2Y$
43. In the diagram shown, the normal reaction force between 2 kg and 1 kg is (Consider the surface, to be smooth) : Given $g = 10ms^{-2}$



- (A) 10N (B) 25N (C) 39N (D) 6N
44. A spherical ball rolls on a table without slipping. Then the fraction of its total energy associated with rotation is
 (A) $2/5$ (B) $2/7$ (C) $3/5$ (D) $3/7$
45. The bulk modulus of a spherical object is 'B'. If it is subjected to uniform pressure 'p', the fractional decrease in radius is
 (A) $\frac{B}{3p}$ (B) $\frac{3p}{B}$
 (C) $\frac{p}{3B}$ (D) $\frac{p}{B}$
46. A body of mass 60 g experiences a gravitational force of 3.0 N, when placed at a particular point. The magnitude of the gravitational field intensity at that point is:
 (A) 50 N/kg (B) 20 N/kg
 (C) 180 N/kg (D) 0.05 N/kg
47. When a block of mass M is suspended by a

- long wire of length L , the length of the wire becomes $(L+l)$. The elastic potential energy stored in the extended wire is:
- (A) Mgl (B) MgL
(C) $\frac{1}{2}Mgl$ (D) $-Mgl$
48. The escape velocity from the Earth's surface is v . The escape velocity from the surface of another planet having a radius, four times that of Earth and same mass density is
(A) $4v$ (B) v (C) $2v$ (D) $3v$
49. A metal ball of mass 2 kg moving with a velocity of 36 km/h has a head on collision with a stationary ball of mass 3 kg. If after the collision, the two balls move together, the loss in kinetic energy due to collision is
(A) 140 J (B) 100 J
(C) 60 J (D) 40 J
50. The potential energy of a satellite, having mass m and rotating at a height of 6.4×10^6 m from the earth surface, is
(A) $-mgR_e$ (B) $-0.67 mgR_e$
(C) $-0.5 mgR_e$ (D) $-0.33 mgR_e$

Chemistry Section - A

Attempt all 35 Questions

51. From the following pairs of ions which one is not an iso-electronic pair?
(A) Fe^{2+} , Mn^{2+} (B) O^{2-} , F^-
(C) Na^+ , Mg^{2+} (D) Mn^{2+} , Fe^{3+}
52. Identify the incorrect match.
Name IUPAC Official Name
(A) Unnilium (i) Mendeleevium
(B) Unniltrium (ii) Lawrencium
(C) Unnilhexium (iii) Seaborgium
(D) Unununium (iv) Darmstadtium
(A) (A), (i) (B) (B), (ii)
(C) (C), (iii) (D) (D), (iv)
53. Among the following, which compound will show the highest lattice energy?
(A) KF (B) NaF
(C) CsF (D) RbF
54. $3O_{2(g)} \rightleftharpoons 2O_{3(g)}$ For the above reaction at 298 K, K_c is found to be 3.0×10^{-59} . If the concentration of O_2 at equilibrium is 0.040 M then concentration of O_3 in M is
(A) 4.38×10^{-32} (B) 1.9×10^{-63}
(C) 2.4×10^{31} (D) 1.2×10^{21}
55. Which of the following is redox reaction?

- (A) Evaporation of H_2O
(B) Both oxidation and reduction
(C) H_2SO_4 with NaOH
(D) In atmosphere O_3 from O_2 by lightning
56. The number of sigma (σ) and (π) bonds in pent-2-en-4-yne is
(A) 13 σ bonds and no π bond
(B) 10 σ bonds and 3 π bonds
(C) 8 σ bonds and 5 π bonds
(D) 11 σ bonds and 2 π n bonds.
57. The number of protons, neutrons and electrons in $^{175}_{71}Lu$, respectively, are
(A) 71, 104 and 71 (B) 104, 71 and 71
(C) 71, 71 and 104 (D) 175, 104 and 71
58. The element $Z=114$ has been discovered recently. It will belong to which of the following family/group and electronic configuration?
(A) Carbon family, $[Rn] 5f^{14}6d^{10} 7s^2 7p^2$
(B) Oxygen family, $[Rn] 5f^{14}6d^{10} 7s^2 7p^4$
(C) Nitrogen family, $[Rn] 5f^{14}6d^{10} 7s^2 7p^6$
(D) Halogen family, $[Rn] 5f^{14}6d^{10} 7s^2 7p^5$
59. Amongst the following which one will have maximum lone pair-lone pair electron repulsions?
(A) ClF_3 (B) IF_5
(C) SF_4 (D) XeF_2
60. If the equilibrium constant for $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$ is K , the equilibrium constant for $\frac{1}{2}N_{2(g)} + \frac{1}{2}O_{2(g)} \rightleftharpoons NO_{(g)}$ will be
(A) $\frac{1}{2}K$ (B) K
(C) K^2 (D) $K^{1/2}$
61. Without losing its concentration, $ZnCl_2$ solution cannot be kept in contact with
(A) Pb (B) Al
(C) Au (D) Ag
62. The state of hybridisation of C_2 , C_3 , C_5 , and C_6 of the hydrocarbon,
$$\begin{array}{ccccccc} & & CH_3 & & CH_3 & & \\ & & | & & | & & \\ CH_3 & - & C & - & CH & = & CH & - & CH & - & C \equiv & CH \\ & & | & & | & & | & & | & & | & \\ & & CH_3 & & & & & & & & & \end{array}$$

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
63. A particular station of All India Radio, New

