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DIVISION: PRE-MEDICAL

Academic Session: 2023-24

PERIODIC ASSESSMENT TEST (PAT)

PAPER BOOKLET

PERIODIC ASSESSMENT TEST (PAT) DETAILS

TARGET EXAMINATION	NEET (UG)
TARGET YEAR	2024
PAPER NO.	ONE
PAPER CODE	1
CLASS	XIII
COURSE NAME	SAARANSH
COURSE CODE	MER
PHASE CODE(S)	MER
BATCH CODE(S)	MER

PERIODIC ASSESSMENT TEST (PAT) SCHEDULE

TEST PATTERN	NEET
TEST TYPE	PART TEST
TEST CODE & SEQUENCE	PT-3
MAX. MARKS	720
TEST DURATION	3 Hrs. 20 Min.
TEST DATE	14th April 2024
TEST DAY	Sunday
TEST TIME	Start: 02:30 PM End : 5:50 PM
TOTAL NO. OF PAGES IN PAPER BOOKLET	28

PERIODIC ASSESSMENT TEST (PAT) PAPER BOOKLET INOFRMATION

TEST PAPER DETAILS					MARKING SCHEME				
Qs. No.	Section No.	Subject Sequence	Type of Qs.*	No. of Qs.	Full Marks Per Qs.	If No Option Chosen	(–)ve Marks	Total Marks	Subject Total
1 to 35	1	Physics	MCQ	35	4	0	–1	140	180
36 to 50	2		MCQ	15**	4	0	–1	40	
51 to 85	1	Chemistry	MCQ	35	4	0	–1	140	180
86 to 100	2		MCQ	15**	4	0	–1	40	
101 to 135	1	Biology (Botany)	MCQ	35	4	0	–1	140	180
136 to 150	2		MCQ	15**	4	0	–1	40	
151 to 185	1	Biology (Zoology)	MCQ	35	4	0	–1	140	180
186 to 200	2		MCQ	15**	4	0	–1	40	
TOTAL Qs.				200	MAXIMUM MARKS				720

* Please turn overleaf to understand the meaning of coding for types of Questions.
**you have attempt any 10 Questions. If a student attempts more than 10 questions, then only first 10 questions which he has attempted will be checked.

Please read all the information & instructions related to Test Paper & OMR Sheet before attempting the test paper.

NAME OF THE CANDIDATE: _____ **Roll No.:** | | | | | | | | |

I have read all the instructions and shall abide by them.

_____

(Signature of the Candidate)

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

_____

(Signature of the Invigilator)

INSTRUCTIONS FOR OPTICAL RESPONSE SHEET (ORS)

A. GENERAL INSTRUCTIONS

1. Darken the appropriate bubbles on the original by applying sufficient pressure.
2. The original is machine-gradable and will be collected by the invigilator at the end of the examination.
3. Do not tamper with or mutilate the ORS.
4. Write your name, roll number and the name of the examination centre and sign with pen in the space provided for this purpose on the original. **Do not write any of these details anywhere else**. Darken the appropriate bubble under each digit of your roll number.

B. DARKENING THE BUBBLES ON THE ORS :

5. Use a **BLACK BALL POINT** to darken the bubbles in the upper sheet.
6. Darken the bubble **COMPLETELY.**
7. Darken the bubble **ONLY** if you are sure of the answer.
8. The correct way of darkening a bubble is as shown here : ●
9. There is **NO** way to erase or "un-darkened bubble.
10. The marking scheme given at the beginning of each section gives details of how darkened and **not darkened** bubbles are evaluated.

A. सामान्य निर्देश

1. ऊपरी मूल पृष्ठ के अनुरूप बुलबुलों (BUBBLES) को पर्याप्त दबाव डालकर काला करें।
2. मूल पृष्ठ मशीन–जाँच है तथा यह परीक्षा के समापन पर निरीक्षक के द्वारा एकत्र कर लिया जायेगा।
3. ओ.आर.एस. को हेर–फेर/विकृति न करें।
4. अपना नाम, रोल नं. और परीक्षा केंद्र का नाम मूल पृष्ठ में दिए गए खानों में कलम से भरें और अपने हस्ताक्षर करें। इनमें से कोई भी जानकारी कहीं और न लिखें। रोल नम्बर के हर अंक के नीचे अनुरूप बुलबुले को काला करें।

B. ORS पर बुलबुलों को काला करने की विधि :

5. ऊपरी मूल पृष्ठ के बुलबुलों को काले बॉल पाइन्ट कलम से काला करें।
6. बुलबुले को पूर्ण रूप से काला करें।
7. बुलबुलों को तभी काला करें जब आपका उत्तर निश्चित हो।
8. बुलबुलों को काला करने का उपयुक्त तरीका यहाँ दर्शाया गया है : ●
9. काले किये हुये बुलबुले को मिटाने का कोई तरीका नहीं है।
10. हर खण्ड के प्रारम्भ में दी गयी अंकन योजना में काले किये गये तथा काले न किये गये बुलबुलों को मूल्यांकित करने का तरीका दिया गया है।

TYPE WISE CODES FOR QUESTIONS

SR#	QUESTION TYPE	CODE
1	MULTIPLE CHOICE QUESTION (ONLY ONE CORRECT OPTION)	MCQ
6	COLUMN MATCH QUESTION	CMQ
9	ASSERTION & REASON / STATEMENT TYPE QUESTION	ARQ

PART-A
Physics

SECTION – A : (Maximum Marks : 140)

- This section contains **THIRTY FIVE (35)** questions.
- Each question has **FOUR** options (1), (2), (3) and (4) **ONLY ONE** of these four option is correct
- Marking scheme :
- Full Marks : **+4** If ONLY the correct option is chosen.
- Zero Marks : **0** If none of the options is chosen (i.e. the question is unanswered).
- Negative Marks : **–1** In all other cases

1. A current of i ampere is flowing in an equilateral triangle of side a. The magnetic induction at the centroid will be -

(1) $\frac{\mu_0 i}{3\sqrt{3}\pi a}$ (2) $\frac{3\mu_0 i}{2\pi a}$

(3) $\frac{5\sqrt{2}\mu_0 i}{3\pi a}$ (4) $\frac{9\mu_0 i}{2\pi a}$

2. The vector form of Biot-Savart's law for a current carrying element is

(1) $d\vec{B} = \frac{\mu_0}{4\pi}\frac{Id\vec{l}\sin\phi}{r^2}$

(2) $d\vec{B} = \frac{\mu_0}{4\pi}\frac{Id\vec{l}\times\hat{r}}{r^2}$

(3) $d\vec{B} = \frac{\mu_0}{4\pi}\frac{Id\vec{l}\times\hat{r}}{r^3}$

(4) $d\vec{B} = \frac{\mu_0}{4\pi}\frac{Id\vec{l}\times\hat{r}}{r^2}$

3. Two parallel, long wires carry currents i_1 and i_2 with $i_1 > i_2$. When the current are in the same direction, the magnetic field at a point midway between the wire is $10\mu T$. If the direction of i_2 is reversed, the field becomes $30\mu T$. The ratio i_1/i_2 is

(1) 4 (2) 3

(3) 2 (4) 1

4. The magnetic field on the axis of a circular loop of radius 100 cm carrying current $I = \sqrt{2}$ A, at point 1 m away from the centre of the loop is given by :

(1) 3.14×10^{-7} T

(2) 6.28×10^{-7} T

(3) 3.14×10^{-4} T

(4) 6.28×10^{-4} T

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

Assertion (A) : Gauss's law for magnetism states that the net magnetic flux through any closed surface is zero.

Reason (R) : The magnetic monopoles do not exist. North and South poles occur in pairs, allowing vanishing net magnetic flux through the surface.

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

(1) **(A)** is false but **(R)** is true

(2) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**

(3) Both **(A)** and **(R)** are true and **(R)** is not the correct explanation of **(A)**

(4) **(A)** is true but **(R)** is false

6. A strong magnetic field is applied along the direction of velocity of an electron. The electron would move along :

(1) the original path

(2) a helical path

(3) a circular path

(4) a parabolic path

7. In a circuit with coil of resistance 5Ω, the magnetic flux changes from 20 Weber to 10 Weber in 0.1 second. The charge that flows in the coil during this time is

(1) 1 coulomb

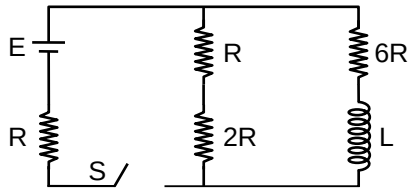
(2) 2 coulomb

(3) 6 coulomb

(4) 4 coulomb

Space for Rough Work

8. If switch is closed at t = 0, the current supplied by battery immediately after closing the switch is



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

(3) $\frac{E}{7R}$ (4) $\frac{E}{R}$

9. The current in an inductor of self inductance 4 H changes from 4 A to 2 A in 1 second. The e.m.f. induced in the coil is:

(1) 2 V (2) –4V

(3) 8V (4) –2 V

10. The dimensions of mutual inductance (M) are :

(1) $[MLT^{-2}A^2]$ (2) $[M^2L^2T^{-2}A^2]$

(3) $[ML^2T^{-2}A^{-2}]$ (4) $[M^2LT^{-2}A^{-2}]$

11. The magnetic flux linked to a circular coil of radius R is :

$$\phi = 2t^3 + 4t^2 + 2t + 5 \text{ Wb}$$

The magnitude of induced emf in the coil at t = 5s is :

(1) 108 V (2) 197 V

(3) 150 V (4) 192 V

12. An emf is generate by an ac generator having 100 turn coil, of loop area 1 m^2. The coil rotates at a speed of one revolution per second and placed in a uniform magnetic field of 0.05 T perpendicular to the axis of rotation of the coil. The maximum value of emf is :

(1) 3.14 V (2) 31.4 V

(3) 62.8 V (4) 6.28 V

13. The effective capacitances of two capacitors are 3 μF and 16 μF, when they are connected in series and parallel respectively. The capacitance of two capacitors are :

(1) 10 μF, 6 μF

(2) 8 μF, 8 μF

(3) 12 μF, 4 μF

(4) 1.2 μF, 1.8 μF

14. The distance between the two plates of a parallel plate capacitor is doubled and the area of each plate is halved. If C is its initial capacitance, its final capacitance is equal to

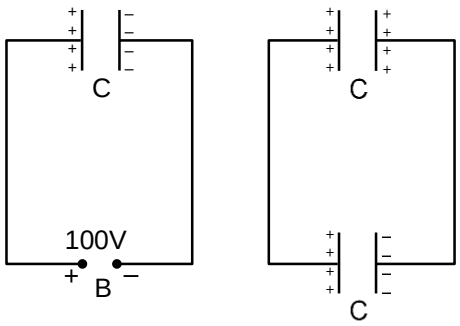
(1) 2C

(2) C/2

(3) 4C

(4) C/4

15. A capacitor of capacitance C = 900 mF is charged fully by 100V battery B as shown in figure (a). Then it is disconnected from the battery and connected to another uncharged capacitor of capacitance C = 900 pF as shown in figure (b). The electrostatics energy stored by the system (b) is :



(1) 2.25×10^{-6} J

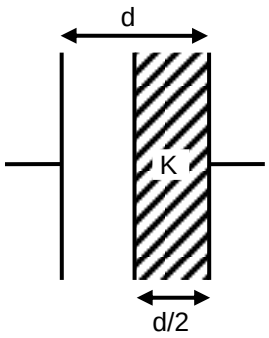
(2) 1.5×10^{-6} J

(3) 4.5×10^{-6} J

(4) 3.25×10^{-6}J

Space for Rough Work

16. A parallel plate capacitor having cross sectional area A and separation d has air in between the plates. Now an insulating slab of same area but thickness d/2 is inserted between the plates as shown in figure having dielectric constant K (=4). The ratio of new capacitance to its original capacitance will be,



(1) 2 : 1 (2) 8 : 5
(3) 6 : 5 (4) 4 : 1

17. On placing a dielectric slab between the plates of an isolated charged condenser its–

	Capacitance	**Charge**	**Potential-Difference**	**Energy-stored**	**Electric-field**
(1)	decreases	remains unchanged	decreases	increases	increases
(2)	increases	remains unchanged	increases	increases	decreases
(3)	increases	remains unchanged	decreases	decreases	decreases
(4)	decreases	remains unchanged	decreases	increases	remains unchanged

18. Time constant of a series R-C circuit is
(1) +RC (2) –RC
(3) R/C (4) C/R

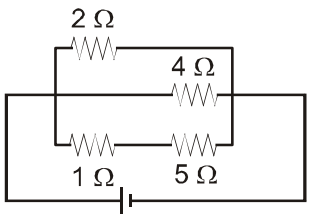
19. Two rods one made of copper and other made of steel of the same length and same cross sectional area are joined together. The thermal conductivity of copper and steel are 385 J s^{-1} K^{-1} m^{-1} and 50 J s^{-1} K^{-1} m^{-1} respectively. The free ends of copper and steel are held at 100ºC and 0ºC respectively. The temperature at the junction is, nearly :
(1) 12ºC (2) 50ºC
(3) 73ºC (4) 88.5ºC

20. The reciprocal of conductivity is :
(1) reactance (2) mobility
(3) Resistivity (4) conductance

21. The resistance of an ideal voltmeter is ;
(1) very low (2) infinite
(3) zero (4) none of these

22. When a wire of uniform cross-section a, length ℓ and resistance R is bent into a complete circle, resistance between two of diametrically opposite points will be :
(1) $\frac{R}{4}$ (2) $\frac{R}{8}$
(3) 4R (4) $\frac{R}{2}$

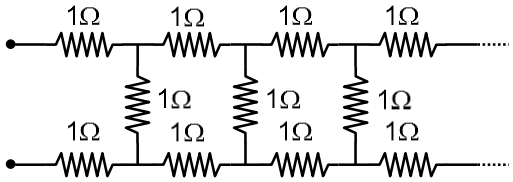
23. A current of 3 A flows through the 2Ω resistor shown in the circuit. The power dissipated in the 5Ω resistor is



(1) 4 W (2) 2 W
(3) 1 W (4) 5 W

Space for Rough Work

24. The equivalent resistance of the infinite network given below is :



(1) 2 Ω (2) $(1+\sqrt{2})\Omega$

(3) $(1+\sqrt{3})\Omega$ (4) $(1+\sqrt{5})\Omega$

25. The electric charge in uniform motion produces -

(1) an electric field only

(2) a magnetic field only

(3) both electric and magnetic fields

(4) neither electric nor magnetic fields

26. A charged particle of charge q and mass m is released from rest in an uniform electric field E. Neglecting the effect of gravity, the kinetic energy of the charged particle after time 't' seconds is

(1) $\frac{Eqm}{t}$ (2) $\frac{E^2q^2t^2}{2m}$

(3) $\frac{2E^2t^2}{mq}$ (4) $\frac{Eq^2m}{2t^2}$

27. Choose correct statement regarding electric lines of force :

(1) emerges from ($-\upsilon e$) charge and meet from ($+\upsilon e$) charge

(2) where the electric lines of force are close electic field in that region is strong

(3) just as it is shown for a point system in the same way it represent for a solid sphere