- Delhi, broadcasts on a frequency of 1,368 kHz (kilohertz). The wavelength of the electromagnetic radiation emitted by the transmitter is [speed of light, $c = 3.0 \times 10^8 \text{ms}^{-1}$]
- (A) 21.92 cm (B) 219.3 m
(C) 219.2 m (D) 2192 m
64. For the second period elements the correct increasing order of first ionization enthalpy is
(A) $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{O} < \text{N} < \text{F} < \text{Ne}$
(B) $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{N} < \text{O} < \text{F} < \text{Ne}$
(C) $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{O} < \text{N} < \text{F} < \text{Ne}$
(D) $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{N} < \text{O} < \text{F} < \text{Ne}$
65. Match List-I with List-II
- | | |
|--------------------|---------------------------|
| List-I | List-II |
| (A) PCl_5 | (i) Square pyramidal |
| (B) SF_6 | (ii) Trigonal planar |
| (C) BrF_5 | (iii) Octahedral |
| (D) BF_3 | (iv) Trigonal bipyramidal |
- Choose the correct answer from the options given below.
- (A) (A) - (iv), (B) - (iii), (C) - (ii), (D) - (i)
(B) (A) - (iv), (B) - (iii), (C) - (i), (D) - (ii)
(C) (A) - (ii), (B) - (iii), (C) - (iv), (D) - (i)
(D) (A) - (iii), (B) - (i), (C) - (iv), (D) - (ii)
66. In which of the following equilibrium K_c and K_p are not equal?
- (A) $2\text{NO}_{(g)} \rightleftharpoons \text{N}_{2(g)} + \text{O}_{2(g)}$
(B) $\text{SO}_{2(g)} + \text{NO}_{2(g)} \rightleftharpoons \text{SO}_{3(g)} + \text{NO}_{(g)}$
(C) $\text{H}_{2(g)} + \text{I}_{2(g)} \rightleftharpoons 2\text{HI}_{(g)}$
(D) $2\text{C}_{(s)} + \text{O}_{2(g)} \rightleftharpoons 2\text{CO}_{2(g)}$
67. Which of the following reactions are disproportionation reactions?
- (i) $2\text{Cu}^+ \rightarrow \text{Cu}^{2+} + \text{Cu}^0$
(ii) $3\text{MnO}_4^{2-} + 4\text{H}^+ \rightarrow 2\text{MnO}_4^- + \text{MnO}_2 + 2\text{H}_2\text{O}$
(iii) $2\text{KMnO}_4 \xrightarrow{\Delta} \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$
(iv) $2\text{KMnO}_4 + 3\text{Mn}^{2+} + 2\text{H}_2\text{O} \rightarrow 5\text{MnO}_2 + 4\text{H}^+$
- Select the correct option from the following.
- (A) (i) and (iv) only
(B) (i) and (ii) only
(C) (i), (ii) and (iii) only
(D) (i), (iii) and (iv) only
68. The Cl-C-Cl angle in 1, 1, 2, 2-tetrachloroethene and tetrachloromethane respectively will be about
(A) 120° and 109.5° (B) 90° and 109.5°
(C) 109.5° and 90° (D) 109.5° and 120°
69. Which of the following series of transitions in the spectrum of hydrogen atom falls in visible region?
(A) Brackett series (B) Lyman series
(C) Balmer series (D) Paschen series
70. Which of the following oxides is most acidic in nature?
(A) MgO (B) BeO
(C) BaO (D) CaO
71. Consider the following species: CN^- , CN , NO^+ and CN^+ . Which one of these will have the highest bond order?
(A) NO (B) CN^-
(C) CN^+ (D) CN
72. The reaction quotient (Q) for the reaction
 $\text{N}_{2(g)} + 3\text{H}_{2(g)} \rightleftharpoons 2\text{NH}_{3(g)}$
 $Q = \frac{[\text{NH}_3]^2}{[\text{N}_2][\text{H}_2]^3}$. The reaction will proceed from right to left if
(A) $Q = K_c$ (B) $Q < K_c$
(C) $Q > K_c$ (D) $Q = 0$
- Where K_c is the equilibrium constant.
73. The correct order of N-compounds in its decreasing order of oxidation states is
(A) HNO_3 , NO, N_2 , NH_4Cl
(B) HNO_3 , NO, NH_4Cl , N_2
(C) HNO_3 , NH_4Cl , NO, N_2
(D) NH_4Cl , N_2 , NO, HNO_3
74. If radius of second Bohr orbit of the He^+ ion is 105.8 pm, what is the radius of third Bohr orbit of Li^{2+} ion?
(A) 158.7 pm (B) 15.87 pm
(C) 1.587 pm (D) 158.7 Å
75. Hydrolysis of sucrose is given by the following reaction: $\text{Sucrose} + \text{H}_2\text{O} \rightleftharpoons \text{Glucose} + \text{Fructose}$ If the equilibrium constant (K_c) is 2×10^{13} at 300 K, the value of $\Delta_r G^\circ$ at the same temperature will be
(A) $-8.314 \text{ J mol}^{-1} \text{K}^{-1} \times 300 \text{ K} \times \ln(2 \times 10^{13})$
(B) $8.314 \text{ J mol}^{-1} \text{K}^{-1} \times 300 \text{ K} \times \ln(2 \times 10^{13})$
(C) $8.314 \text{ J mol}^{-1} \text{K}^{-1} \times 300 \text{ K} \times \ln(2 \times 10^{13})$
(D) $-8.314 \text{ J mol}^{-1} \text{K}^{-1} \times 300 \text{ K} \times \ln(4 \times 10^{13})$
76. Which one of the following pairs of solutions is not an acidic buffer?
(A) CH_3COO and CH_3COONa
(B) H_2CO_3 and Na_2CO_3
(C) H_3PO_4 and Na_3PO_4
(D) HClO_4 and NaClO_4
77. Which one of the following conditions will favour