(4) has a physical nature

28. If a uniformly charged spherical shell of radius 10 cm has a potential V at a point distant 5 cm from its centre, then the potential at a point distant 15 cm from the centre will be :

(1) $\frac{V}{3}$ (2) $\frac{2V}{3}$

(3) $\frac{3}{2}V$ (4) 3V

29. Match List-I with List-II :

List-I		List-II	
(A)	Gravitational constant	(p)	$[L^2T^{-2}]$
(B)	Gravitational potential energy	(q)	$[M^{-1}L^3T^{-2}]$
(C)	Gravitational potential	(r)	$[LT^{-2}]$
(D)	Gravitational intensity	(s)	$[ML^2T^{-2}]$

Choose the correct answer from the options given below :

(1) (a) – (ii), (b) – (iv), (c) – (iii), (d) – (i)

(2) (a) – (iv), (b) – (ii), (c) – (i), (d) – (iii)

(3) (a) – (ii), (b) – (i), (c) – (iv), (d) – (iii)

(4) (a) – (ii), (b) – (iv), (c) – (i), (d) – (iii)

30. 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 :

(1) 2v (2) 3v

(3) 4v (4) v

31. Dot product of two mutual perpendicular vector is

(1) 0 (2) 1

(3) ∞ (4) None of these

32. If a train travelling at 72 kmph is to be brought to rest in a distance of 200 metres, then its retardation should be

(1) 20 ms^{-2} (2) 10 ms^{-2}

(3) 2 ms^{-2} (4) 1 ms^{-2}

Space for Rough Work

33. A ball thrown by one player reaches the other in 2 sec. the maximum height attained by the ball above the point of projection will be about
(1) 10 m (2) 7.5 m
(3) 5 m (4) 2.5 m

34. **Assertion :** Horizontal range is same for angle of projection θ and $(90 - \theta)$.
Reason : Horizontal range is independent of angle of projection.
Read the **Assertion** and **Reason** carefully to mark the correct option out of the options given below:
(1) Both **Assertion** and **Reason** are true and the **Reason** is the correct explanation of the **Assertion**.
(2) Both **Assertion** and **Reason** are true but **Reason** is not the correct explanation of the **Assertion**.
(3) **Assertion** is true but **Reason** is false.
(4) **Assertion** is false but **Reason** is true.

35. An elevator weighing 6000 kg is pulled upward by a cable with an acceleration of $5 ms^{-2}$. Taking g to be $10 ms^{-2}$, then the tension in the cable is
(1) 6000 N (2) 9000 N
(3) 60000 N (4) 90000 N

SECTION – B : (Maximum Marks : 40)

- This section contains **FIFTEEN (15)** questions. **You have attempt any 10 Questions. If a student attempts more than 10 questions, then only first 10 questions which he has attempted will be checked.**
- Each question has **FOUR** options (1), (2), (3) and (4) **ONLY ONE** of these four option is correct
- Marking scheme :
  - Full Marks : **+4** If ONLY the correct option is chosen.
  - Zero Marks : **0** If none of the options is chosen (i.e. the question is unanswered).
  - Negative Marks : **–1** In all other cases

36. The work done against gravity in taking 10 kg mass at 1m height in 1sec will be
(1) 49 J (2) 98 J
(3) 196 J (4) None of these

37. Which one of the following is not a conservative force
(1) Gravitational force
(2) Electrostatic force between two charges
(3) Magnetic force between two magnetic dipoles
(4) Frictional force

38. An unbanked curve has a radius of 60m. The maximum speed at which a car can make a turn if the coefficient of static friction is 0.75, is
(1) 2.1 m/s (2) 14 m/s
(3) 21 m/s (4) 7 m/s

39. The radius of a sphere is (5.3 ± 0.1) cm. The percentage error in its volume is
(1) $\frac{0.1}{5.3} \times 100$ (2) $3 \times \frac{0.1}{5.3} \times 100$
(3) $\frac{0.1 \times 100}{3.53}$ (4) $3 + \frac{0.1}{5.3} \times 100$

40. A uniform heavy disc is rotating at constant angular velocity ω about a vertical axis through its centre and perpendicular to the plane of the disc. Let L be its angular momentum. A lump of plasticine is dropped vertically on the disc and stick to it. Which will be constant
(1) ω (2) ω and L both
(3) L only (4) Neither ω nor L

Space for Rough Work

41. Moment of inertia along the diameter of a ring is

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

(3) MR^2 (4) $2\,MR^2$

42. The distance covered by a body of mass 5 g having linear momentum 0.3 kg m/s in 5 s is :

(1) 300 m (2) 30 m

(3) 3 m (4) 0.3 m

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

Assertion (A) : A standing bus suddenly accelerates. If there were no friction between the feet of a passenger and the floor of the bus, the passenger would move back.

Reason (R) : In the absence of friction, the floor of the bus would slip forward under the feet of the passenger.

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

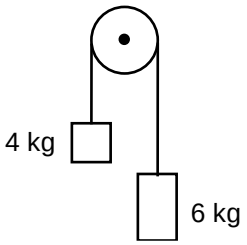
(1) **(A)** is false but **(R)** is true

(2) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**

(3) Both **(A)** and **(R)** are true and **(R)** is not the correct explanation of **(A)**

(4) **(A)** is true but **(R)** is false

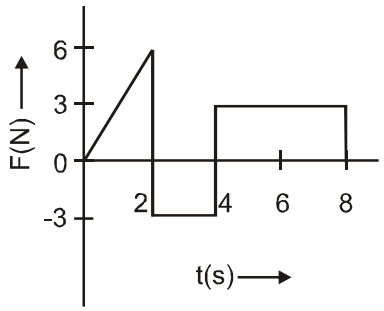
44. Two bodies of mass 4 kg and 6 kg are tied to the ends of a massless string. The string passes over a pulley which is frictionless (see figure). The acceleration of system in terms of acceleration due to gravity (g) is :



(1) g/ 2 (2) g/5

(3) g/ 10 (4) g

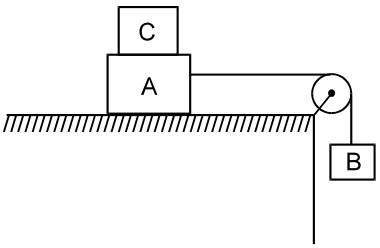
45. The force 'F' acting on a particle of mass 'm' is indicated by the force-time graph shown below. The change in momentum of the particle over the time interval from zero to 8 s is :



(1) 24 Ns (2) 20 Ns

(3) 12 Ns (4) 6 Ns

46. Two masses A and B of 10 kg and 5 kg respectively are connected with a string passing over a frictionless pulley fixed at the corner of a table as shown. The coefficient of static friction of A with table is 0.2. The minimum mass of C that may be placed on A to prevent it from moving is



(1) 15 kg (2) 10 kg

(3) 5 kg (4) 12 kg

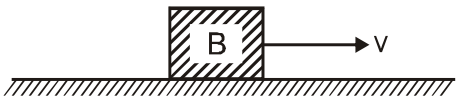
47. If the normal force is doubled, the co-efficient of friction is :

(1) halved (2) doubled

(3) tripled (4) not changed

Space for Rough Work

48. A block B is pushed momentarily along a horizontal surface with an initial velocity v. If μ is the coefficient of sliding friction between B and the surface, block B will come to rest after a time :



(1) $\frac{v}{g\mu}$ (2) $\frac{g\mu}{v}$

(3) $\frac{g}{v}$ (4) $\frac{v}{g}$

49. The speed of a swimmer in still water is 20 m/s. The speed of river water is 10 m /s and due east. If he is standing on the south bank and wishes to cross the river along the shortest path the angle at which he should make his stroke w.r.t. north is given by :-