- maximum formation of the product in the reaction $A_{2(g)} + B_{2(g)}, \Delta rH = -XkJ$?
- (A) Low temperature and high pressure
 (B) Low temperature and low pressure
 (C) High temperature and high pressure
 (D) High temperature and low pressure
78. The percentage of pyridine (C_5H_5N) that forms pyridinium ion (C_5H_5NH) in a 0.10 M aqueous pyridine solution (K_b for $C_5H_5N = 1.7 \times 10^{-9}$) is
 (A) 0.0060% (B) 0.013%
 (C) 0.77% (D) 1.6%
79. For the reversible reaction,
 $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)} + \text{heat}$. The equilibrium shifts in forward direction
 (A) by increasing the concentration of $NH_{3(g)}$
 (B) by decreasing the pressure
 (C) by decreasing the concentrations of $N_{2(g)}$ and $H_{2(g)}$
 (D) by increasing pressure and decreasing temperature
80. Aqueous solution of acetic acid contains
 (A) CH_3COO^- and H^+
 (B) CH_3COO^- , H_3O^+ and CH_3COOH
 (C) CH_3COO^- , H_3O^+ and H^+
 (D) CH_3COOH , CH_3COO^- and H^+
81. What is the pH of the resulting solution when equal volumes of 0.1 M NaOH and 0.01 M HCl are mixed?
 (A) 2.0 (B) 7.0
 (C) 1.04 (D) 12.65
82. Which of the following molecules acts as a Lewis acid?
 (A) $(CH_3)_2O$ (B) $(CH_3)_3P$
 (C) $(CH_3)_3N$ (D) $(CH_3)_3B$
83. Which of the following salts will give highest pH in water?
 (A) KCl (B) NaCl
 (C) Na_2CO_3 (D) $CuSO_4$
84. Based on equation $E = -2.178 \times 10^{-18} J \left(\frac{Z^2}{n^2} \right)$, certain conclusions are written. Which of them is not correct?
 (A) Equation can be used to calculate the change in energy when the electron changes orbit.
 (B) For $n = 1$, the electron has a more negative energy than it does for $n = 6$ which means that the electron is more loosely bound in the smallest allowed orbit.
 (C) The negative sign in equation simply means that the energy of electron bound to the nucleus is lower than it would be if the electrons were at the infinite distance from the nucleus.
 (D) Larger the value of n , the larger is the orbit radius.
85. Which one of the following compounds is not a protonic acid?
 (A) $B(OH)_3$ (B) $PO(OH)_3$
 (C) $SO(OH)_2$ (D) $SO_2(OH)_2$

Chemistry Section - B
Attempt any 10 Questions

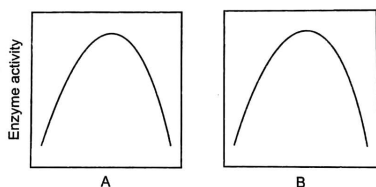
86. The IUPAC name of an element with atomic number 119 is
 (A) ununennium (B) unnilennium
 (C) unununnium (D) ununoctium
87. The hybridizations of atomic orbitals of nitrogen in NO_2^+ , NO_3^- and NH_4^+ respectively are
 (A) sp , sp^3 and sp^2 (B) sp^2 , sp^3 and sp
 (C) sp , sp^2 and sp^3 (D) sp^2 , sp and sp^3
88. Which of the following fluoro-compounds is most likely to behave as a Lewis base?
 (A) BF_3 (B) PF_3
 (C) CF_4 (D) SiF_4
89. The pH of the solution containing 50 mL each of 0.10 M sodium acetate and 0.01 M acetic acid is [Given: PK of $H_2COOH = 4.57$]
 (A) 5.57 (B) 3.57 (C) 4.57 (D) 2.57
90. Which of the following reactions is the metal displacement reaction? Choose the right option.
 (A) $2Pb(NO_3)_2 \rightarrow 2PbO + O_2 \uparrow$
 (B) $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$
 (C) $Cr_2O_3 + 2Al \xrightarrow{\Delta} Al_2O_3 + 2Cr$
 (D) $Fe + 2HCl \rightarrow FeCl_2 + H_2 \uparrow$
91. Which of the following molecules represents the order of hybridisation sp^2 , sp^2 , sp , sp from left to right atoms?
 (A) $HC \equiv C - C \equiv CH$
 (B) $CH_2 = CH - C \equiv CH$
 (C) $CH_2 = CH - CH = CH$
 (D) $CH_3 - CH = CH - CH_3$
92. The correct geometry and hybridization for XeF_4 are
 (A) octahedral, sp^3d^2
 (B) trigonal bipyramidal, sp^3d
 (C) planar triangle, sp^3d^3

- (D) square planar, sp^3d^2
93. Conjugate base for Bronsted acids H_2O and HF are
 (A) H_3O^+ and H_2F^+ , respectively
 (B) OH^- and H_2F^+ , respectively
 (C) H_3O^+ and F^- , respectively
 (D) OH^- and F^- , respectively.
94. pH of a saturated solution of $Ca(OH)_2$ is 9. The solubility product (K_{sp}) of $Ca(OH)_2$ is
 (A) 0.5×10^{-10} (B) 0.5×10^{-15}
 (C) 0.25×10^{-10} (D) 0.125×10^{-15}
95. What is the change in oxidation number of carbon in the following reaction?
 $CH_{4(g)} + 4Cl_{2(g)} \rightarrow CCl_{4(l)} + 4HCl_{(g)}$
 (A) +4 to +4 (B) 0 to +4
 (C) -4 to +4 (D) 0 to -4
96. The total number of π -bond electrons in the following structure is
-
- (A) 12 (B) 16 (C) 4 (D) 8
97. The IUPAC name of $(CH_3)_2CH - CH_2 - CH_2 - Br$ is
 (A) 1-bromo-3-methylbutane
 (B) 2-methyl-3-bromopropane
 (C) 1-bromopentane
 (D) 2-methyl-4-bromobutane.
98. Aqueous solution of which of the following compounds is the best conductor of electric current?
 (A) Hydrochloric acid, HCl
 (B) Ammonia, NH_3
 (C) Fructose, $C_6H_{12}O_6$
 (D) Acetic acid, $C_2H_4O_2$
99. Find out the solubility of $Ni(OH)_2$ in 0.1 M $NaOH$. Given that the ionic product of $Ni(OH)_2$ is 2×10^{-15}
 (A) $2 \times 10^{-13} M$ (B) $2 \times 10^{-8} M$
 (C) $1 \times 10^{-13} M$ (D) $1 \times 10^8 M$
100. The pK_b of dimethylamine and pK_a of acetic acid are 3.27 and 4.77 respectively at T(K). The correct option for the pH of dimethylammonium acetate solution is
 (A) 6.25 (B) 8.50
 (C) 5.50 (D) 7.75

Attempt all 35 Questions

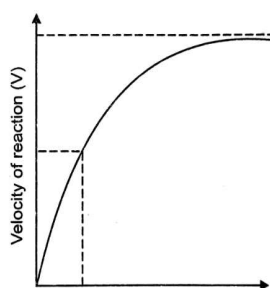
101. Which of the following is a member of Aves?
 (A) Neophron Hemidactylus, Naja,
 (B) Pteropus, Camelus, Macaca
 (C) Struthio, Pavo, Aptenodytes, Neophron
 (D) Clarias, Betta, Pterophyllum
102. The most unique mammalian characteristic is the presence of
 (A) Mammary glands
 (B) Hair
 (C) External ears or pinnae
 (D) All of these
103. Which one of the following in birds, indicates their reptilian ancestry?
 (A) Scales on their hindlimbs
 (B) Four-chambered heart
 (C) Eosinophils
 (D) Monocytes
104. What is common between parrot, platypus and kangaroo?
 (A) Ovoparity
 (B) Homoeothermy
 (C) Toothless jaws
 (D) Functional post-anal tail
105. A female frog has:
 (A) Copulatory pad (B) Neck
 (C) Vocal sac (D) Cloaca
106. Frogs help human as they:
 (A) Eat insect and protect the crop
 (B) Maintain ecological balance
 (C) In some countries the muscular legs of frog are used as food by man
 (D) All are correct
107. Blood of frog consist of which of the following cells:
 (A) RBCs (red blood cells) or erythrocytes
 (B) WBCs (white blood cells) or leucocytes
 (C) Platelets
 (D) All of these
108. Find the wrong statement about frog:
 (A) The hind limbs have five digits
 (B) Fore limbs have four digits
 (C) Frogs exhibit sexual dimorphism
 (D) Partially digested food called chyle is passed from stomach to the duodenum.
109. Given graph A and B represents:

Zoology Section - A



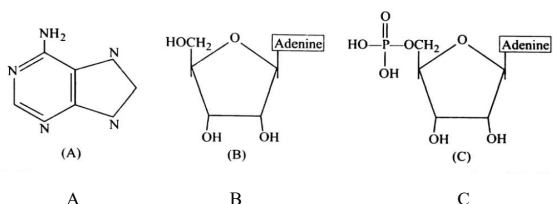
- (A) A-Effect of pH on enzyme activity, B-Effect of concentration on enzyme activity
 (B) A-Effect of pH on enzyme activity, B-Effect of temperature on enzyme activity
 (C) A-Effect of co-enzyme on enzyme activity, B-Effect of pH on enzyme activity
 (D) A-Effect of concentration on enzyme activity, B-Effect of temperature on enzyme activity

110. Given graph shows:



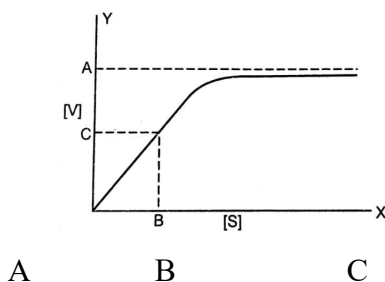
- (A) Effect of pH on enzyme activity
 (B) Effect of concentration on enzyme activity
 (C) Effect of temperature on enzyme activity
 (D) All of the above are correct

111. Which of the following options is correct for given diagram?



- (A) Adenine (N-base) Adenosine (Nucleotide) Adenylic acid (Nucleotide)
 (B) Adenine (N-base) Adenosine (Nucleotide) Adenylic acid (Nucleotide)
 (C) Adenosine (Nucleotide) Adenylic acid (Nucleotide) Adenine (N-base)
 (D) Uracil Adenosine (Nucleoside) Adenylic acid (Nucleotide)

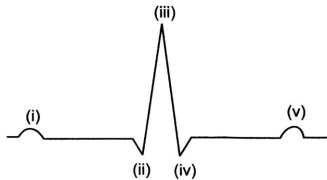
112. The adjoining graph shows and C. change in conc. of substrate of enzyme activity. Identify A, B and C.



- (A) K_i K_m K_{max}
 (B) $\frac{V_{max}}{2}$ K_m K_i
 (C) V_{max} K_m $\frac{V_{max}}{2}$
 (D) K_m V_{max} $\frac{V_{max}}{2}$

113. Expiration involves :
 (A) Relaxation of diaphragm and intercostal muscles
 (B) Contraction of diaphragm and intercostal muscles
 (C) Contraction of diaphragm muscles and relaxation of intercostal muscles
 (D) Contraction of intercostal muscles and relaxation of diaphragm
114. Air is breathed through:
 (A) Trachea → Lungs → Larynx → Pharynx → Alveoli
 (B) Nose → Larynx → Pharynx → Bronchus → Alveoli → Bronchioles
 (C) Nostrils → Pharynx → Larynx → Trachea → Bronchi → Bronchioles → Alveoli
 (D) Nose → Mouth → Lungs
115. Functional residual capacity can be represented as:
 (A) TV + RV (B) ERV + RV
 (C) VC + RV (D) TV + IRV
116. The volume of air that remains in the lungs after normal expiration is:
 (A) Residual volume
 (B) Vital capacity
 (C) Expiratory capacity
 (D) Functional residual capacity
117. Systolic pressure is higher than diastolic pressure due to :
 (A) Volume of blood in the heart is greater during systole
 (B) Arteries contract during systole
 (C) Blood vessels offer resistance to flowing blood during systole
 (D) Blood is forced into arteries during systole
118. Among the following which one is not true about chordae tendinae?
 (A) They are strips of muscle fibres
 (B) They are attached to the valves
 (C) They regulate opening of valves
 (D) They prevent backflow of blood