(1) 45º west (2) 30º west

(3) 0º (4) 60º west

50. Two particles A and B, move with constant velocities $\vec{v}_1$ and $\vec{v}_2$. At the initial moment their position vector are $\vec{r}_1$ and $\vec{r}_2$ respectively. The condition for particles A and B for their collision is:

(1) $\vec{r}_1 \cdot \vec{v}_1 = \vec{r}_2 \cdot \vec{v}_2$

(2) $\vec{r}_1 \times \vec{v}_1 = \vec{r}_2 \times \vec{v}_2$

(3) $\vec{r}_1 - \vec{r}_2 = \vec{v}_1 - \vec{v}_2$

(4) $\frac{\vec{r}_1 - \vec{r}_2}{|\vec{r}_1 - \vec{r}_2|} = \frac{\vec{v}_2 - \vec{v}_1}{|\vec{v}_2 - \vec{v}_1|}$

Space for Rough Work

PART – B

Atomic masses : [H = 1, D = 2, Li = 7, C = 12, N = 14, O = 16, F = 19, Na = 23, Mg = 24, Al = 27, Si = 28, P = 31, S = 32, Cl = 35.5, K = 39, Ca = 40, Cr = 52, Mn = 55, Fe = 56, Cu = 63.5, Zn = 65, As = 75, Br = 80, Ag = 108, I = 127, Ba = 137, Hg = 200, Pb = 207]

SECTION – A : (Maximum Marks : 140)

- This section contains **THIRTY FIVE (35)** questions.
- Each question has **FOUR** options (1), (2), (3) and (4) **ONLY ONE** of these four option is correct
- Marking scheme :
- Full Marks : **+4** If ONLY the correct option is chosen.
- Zero Marks : **0** If none of the options is chosen (i.e. the question is unanswered).
- Negative Marks : **–1** In all other cases

51. The correct order of the acidic nature of oxides is in the order

(1) $NO < N_2O < N_2O_3 < NO_2 < N_2O_5$

(2) $N_2O < NO < N_2O_3 < NO_2 < N_2O_5$

(3) $N_2O_5 < N_2O < N_2O_3 < NO < NO_2$

(4) $N_2O_5 < N_2O_3 < NO_2 < N_2O$

52. The vapour pressure of pure A is 10 torr and at the same temperature when 1 g of B is dissolved in 20 gm of A, its vapour pressure is reduced to 9.0 torr. If the molecular mass of A is 200 amu, then the molecular mass of B is :

(1) 100 amu (2) 90 amu

(3) 75 amu (4) 120 amu

53. The correct sequence of decrease in the bond angle of the following hydrides is -

(1) $NH_3 > PH_3 > AsH_3 > SbH_3$

(2) $NH_3 > AsH_3 > PH_3 > SbH_3$

(3) $SbH_3 > AsH_3 > PH_3 > NH_3$

(4) $PH_3 > NH_3 > AsH_3 > SbH_3$

54. A binary liquid solution is prepared by mixing n-heptane and ethanol. Which one of the following statement is correct regarding the behaviour of the solution ?

(1) The solution is non-ideal, showing +ve deviation from Raoult's Law.

(2) The solution in non-ideal, showing –ve deviation from Raoult's Law.

(3) n-heptane shows +ve deviation while ethanol shows –ve deviation from Raoult's Law.

(4) The solution formed is an ideal solution.

55. Which one of the following statements is false

(1) Because of the compact nature of oxygen atom, it has less negative electron gain enthalpy than sulphur.

(2) Next to fluorine, oxygen has the highest electronegativity value amongst the elements (exclude zero group).

(3) There is large difference in the melting and boiling points of oxygen and sulphur because oxygen exists as diatomic molecules (O_2) where as sulphur exists as polyatomic molecules (S_8).

(4) None

Space for Rough Work

56. A complex of iron and cyanide ions is 100% ionised at 1m (molal). If its elevation in boiling point is 2.08K. (K_b = 0.52K mol^{-1} kg), then the complex is :

(1) $K_3[Fe(CN)_6]$

(2) $Fe(CN)_2$

(3) $K_4[Fe(CN)_6]$

(4) $Fe(CN)_4$

57. The equivalent conductivitys of two strong electrolytes at infinite dilution in H_2O (where ions move freely through a solution) at 25°C are given below :

$\Lambda^0_{CH_3COONa}$ = 91.0 Scm^2/equiv and

Λ^0_{HCl} = 426.2 Scm^2/equiv

What additional information/quantity one needs to calculate Λ^o of an aqueous solution of acetic acid :

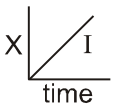
(1) The limiting equivalent conductivity of H^+ ($\lambda^\circ_{H^+}$)

(2) Λ^o of chloroacetic acid ($ClCH_2COOH$)

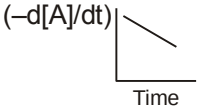
(3) Λ^o of NaCl

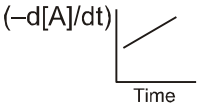
(4) Λ^o of CH_3COOK

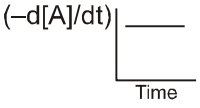
58. Graph between concentration of the product and time of the reaction A $\rightarrow$ B is of the type

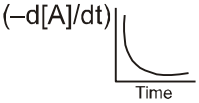


Hence graph between – d[A]/dt and time will be of the type :

(1) 

(2) 

(3) 

(4) 

59. For the redox reaction :

$Zn(s) + Cu^{2+}$ (0.1 M) $\rightarrow Zn^{2+}$ (1 M) + Cu(s)

taking place in a cell, E^o_{cell} is 1.10 volt. E_{cell} for the cell will be : $\left(\frac{2.303\ RT}{F} = 0.0591\right)$

(1) 2.14 V (2) 1.80 V

(3) 1.07 V (4) 0.82 V

60. For the reaction

$2A + B \longrightarrow 3C + D$

Which of the following does not express the reaction rate ?

(1) $-\frac{d[C]}{3dt}$ (2) $-\frac{d[B]}{dt}$

(3) $\frac{d[D]}{dt}$ (4) $\frac{-d[A]}{2dt}$

Space for Rough Work

61. Which of the following has the highest osmotic pressure

(1) 1.5 M magnesium sulphate ($MgSO_4$)

(2) 1.0 M sodium chloride (NaCl)

(3) 1.5 M aluminum nitrate ($Al(NO_3)_3$

(4) 1.5 M calcium chloride ($CaCl_2$)

62. If 0.1 M solution of glucose and 0.1 M urea solution are placed on two sides of a semipermeable membrane to equal heights, then it will be correct to say that :

(1) There will be no net movement across the membrane

(2) Glucose will flow towards urea solution

(3) Urea will flow towards glucose solution

(4) Water will flow from urea solution towards glucose solution.

63. In a first order reaction the a/(a–x) was found to be 8 after 10 minute. The rate constant is

(1) $(2.303 \times 3\log 2)/10$

(2) $(2.303 \times 2\log 3)/10$

(3) $10 \times 2.303 \times 2\log 3$

(4) $10 \times 2.303 \times 3 \log 2$

64. Zn can not displace following ions from their aqueous solution :

(1) Ag^+

(2) Cu^{2+}

(3) Fe^{2+}

(4) Na^+

65. For a zero order reaction. Which of the following statement is false :

(1) the rate is independent of the temperature of the reaction.

(2) the rate is independent of the concentration of the reactants.

(3) the half life depends as the concentration of the reactants.

(4) the rate constant has the unit mole lt^{-1} sec^{-1}.

66. Standard electrode potential of three metals X, Y and Z are – 1.2 V, + 0.5 V and – 3.0 V respectively. The reducing power of these metals will be :

(1) Y > Z > X (2) X > Y > Z

(3) Z > X > Y (4) X > Y > Z

67. For a cell given below :

$Ag \mid Ag^+ \| Cu^{2+} \mid Cu$

$\quad\quad - \quad\quad +$

$Ag^+ + e^- \longrightarrow Ag \quad\quad E^o = x$

$Cu^{2+} + 2e^- \longrightarrow Cu, \quad\quad E^o = y$

The value of E^o_{cell} is :

(1) x + 2y (2) 2x + y

(3) y –x (4) y – 2x

68. Match the list-I with List–II and select the correct answer using the codes given below with the lists.

List–I (Compounds) List-II (Shape)

(a) XeF_4 (i) Tetrahedral

(b) XeO_3 (ii) Square planar

(c) XeO_4 (iii) Trigonal bipyramidal

(d) XeO_3F_2 (iv) Pyramidal

(1) a – iv, b – iii, c – i, d – ii

(2) a – ii, b – iv, c – i, d – iii

(3) a – i, b – iv, c – ii, d – iii

(4) a – ii, b – i, c – iii, d – iv

Space for Rough Work

69. In which of the following pairs hybridisation of the central atom is same:

(1) ClF_3, ClF_3O

(2) $ClFO_2$, ClF_3O_2

(3) $[ClF_2O]^+$, $[ClF_4O]^-$

(4) $[XeO_2F_4]$, $[XeO_2F_2]$

70. How many ml water should be added to 100ml HCl solution (d = 1.5 g/ml) 80% by wt. to make it a solution of 40% by wt. of density = 1 g/ml.

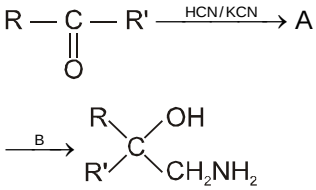
(1) 100 ml

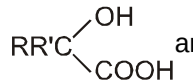
(2) 300 ml

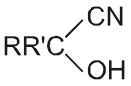
(3) 200 ml

(4) none of these

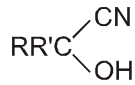
71. A and B in the following reactions are :



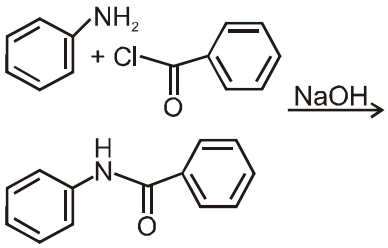
(1) A $\Rightarrow$  and B $\Rightarrow$ NH_3

(2) A $\Rightarrow$  and B $\Rightarrow$ $H_3O^{\oplus}$

(3) A $\Rightarrow$ $RR'CH_2CN$ and B $\Rightarrow$ NaOH

(4) A $\Rightarrow$  and B $\Rightarrow$ $LiAlH_4$

72. The following reaction



is known by the name :

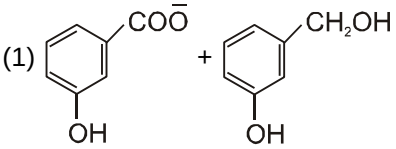
(1) Friedel-Craft's reaction

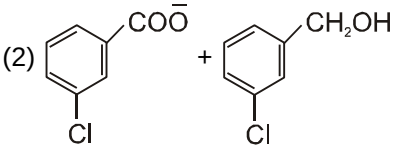
(2) Perkin's reaction

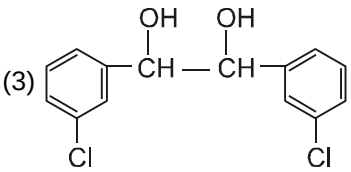
(3) Acetylation reaction

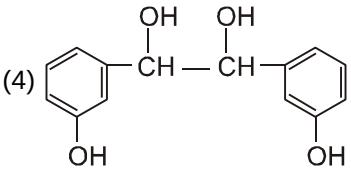
(4) Schotten-Baumen reaction

73. When m-chlorobenzaldehyde is treated with 50% KOH solution, the product(s) obtained is (are) :

(1) 

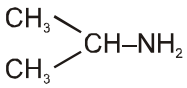
(2) 

(3) 

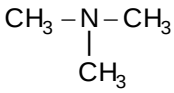
(4) 

Space for Rough Work

74. An organic compound (C_3H_9N) (A), when treated with nitrous acid, gave an alcohol and N_2 gas was evolved. (A) on warming with $CHCl_3$ and caustic potash gave (C) which on reduction gave isopropylmethylamine. Predict the structure of (A).

(1) 

(2) $CH_3CH_2—NH—CH_3$

(3) 

(4) $CH_3CH_2CH_2—NH_2$

75. In this reaction :

$CH_3CHO + HCN \longrightarrow CH_3CH(OH)CN \xrightarrow{H_2O} CH_3CH(OH)COOH$

an asymmetric centre is generated. The acid obtained would be :

(1) D-isomer

(2) L-isomer

(3) 50% D + 50% L-isomer

(4) 20% D + 80% L-isomer

76. Consider the following reaction,

$$\text{Ethanol} \xrightarrow{PBr_3} X \xrightarrow{\text{alc. KOH}} Y \xrightarrow[\text{(ii) } H_2O,\ \text{heat}]{\text{(i) } H_2SO_4,\ \text{room temperature}} Z\ ;$$

the product Z, is

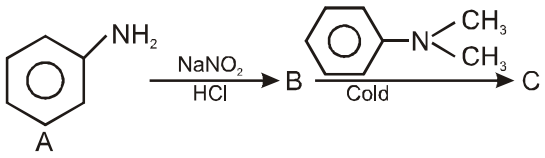
(1) $CH_2=CH_2$

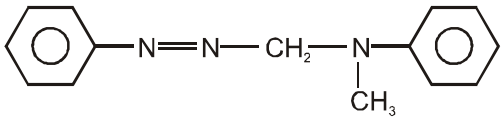
(2) $CH_3CH_2OCH_2CH_3$

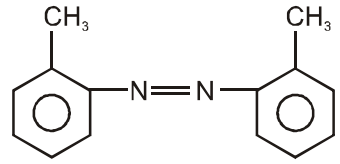
(3) $CH_3CH_2OSO_3H$

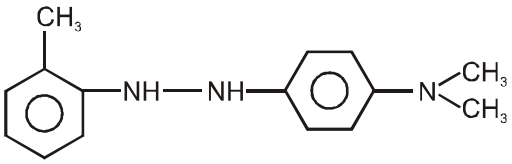
(4) CH_3CH_2OH

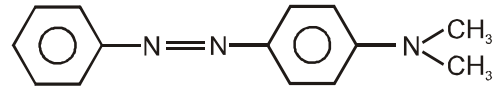
77. In a reaction of aniline a coloured products C was obtained. The structure of C would be :



(1) 

(2) 

(3) 

(4) 

78. The major organic product in the reaction,

$CH_3OCH(CH_3)_2 + HI \rightarrow$ Product, is/are

(1) $CH_3OH + (CH_3)_2CHI$

(2) $ICH_2OCH(CH_3)_2$

(3)

(4) $CH_3I + (CH_3)_2CHOH$

79. In the following reaction, $C_6H_5CH_2Br \xrightarrow[2.\ H_3O^+]{1.\ Mg\ Ether} X$, the product 'X' is :

(1) $C_6H_5CH_2OCH_2C_6H_5$

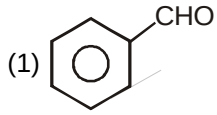
(2) $C_6H_5CH_2OH$

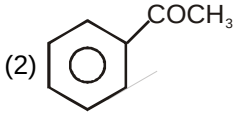
(3) $C_6H_5CH_3$

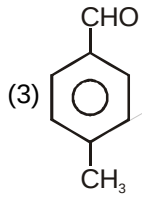
(4) $C_6H_5CH_2CH_2C_6H_5$

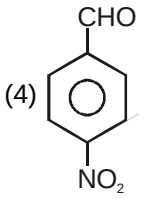
Space for Rough Work

80. Which one is most reactive towards Nucleophilic addition reaction ?

(1) 