119. The heart keeps on beating through the life without fatigue because:
 (A) It contracts slowly
 (B) It has a resting or recovery period
 (C) It can use lactic acid as an extra source of energy
 (D) None of the above
120. (i), (ii), (iii), (iv) and (v) label different waves of standard ECG tracing. Which of the following wave correctly represents depolarisation of atria:



- (A) (i) only (B) (i) and (ii)
 (C) (i) and (iv) (D) (ii), (iii), (iv)
121. Indicate whether the following statements are true or false:
 (i) Micturition is carried out by a reflex.
 (ii) ADH helps in water elimination, making the urine hypotonic.
 (iii) Protein-free fluid is filtered from blood plasma into the Bowman's capsule,
 (iv) Henle's loop plays an important role in concentrating the urine.
 (v) Glucose is actively reabsorbed in the proximal convoluted tubule.
 (A) (i) -T, (ii) -F, (iii) -F, (iv) -T and (v) -F
 (B) (i) -T, (ii) -F, (iii) -T, (iv) -T and (v) -T
 (C) (i) -F (ii) -F, (iii) -T, (iv) -T and (v) -T
 (D) (i) -F, (ii) -F, (iii) -T, (iv) -F and (v) -T
122. Match the items of column I with those of column II:
- | Column I | Column II |
|----------------------|-------------------------|
| (A) Ammonotelism | (i) Birds |
| (B) Bowman's capsule | (ii) Water reabsorption |
| (C) Micturition | (iii) Bony fish |
| (D) Uricotelism | (iv) Urinary bladder |
| (E) ADH | (v) Renal tubule |
- (A) (A) - (v), (B) - (iii), (C) - (ii), (D) - (i), (E) - (iv)
 (B) (A) - (iii), (B) - (v), (C) - (ii), (D) - (i), (E) - (iv)
 (C) (A) - (iii), (B) - (v), (C) - (iv), (D) - (i), (E) - (ii)
 (D) (A) - (i), (B) - (v), (C) - (ii), (D) - (iii), (E) - (iv)
123. Assertion: The JGA plays a complex regulatory role on kidney.
 Reason: A fall in glomerular blood flow/ glomerular blood pressure/GFR can activate the JG cells to release rennin.

- (A) Assertion and reason both are true and the reason is correct explanation of assertion.
 (B) Assertion and reason both are true but reason is not correct explanation of assertion.
 (C) Assertion is true but reason is wrong
 (D) Assertion and reason both are wrong
124. Assertion: Rennin converts angiotensinogen to angiotensin I and further to angiotensin II which increase GFR.
 Reason: Angiotensin II, increases the glomerular blood pressure and also activates the adrenal cortex to release Aldosterone and thereby GFR.
 (A) Assertion and reason both are true and the reason is correct explanation of assertion.
 (B) Assertion and reason both are true but reason is not correct explanation of assertion.
 (C) Assertion is true but reason is wrong
 (D) Assertion and reason both are wrong
125. Oxygen can be stored in:
 (A) Red muscle fibres (B) White muscle fibres
 (C) Both (A) and (D) None of these
126. The H-zone in the skeletal muscle fibre is due to:
 (A) The absence of myofibrils in the central portion of A-band
 (B) The central gap between myosin filaments in the A-band
 (C) The central gap between actin filaments extending through myosin filaments in the A-band
 (D) Extension of myosin filaments in the central portion of the A-band
127. Striated and voluntary muscle fibres are found in:
 (A) Lungs (B) Leg muscles
 (C) Gall bladder (D) Blood vessels
128. Cross-bridges occur in :
 (A) Mid brain (B) Mid ear
 (C) Cranial nerves (D) Muscle fibres
129. In relaxation of muscles :
 (A) Ca^{++} concentration increases
 (B) Ca^{++} concentration decreases
 (C) Actin filaments slide over myosin filaments
 (D) Actin filaments form cross bridges
130. Krause membrane or Z-line is a myofibril which separates two adjacent :
 (A) Sarcomere (B) H - zones
 (C) I - bands (D) A - bands