(2) 

(3) 

(4) 

81. Identify Z in the sequence of reactions :

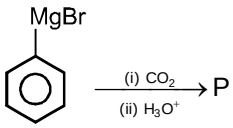
$$CH_3CH_2CH{=}CH_2 \xrightarrow[H_2O_2]{HBr} Y \xrightarrow{C_2H_5ONa} Z$$

(1) $CH_3–(CH_2)_3–O–CH_2CH_3$

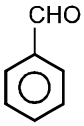
(2) $(CH_3)_2CH_2–O–CH_2CH_3$

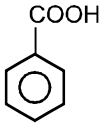
(3) $CH_3(CH_2)_4–O–CH_3$

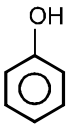
(4) $CH_3CH_2–CH(CH_3)–O–CH_2CH_3$

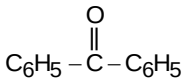
82. 

In the above reaction product 'P' is

(1) 

(2) 

(3) 

(4) 

83. Match the compounds given in List I with their characteristic reactions given in List II. Select the correct option.

	List-I (Compounds)		**List-II (Reactions)**
(a)	$CH_3(CH_2)_3NH_2$	**(i)**	Alkaline hydrolysis
(b)	$CH_3C{\equiv}CH$	**(ii)**	With KOH and $CHCl_3$ produces bad smell
(c)	$CH_3CH_2COOCH_3$	**(iii)**	Gives white ppt. with ammonical $AgNO_3$
(d)	$CH_3CH(OH)CH_3$	**(iv)**	With Lucas reagent cloudiness appears after 5 minutes

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

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

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

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

84. Among the following which one can have a meso form ?

(1) $CH_3CH(OH)CH(Cl)C_2H_5$

(2) $CH_3CH(OH)CH(OH)CH_3$

(3) $C_2H_5CH(OH)CH(OH)CH_3$

(4) $HOCH_2CH(Cl)CH_3$

85. Which of the following presents the correct order of the acidity in the given compounds ?

(1) $BrCH_2COOH > ClCH_2COOH > FCH_2COOH > CH_3COOH$

(2) $FCH_2COOH > ClCH_2COOH > BrCH_2COOH > CH_3COOH$

(3) $CH_3COOH > BrCH_2COOH > ClCH_2COOH > FCH_2COOH$

(4) $FCH_2COOH > CH_3COOH > BrCH_2COOH > ClCH_2COOH$

Space for Rough Work

SECTION – B : (Maximum Marks : 40)

- ❖ This section contains **FIFTEEN (15)** questions. You have attempt any 10 Questions. If a student attempts more than 10 questions, then only first 10 questions which he has attempted will be checked.
- ❖ Each question has **FOUR** options (1), (2), (3) and (4) **ONLY ONE** of these four option is correct.
- ❖ Marking scheme :
- ➢ Full Marks : **+4** If ONLY the correct option is chosen.
- ➢ Zero Marks : **0** If none of the options is chosen (i.e. the question is unanswered).
- ➢ Negative Marks : **–1** In all other cases.

86. Select incorrect statement :

(1) Oxidation number of chromium in Cr_2O_3 is +3.

(2) Sum of oxidation number of all the sulphur atoms in $Na_2S_4O_6$ is 0.

(3) Sum of oxidation number of all the phosphorous atoms in $H_4P_2O_7$ is +10.

(4) In I_2O_5 average oxidation number of I = + 5

87. Find out the total numbers of ions/atoms having greater ionic radii then oxygen atom.

Al^{3+}, Mg^{2+}, S^{2-}, O^{2-}, F^-, Br^-, I^-, Ne, He, F, C

(1) 04.00 (2) 06.00

(3) 03.00 (4) 01.00

88. The first ionization enthalpy values (in KJ mol^{-1}) of group-13 elements are :

B	Aℓ	Ga	In	Tℓ
801	577	579	558	589

Correct explanation for deviation from 'In' to 'Tℓ' is :

(1) Due to poor shielding by 4f & 5d orbitals, effective nuclear charge increases

(2) Greater the value of n greater will be ionization energy

(3) Due to inert pair effect

(4) Actinoid contraction.

89. The first ionization enthalpy values (in KJ mol^{-1}) of group-13 elements are :

B	Aℓ	Ga	In	Tℓ
801	577	579	558	589

Correct explanation for deviation from 'In' to 'Tℓ' is :

(1) Due to poor shielding by 4f & 5d orbitals, effective nuclear charge increases

(2) Greater the value of n greater will be ionization energy

(3) Due to inert pair effect

(4) Actinoid contraction.

90. The correct order of first ionization enthalpy of the given elements is:

(1) C < N < Si < P

(2) N < Si < C < P

(3) Si < P < C < N

(4) P < Si < N < C

91. Consider the isoelectronic ions, K^+, S^{2-}, Cl^- and Ca^{2+}. The radii of these ionic species follow the order –

(1) $Ca^{2+} > K^+ > Cl^- > S^{2-}$

(2) $Cl^- > S^{2-} > K^+ > Ca^{2+}$

(3) $S^{2-} > Cl^- > K^+ > Ca^{2+}$

(4) $K^+ > Ca^{2+} > S^{2-} > Cl^-$

Space for Rough Work

92. Match List-I with List-II:

	List-I		List-II
(A)	$[PtCl_4]^{2-}$	(I)	sp^3d
(B)	BrF_5	(II)	d^2sp^3
(C)	PCl_5	(III)	dsp^2
(D)	$[Co(NH_3)_6]^{3+}$	(IV)	sp^3d^2

Choose the most appropriate answer from the options given below:

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

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

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

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

93. The correct order of increasing intermolecular hydrogen bond strength is :

(1) $HCN < H_2O < NH_3$

(2) $HCN < CH_4 < NH_3$

(3) $CH_4 < HCN < NH_3$

(4) $CH_4 < NH_3 < HCN$

94. Bonding in which of the following diatomic molecule(s) become(s) stronger, on the basis of MO Theory, by removal of an electron.

(A) NO (B) N_2

(C) O_2 (D) C_2

(E) B_{2s}

Choose the most appropriate answer from the options given below.

(1) (A),(B),(C) only

(2) (B),(C),(E) only

(3) (A),(C) only

(4) (D) only

95. Among BeF_2, BF_3, H_2O, NH_3, CCl_4 and HCl, the number of molecule with non-zero net dipole moment is _____.

(1) 02.00 (2) 04.00

(3) 03.00 (4) 01.00

96. The reagent used for the separation of acetaldehyde from acetophenone is :

(1) $NaHSO_3$ (2) $C_6H_5NHNH_2$

(3) NH_2OH (4) NaOH + I_2

97. How many π and σ bond are present in ethylene :

(1) 5 σ , 1 π (2) 3 σ , 3 π

(3) 2 σ ,4 π (4) 4 σ , 2 π

98. **Assertion :** The presence of nitro group facilitates nucleophilic substitution reaction in aryl halides

Reason : The intermediate carbanion is stabilized due to the presence of nitro group.

(1) If both assertion and reason are true and reason is the correct explanation of assertion.

(2) If both assertion and reason are true but reason is not the correct explanation of assertion.

(3) If Assertion is true but reason is false.

(4) If both assertion and reason are false.