131. In strained muscle contraction:
 (A) H-band is lengthened
 (B) H-band is obliterated
 (C) A-band decreases in length
 (D) Z-line moves away from A-band
132. Which of the following proteins is found in the thick filaments of skeletal muscle?
 (A) Myosin (B) Actin
 (C) Tropomyosin (D) Troponin
133. In the region of joining of two cardiac muscle cells is present :
 (A) Ligament (B) Basement
 (C) Intercalated disc (D) Fibres
134. ATPase enzyme needed for muscle contraction is located in:
 (A) Myosin (B) Actin
 (C) Tropomyosin (D) Troponin
135. A number of bones in the skull of man are:
 (A) 10 (B) 18
 (C) 22 (D) 14
- Zoology Section - B**
Attempt any 10 Questions
136. Acromion process is part of:
 (A) Vertebral column (B) Pelvic girdle
 (C) Femur (D) Pectoral girdle
137. Axial skeleton is made up of:
 (A) Skull only
 (B) Sternum only
 (C) Complete vertebral column
 (D) All of these
138. Number of bones in skull of human is:
 (A) 21 (B) 24
 (C) 29 (D) 14
139. Appendicular skeleton includes all except :
 (A) Hindlimb (B) Forelimb
 (C) Vertebrae (D) Pectoral and pelvic girdle
140. Acetabulum cavity is derived from:
 (A) Pelvic girdle (B) Skull
 (C) Pectoral girdle (D) Sternum
141. Glenoid cavity is derived from:
 (A) Pelvic girdle (B) Skull
 (C) Pectoral girdle (D) Sternum
142. Ethmoid bone occurs in:
 (A) Skull (B) Pectoral girdle
 (C) Legs (D) All of these
143. Foramen magnum, occipital condyles are found in:
 (A) Parietal bone (B) Ethmoid bone
 (C) Sphenoid bone (D) Occipital bone
144. Tongue bone is:
 (A) Hyoid bone (B) Maxilla
 (C) Mandible (D) None of these
145. The total number of ear bones in man is:
 (A) 3 (B) 6 (C) 4 (D) 2
146. Joint between bones of cranium is:
 (A) Hinge joint (B) Synovial joint
 (C) Cartilaginous joint (D) Fibrous joint
147. The joint between atlas and axis is called:
 (A) Angular joint (B) Saddle joint
 (C) Pivot joint (D) Hinge joint
148. Joint of wrist is of:
 (A) Hinge type (B) Ball and socket type
 (C) Pivot type (D) None of these
149. Muscular dystrophy is a:
 (A) Autoimmune disorder
 (B) Genetic disorder
 (C) Infectious disorder
 (D) All of these
150. Osteoporosis is a:
 (A) Inflammation of joints
 (b) Inflammation of joints due to accumulation of uric acid crystals
 (C) Age-related disorder characterised by decreased bone mass and increased chances of fractures
 (D) All of the above
- Botany Section - A**
Attempt all 35 Question
151. Which of the following statement is false :-
 (A) Cell division is a progressive process and very clear cut line can be drawn between various stages.
 (B) M phase is the most dramatic period of the cell cycle.
 (C) Animal cell and plant cell are undergo cytokinesis by a different mechanism
 (D) Plants can show mitotic division in both haploid and diploid cells.
152. In Anaphase of mitosis :-
 (A) Chromosomes are moved to spindle equator and get aligned along metaphase plate
 (B) Centromere of each chromosome is toward the equator when chromosomes move away from the equatorial plate.

- (C) Each chromosomes arranged at the metaphase plate split simultaneously.
 (A) A, B, incorrect and C correct
 (B) B, C incorrect and A correct
 (C) A, C incorrect and B correct
 (D) A, B, C correct
153. Sporophyte of Funaria begins its development inside :-
 (A) Archegonium (B) Protonema
 (C) Antheridium (D) Capsule
154. Read the following statements and give the answer that is asked below :-
 (A) Members are found in aquatic habitate
 (B) Spores are endogenously produced in sporangium
 (C) Zygosporangia are formed by fusion of two gametes
 (D) They show all type of syngamy
 Above statements are related to which class of fungi
 (A) Phycomycetes (B) Ascomycetes
 (C) Basidiomycetes (D) Deuteromycetes
155. Radial and bilateral symmetry is found respectively in flowers of
 (A) Pea and tomato (B) Sem and chilli
 (C) Chilli and pea (D) Bean and pea
156. Prop roots found in banyan trees
 (A) Are responsible for photosynthesis
 (B) Provide mechanical support
 (C) Enter the soil obliquely for storage of food
 (D) Are modified for respiration
157. Read the following statements and state true(T) or false (F) and select the correct option.
 A. RER provides precursor of enzymes of lysosomes.
 B. Glycosylation of proteins is facilitated by lysosomes.
 C. Breakdown of proteins with the help of proteases is a function of the suicidal bag of the cell.
 D. Maintenance of osmotic concentration of cell is aided by the organelle involved in the synthesis of carbohydrates.
- | | | | |
|-------|---|---|---|
| A | B | C | D |
| (A) T | F | T | F |
| (B) F | T | F | T |
| (C) T | T | F | F |
| (D) T | F | T | T |
158. Duplication of cell-organelles like mitochondria and chloroplast takes place in
 (A) G₁ phase (B) G₂ phase
 (C) S phase (D) M phase
159. In A of some vertebrates, during meiosis I, B stage lasts for month or years. Here A and B are respectively

A	B
(A) Oocytes	Pachytene
(B) Spermatocyte	Leptotene
(C) Oocytes	Diplotene
(D) Spermatocyte	Zygotene
160. Interkinesis does not involve
 (A) Centriole duplication
 (B) DNA replication
 (C) RNA formation
 (D) Protein synthesis
161. TW Engelmann using a prism split light into its spectral components and then illuminated:
 (A) A green alga, *Cladophora*, placed in a suspension of aerobic bacteria.
 (B) A green alga, *Cladophora*, placed in a suspension of anaerobic bacteria.
 (C) A redalga placed in a suspension of aerobic bacteria.
 (D) A brown alga, *Cladophora*, placed in a suspension of aerobic bacteria.
162. Photosynthetically active radiation (PAR) is the part of spectrum with wavelength (in nm) ranging from
 (A) 100-390 (B) 400-700
 (C) 390-430 (D) 760-100,00
163. Structure of chlorophyll consists of which metal ion?
 (A) Iron (B) Magnesium
 (C) Copper (D) Zinc
164. Dark reaction in photosynthesis is called so because
 (A) It occurs more rapidly at night
 (B) It can occur in dark also
 (C) It does not directly depend on light energy
 (D) It cannot occur during day light
165. The products formed during light reaction of photosynthesis are:
 (A) ATP and sugar
 (B) Hydrogen, O₂ and sugar
 (C) ATP, hydrogen and O₂ donor
 (D) ATP, hydrogen donor and O₂

166. In purple and green sulfur bacteria, the "oxidation" product is:
(A) Sulfur (B) Sulfate
(C) O₂ (D) May be both (A) and (B)
167. Which part of chloroplast contains pigments required for capturing solar energy to initiate photosynthesis?
(A) Outer membrane (B) Matrix
(C) Thylakoids (D) Inner membrane
168. Chlorophylls reflect the _____ light and impart _____ color to the leaves.
(A) Red, green (B) Blue, green
(C) Green, green (D) Violet, green
169. The full form of NAD is:
(A) Nicotinamide adenine diphosphate
(B) Nicotine adenosine diphosphate
(C) Nicotinamide adenine dinucleotide
(D) Nicotinamide adenosine dinucleotide
170. Stroma in the chloroplasts of higher plant contains:
(A) Cristae (B) Chlorophylls
(C) Light-independent reaction enzymes
(D) Light-dependent reaction enzymes
171. Anoxygenic photosynthesis is characteristic of:
(A) *Ulva* (B) *Rhodospirillum*
(C) *Spirogyra* (D) *Chlamydomonas*
172. Statement I: Blue-green bacteria perform oxygenic photosynthesis.
Statement II: Purple bacteria and green bacteria perform anoxygenic photosynthesis.
(A) Both statements I and II are correct and II explains I.
(B) Both statements I and II are correct and II does not explain I.
(C) Statement I is true and statement II is false.
(D) Both statements I and II are false.
173. Statement I: Photophosphorylation requires light.
Statement II: Photophosphorylation occurs in chloroplast.
(A) Both statements I and II are correct and II explains I.
(B) Both statements I and II are correct and II does not explain I.
(C) Statement I is true and statement II is false.
(D) Both statements I and II are false.
174. Which of the following is correct regarding *Cycas*:-
(A) The same sporophyll bears microsporangia and ovule

- (B) A single cone consist of both mega & microsporophylls
(C) Male strobillus and mega sporophylls occur on the same plant
(D) Male strobillus and mega sporophylls occur on separate plants
175. Three of the following statements regarding cell organelles are correct while one is wrong which one is wrong.:-
(A) In chloroplast many flat membranous tubules are present called the stroma lamellae connecting the thylakoids of the different grana.
(B) 'S' (sedimentation coefficient) is a direct measurement of density and size.
(C) The central part of the proximal region of the centriole is proteinaceous called the hub.
(D) In animal SER is the major site for synthesis of lipid as well as steroidal hormones.
176. On the Basis of characters in group A & group B identify the correct :-

Group - A		Group-B	
(i)	Land plant	(i)	Land plant
(ii)	Plant body forms thallus	(ii)	Sporophyte is divided in to root, stem & leaves
(iii)	Gemma cups present on dorsal surface	(iii)	Vascular tissue is present
(iv)	Multicellular scales are present	(iv)	Fruits are absent
(v)	Gametophytic plant body	(v)	Seeds are present

Options :-

- (A) A - *Spirogyra* B - *Riccia*
(B) A - *Cycas* B - *Pinus*
(C) A - *Marchantia* B - *Cycas*
(D) A - *Pinus* B - *Marchantia*
177. A network of filamentous structure present in the cytoplasm which are involved in many function such as mechanical support, motility, maintenance of the shape of the cell. This elaborate network of filamentous are structures present in the cytoplasm is collectively refered to as the.....-
(A) Lipoidal, plasma membrane
(B) Cytoskeleton, proteinaceous
(C) Proteinaceous, centriole

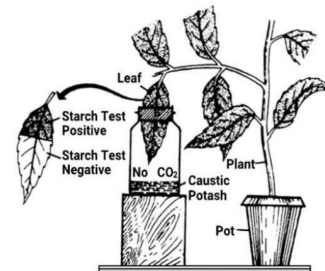
- (D) Proteinaceous, cytoskeleton
178. An organelle which is surrounded by double membrane structure contain small circular DNA molecule, ribosome and also having the site for oxidative phosphorylation is :-
(A) Chloroplast (B) Centriole
(C) Mesosome (D) Mitochondria
179. Find out the incorrect statement in the following:-
(A) Bryophytes in general are of little economic importance
(B) Vegetative reproduction in mosses is by fragmentation and budding
(C) Gemmae are green, unicellular asexual bud
(D) Mosses have elaborate mechanism of spore dispersal
180. Stem tendrils
(A) Are long, thin thread-like structures
(B) Provide support to weak and tender stem
(C) Are found in *Pistia* and *Eichhornia*
Correct statements are
(A) All (A), (B) and (C) (B) Only (A) and (C)
(C) Only (A) and (B) (D) Only (B) and (C)
181. Syncytium
(A) Is a single cell containing single nucleus
(B) Occurs when karyokinesis is followed by cytokinesis
(C) Occurs in all dead cells
(D) Is single cell containing multiple nuclei
182. Choose the correct sequence of events that occur in sub-stages of prophase I.
A. Occurrence of synapsis.
B. Appearance of chiasmata.
C. Crossing over between homologous
D. Condensation and coiling of chromatin fibres begins.
(A) A → B → D → C (B) D → A → C → B
(C) B → C → D → A (D) C → D → B → A
183. Assertion (A): Plasma membrane plays an important role in cell growth, formation of intercellular junctions, secretion, endocytosis etc.
Reason (R): Plasma membrane possesses fluid nature.
In the light of above statements choose the correct option.
(A) Both A and R are true and R is correct explanation of A.
(B) Both A and R are true but R is not correct explanation of A.
(C) A is correct but R is incorrect.

- (D) A is incorrect but R is correct.
184. Carbon dioxide is necessary for photosynthesis. The chemical used to remove this gas most effectively from entering a control apparatus is
(A) calcium oxide
(B) distilled water
(C) potassium hydroxide solution
(D) sodium carbonate.
185. $2H_2A + CO_2 \rightarrow 2A + CH_2O + H_2$ in this given equation H_2A represents to:
(a) Suitable reducible compounds
(b) Suitable oxidisable compound
(c) Suitable buffer
(d) Both (a) and (b)

Botany Section - B

Attempt any 10 Questions

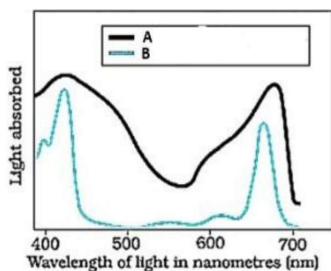
186. What conclusions can be drawn from the Moll's half leaf experiment [the given diagram shows the schematic representation of the experiment]?