99. Which of the following is correct for stability of phenoxide ion?

(1) Resonating structure of benzene ring

(2) Localization of π-electrons in phenoxide ion

(3) Delocalization of π-electrons in phenoxide ion

(4) All of the above

100. **Assertion :** The boiling point of n-alkanes increases with increase in number of carbons.

Reason : vander waals force of attraction increases with increase in number of carbon and molecular mass.

(1) If both assertion and reason are true and reason is the correct explanation of assertion.

(2) If both assertion and reason are true but reason is not the correct explanation of assertion.

(3) If Assertion is true but reason is false.

(4) If both assertion and reason are false.

Space for Rough Work

PART–C
Botany

SECTION – A : (Maximum Marks : 140)

- This section contains **THIRTY FIVE (35)** questions.
- Each question has **FOUR** options (1), (2), (3) and (4) **ONLY ONE** of these four option is correct
- Marking scheme :
  - Full Marks : **+ 4** If ONLY the correct option is chosen.
  - Zero Marks : **0** If none of the options is chosen (i.e. the question is unanswered).
  - Negative Marks : **–1** In all other cases

101. Selaginella and Salvinia are considered to represent a significant step toward evolution of seed habit because:
(1) Female gametophyte is free and gets dispersed like seeds
(2) Female gametophyte lacks archegonia.
(3) Megaspores possess endosperm and embryo surrounded by seed coat.
(4) Embryo develops in female gametophyte which is retained on parent sporophyte.

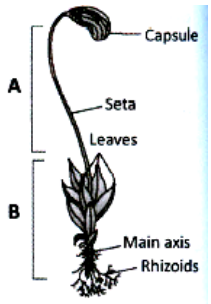
102. Which of the following is incorrect for Gymnosperm
(1) Perennial pinnate leaves found in cycas
(2) Fungal association is found in root of pinus
(3) Male gametophyte is highly reduced
(4) Antheridia develop microsporangia to form microspore

103. Mark wrong statement:
(1) Gymnospermic gametophyte remain within sporangia retained on sporophyte
(2) Development of zygote into embryo occur within female gametophyte in pteridophyte, gymnosperm & Angiosperms.
(3) Leafy gametophyte is found in all bryophytes.
(4) Sporophyte of bryophyte derive nutrition from photosynthetic gametophyte.

104. Fill in the blanks with suitable option :
(1) The _____ have flagellated isogametes.
(2) Fusion between one large, non-motile female gamete and a smaller,_____ male gamete is called oogamy.
(3) Anisogamous condition is found in _____
(4) Non-flagellated isogametes found in _____
(1) Ulothrix, Motile, Udorina, spirogyra
(2) Volvox, Non motile, chlamydomonas, chlorella
(3) Spirogyra, motile, chlamydomonas, chlorella
(4) Chlamydomonas, non-motile, spirogyra, Ulothrix

105. How many character belong to pheophyceae :
(i) Presence of Chl-a and b
(ii) Great variation is size & form
(iii) Stored food as floridian starch
(iv) Pyriform zoospore
(v) Absence of motile gametes
(vi) Laterally attached flagella in zoospore
(1) 5 (2) 4
(3) 3 (4) 2

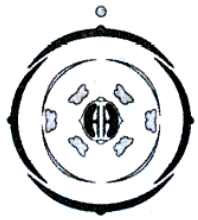
106. In the following stage of Funaria, select the true statement :



(1) A is sporophyte and is independent
(2) A is sporophyte and is dependent on B, which is gametophyte
(3) B is sporophyte and is independent
(4) B is sporophyte and is dependent on A for food, which is gametophyte

107. **Assertion :** There is progressive reduction in gametophytic phase in plants evolution**.**
Reason : Most distinct alternation of generation found in pteridophyte.
(1) Both Assertion and Reason are true and Reason is correct explanation of Assertion.
(2) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
(3) Assertion is true, but Reason is false.
(4) Assertion is false, but Reason is true.

108. On the basis of floral diagram, expected floral formula will be :



(1) ⊕ ♀ $K_{2+2}\ C_4\ A_{2+4}\ \underline{G}_{(2)}$

(2) ⊕ ♂ $K_4\ C_4\ A_6\ \underline{G}_{(1)}$

(3) % ♂ $K_4\ C_4\ A_{2+4}\ \underline{G}_{(1)}$

(4) % ♂ $K_{2+2}\ C_4\ A_6\ \underline{G}_{(3)}$

109. Which of the following represent the members of Fabaceae family?
(1) Soyabean, Tomato, Belladona
(2) Petunia, Sunhemp, Trifolium
(3) Lupin, Sweet pea, Sunhemp
(4) Asparagus, Aloe, Gram

110. Stilt roots are reported from
(1) Maize (2) Radish
(3) Mango ginger (4) Bryophyllum

111. Which of the following statements is false about leaf ?
(1) A leaf is said to be simple, when its lamina is entire or when incised, the incisions do not touch the midrib
(2) A leaf is said to be compound when the incisions of lamina reach upto the midrib breaking into a number of leaflets
(3) Leaf is the most important vegetative organ for photosynthesis
(4) Leaf is not a transpiratory organ

112. P and Q are two types of phyllotaxy given in diagrams. Which of the following options having one example each of P and Q?

	P	Q
(1)	China rose	Guava
(2)	Calotropis	Sunflower
(3)	Guava	Alstonia
(4)	Mustard	Alstonia

113. Presence of leaf base pulvinus is the characteristic of
(1) Cycas leaf (2) Fern leaf
(3) Banana leaf (4) leguminous plant

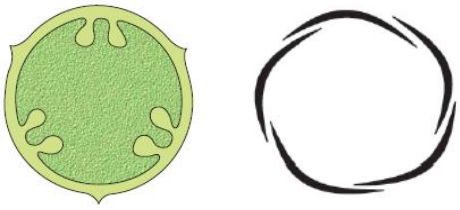
114. Sphagnum is used as a packing material for transporting of living materials because of its
(1) Acidic nature as it does not undergo decay
(2) Creeping capacity
(3) Water holding capacity
(4) Both (1) and (3).

115. Protonema
(1) is a stage of gametophytic generation
(2) is a creeping, green, branched and developes directly from a spore
(3) produces lateral bud which forms leafy plant body
(4) Statements (1), (2) and (3) are correct.

116. Which of the following is not correct?
(1) Both Bryophytes and pteridophytes bear zoodiogamy
(2) Aplanogamy is observed in spirogyra
(3) Agar-agar obtains from gelidium and gracillaria red algae.
(4) Seeds are found in both pteridophyta and gymnosperms

117. Heterosporous plant is
(1) Ginkgo
(2) Sphagnum
(3) Pteridium
(4) Moss

118.



(1) (2)

Above diagrams (1) & (2) represent
(1) (1) Marginal placentation (2) Valvate aestivation
(2) (1) Parietal placentation (2) Twisted aestivation
(3) (1) Basal placentation (2) Imbricate aestivation
(4) (1) Parietal placentation (2) Quincuncial aestivation

119. Life cycle of *Chlamydomonas* / *Spirogyra* / *Ulothrix* is
(1) Haplontic (2) Haplobiontic
(3) Diplontic (4) Diplobiontic

120. Pyrenoids are found in algae in
(1) Cytoplasm (2) Chloroplast
(3) Nucleus (4) Primordial utricle

121. Fruit of coconut is
(1) Berry (2) Cypsela
(3) Drupe (4) Cremocarp.

122. From which part of coconut coir is obtained
(1) Pericarp (2) Mesocarp
(3) Epicarp (4) Endocarp

123. Tetradynamous condition is found in
(1) *Hibiscus rosa-sinensis*
(2) *Ocimum sanctum*
(3) *Helianthus annuus*
(4) *Brassica compestris*

124. In monocots fibrous root system arise from `
(1) Radicle
(2) Apex of stem
(3) Base of stem
(4) Any where from stem

125. **Assertion A:** A flower is defined as modified shoot wherein the shoot apical meristem changes to floral meristem.
Reason R: Internode of the shoot gets condensed to produce different floral appendages laterally at successive nodes instead of leaves. In the light of the above statements, choose the correct answer from the options given below:
(1) Both A and R are true but R is NOT the correct explanation of A.
(2) A is true but R is false.
(3) A is false but R is true.
(4) Both A and R are true and R is the correct explanation of A.