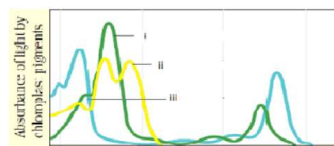
What can be said after observing the results of the experiment?

- I. Negative starch test by the leaf portion present inside the bottle indicates CO_2 is necessary for this process.
II. Negative test of starch, which is also shown by the portion of the leaf present in between the split of the split cork is due to the lack of CO_2 and light, thus indicating that both of them are essential requirements.
(A) Only I (C) Only II
(B) Both I and II (D) None
187. When do you think the chloroplasts will be aligned with their flat surfaces parallel to the walls of the mesophyll cells?
(A) In dark
(B) When light intensity is low
(C) When light intensity is high
(D) They are always aligned parallel to the walls

188. It can be correctly said about the relation between the absorption spectra of various pigments and the action spectrum of photosynthesis that:
- (A) There is a complete one to one overlap between the absorption spectrum of chlorophyll a and the action spectrum of photosynthesis.
- (B) There is a complete one to one overlap between the absorption spectrum of chlorophyll b and the action spectrum of photosynthesis.
- (C) The absorption spectrum of chlorophyll a is wider than the action spectrum of photosynthesis.
- (D) The absorption spectrum of chlorophyll a is narrower than the action spectrum of photosynthesis.
189. The photoautotrophic organisms that do not split water to obtain reducing power are
- (A) purple bacteria (B) cyanobacteria
(C) green plants (D) none of these
190. In the given graph what does A, B represent?



- (A) A- Absorption spectrum; B - Action spectrum (Chl. a).
- (B) A - Action spectrum; B - Absorption spectrum (carotenoids).
- (C) A - Absorption spectrum; B - Action spectrum (Ch. b).
- (D) A- Action spectrum; B - Absorption spectrum (Ch.a).
191. Observe the following picture carefully & select the correct option :

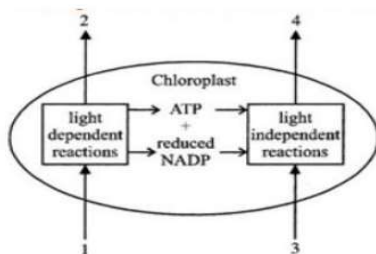


- i, ii, iii represents,
- (A) i- chl.a, ii-chl b, iii-carotenoids
(B) i- chl.b, ii-chl a, iii-carotenoids
(C) i- chl.a, ii-carotenoids, iii-chl b
(D) i- chl.b, ii-carotenoids, iii-chl a
192. All the following regarding the role of xanthophylls and carotenoids in photosynthesis are correct except:
- (A) They act as accessory pigments
(B) Their peak absorption is in blue and red regions of VIBGYOR
(C) They enable a wider range of wavelength of incoming light to be utilized for photosynthesis
(D) They protect chlorophyll a form of photo-oxidation.
193. Red colour of tomatoes, carrots and chillies is due to the presence of a type of carotene pigment called as
- (A) lutein (B) lycopene
(C) fucoxanthin (D) phycoerythrin.
194. Which of the following statements does not justify the importance of photosynthesis?
- (A) it is the primary source of all food on earth.
(B) it is responsible for the release of oxygen into the atmosphere.
(C) it is responsible for the water balance on earth.
(D) use of energy from sunlight by plants doing photosynthesis is the basis of life on earth.
195. Column I Column II
- | | |
|------------|---|
| i. grana | a. dark reaction |
| ii. Stroma | b. light reaction |
| | c. synthesis of ATP and NADPH ⁺ H ⁺ |
| | d. synthesis of sugar |
- (A) i-b, c; ii-a, d. (B) i-a, d; ii-b, c.
(C) i-b, d; ii-a,c. (D) i-b; ii-a, c, d.

196. How many of the following statements are correct?
- Products of dark reaction are substrates of light reaction.
 - Products of light reaction are substrates of dark reaction.
 - In the stroma, enzymatic reactions incorporate CO₂ into the plant leading to the synthesis of sugar.
 - Dark reactions are directly light-driven.
 - Chloroplast is a single membranous organelle.
- (A) 2 (B) 3 (C) 4 (D) 1

197. After performing the chromatographic separation of a plant leaf, experimenter found bright or blue green colour in the chromatogram. Then this pigment should be-
- (A) xanthophyll (B) carotenoid
(C) chlorophyll a (D) chlorophyll b

198. The diagram below shows the movement of substances into and out of a chloroplast with labeling 1, 2, 3 & 4. What do labels 1 to 4 represent?



Algae and other submerged plants bounce in water during day time and sink at night, because:

- (A) They come up to enjoy some time.
(B) They lose weight at night.
(C) They become buoyant due to accumulation of O₂ as a result of photosynthesis.
(D) They become light due to food material accumulation.

199. The _____ in the leaves have a large number of _____ quantity of the incident light. which align themselves along the walls of the _____ such that they get the
- (A) chloroplasts, chlorophyll, chloroplasts, optimum.
(B) mesophyll cells, chlorophyll, mesophyll cells, optimum.
(C) mesophyll cells, chloroplasts, mesophyll cells, optimum.
(D) mesophyll cells, chloroplasts, mesophyll cells, minimum.
200. The chromosome having p and q arm
- (A) Appear V-shaped during anaphase
(B) Appear L shaped during anaphase
(C) Is telocentric chromosome
(D) Has centromere at terminal end