126. Which statement is wrong regarding monocot root ?
(i) There are usually more than six (polyarch) xylem bundles
(ii) Pith is large & well developed
(iii) Monocot roots do not undergo any secondary growths
(iv) The pith is small or inconspicuous
(1) (ii) & (iv) (2) (ii) only
(3) (iv) only (4) (i) only

127. Match Column-I with column-II.

Column I		**Column II**	
(i)	Casparian strips	(a)	Endodermis
(ii)	Initiation of lateral roots & vascular cambium	(b)	Pericycle
(iii)	Passage cells	(c)	Transfusion cells
(iv)	Rhizodermis	(d)	Suberized cells of outer layer of cortex

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

128. **Statement-I:** The trichomes are unicellular elongations of the epidermal cells.
Statement-II: Trichomes helps in absorption of water and minerals from the soil.
(1) Statement-I and Statement-II are true and Statement-II is the correct explanation of Statement-I.
(2) Statement-I and Statement-II are true, but Statement-II is not the correct explanation of Statement -I
(3) Statement-I is true, but Statement -II is false
(4) Statement-I is false, but Statement -II is true

129. Match the following and choose the correct option from below.

(i) Cuticle	(p) Guard cells
(ii) Bulliform cells	(q) Single layer
(iii) Stomata	(r) Waxy layer
(iv) Epidermis	(s) Empty colourless cell

(1) (i)-(r), (ii)-(s), (iii)-(p), (iv)-(q)
(2) (i)-(p), (ii)-(q), (iii)-(r), (iv)-(s)
(3) (i)-(r), (ii)-(q), (iii)-(s), (iv)-(p)
(4) (i)-(r), (ii)-(q), (iii)-(p), (iv)-(s).

130. **Assertion :** All tissues lying inside vascular cambium are called as bark.
Reason : Bark is made up of phellogen, phellem and phelloderm lying inside secondary phloem.
(1) Both Assertion and Reason are true and Reason is correct explanation of Assertion.
(2) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
(3) Assertion is true, but Reason is false.
(4) Assertion is false, but Reason is true.

131. Which statement is / are wrong with respect to leaf -
(a) In dorsiventral leaf abaxial epidermis generally bears more stomata than the adaxial epidermis.
(b) In dorsiventral leaf Mesophyll has Pallisade parenchyma & spongy parenchyma
(c) In grasses certain adaxial epidermal cells modified into bulliform cells
(d) In an isobilateral leaf the stomata are present on both the surface of the epidermis
(1) b and c (2) a, b and d
(3) c and d (4) None of these

132. Which of the following is absent in most of the monocotyledons :
(1) Phloem parenchyma
(2) Sieve tube
(3) Companion cells
(4) Water cavity

133. The radial conduction of water takes place by the :
(1) Ray parenchyma cells
(2) Sclereids
(3) Vessels
(4) Tracheids

134. Select correct option w.r.t phloem fibres :
(i) Selerenchymatous cells
(ii) Absent in primary phloem
(iii) Elongated, branched and pointed apices
(iv) Jute, flax and hemp are used commercially
(1) (i), (ii), (iii)
(2) (ii), (iii), (iv)
(3) (i), (ii), (iv)
(4) (i), (iii), (iv)

135. Conifers are adapted to tolerate extreme environmental conditions because of
(1) presence of vessels
(2) broad hardy leaves
(3) superficial stomata
(4) thick cuticle

SECTION – B : (Maximum Marks : 40)

- This section contains **FIFTEEN (15)** questions. **You have attempt any 10 Questions. If a student attempts more than 10 questions, then only first 10 questions which he has attempted will be checked.**
- Each question has **FOUR** options (1), (2), (3) and (4) **ONLY ONE** of these four option is correct
- Marking scheme :
  - Full Marks : **+4** If ONLY the correct option is chosen.
  - Zero Marks : **0** If none of the options is chosen (i.e. the question is unanswered).
  - Negative Marks : **–1** In all other cases

136. Coniferous leaves have
(1) Needle shape
(2) Thick cuticle
(3) Sunken stomata
(4) All

137. Which two are absent in female plant of Cycas?
(1) Female cone and fruit
(2) Archegonia and seed
(3) Ovule and tap root
(4) Seed and secondary growth

138. Which of the following statement is not correct
(1) The gymnosperms are plants in which the ovules are not enclosed by any ovary and remain exposed, both before and after fertilization
(2) The seeds that develop post fertilization are not covered
(3) The giant redwood tree sequoia is one of the tallest tree species
(4) In the gymnosperms the male and the female gametophytes have and independent free living existence

139. Mark the incorrect statement -
(1) Natural classification system is based on natural affinities among the organism.
(2) Phyllogenetic classification system based on evolutionary relationships between various organisms
(3) Artificial systems gave unequal weightage to vegetative and sexual characteristics
(4) Cytotaxanomy based on cytological information

140. Fucus shows
(1) Oogamy
(2) Diplontic life cycle
(3) Air vasicles
(4) All of the above

141. On the basis of given floral diagram, identify the incorrect statement :

(1) 10 stamens are arranged in two groups
(2) Carpel is single
(3) Polysepalous with imbricate as aestivation
(4) Polypetalous with vexillary aestivation

142. Axillary bud develops from :
(1) Shoot apical meristem
(2) Root apical meristem
(3) Intercalary meristem
(4) Mature cells

143. Which of the following is not secondary in origin?
(1) Interfascicular cambium
(2) Intrafascicular cambium
(3) Vascular cambium in dicot root
(4) None of the above

144. Collenchyma cells are much thickened at the corners due to deposition of
(1) Cellulose, hemicellulose, lignin
(2) Cellulose, hemicellulose, Pectin
(3) Cellulose, Suberin
(4) Suberin, lignin

145. Consider the following statements
(a) Vessels are interconnected through perforations in their common walls
(b) Xylem fibres have obliterated central lumens
(c) Central lumen of xylem fibres may either be septate or aseptate
Which statement(s) are true-
(1) Only a (2) Only b
(3) a and b (4) a, b and c

146. Identify the placentation and select the options with suitable examples In which it is found

(1) Primrose, Dianthus
(2) Marigold, Sunflower
(3) Tomato, Primrose
(4) Pea, China rose

147. Match the column A (type of root) with column B (example of plants) :

Column A	**Column B**
I. Tap roots	1. Maize
II. Fibrous roots	2. Mustard
	3. Wheat
	4. Sugarcane
	5. Neem

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

148. Photosynthetic organ in the plant body of brown algae:
(1) Roots
(2) Holdfast
(3) Stipe
(4) Frond

149. Sporophyte is partially dependent on gametophyte in
(1) *Lycopodium* (2) *Marchantia*
(3) *Funaria* (4) *Lilium*

150. Match the following
(a) Epiphyllous (i) Citrus
(b) Monoadelphous (ii) Pea
(c) Diadelphous (III)Chinarose
(d) Polyadelphous (iv) Lily
(1) a (ii) ,b(i),c (iii),d (iv)
(2) a (i) ,b(ii),c (iii),d (iv)
(3) a (iv) ,b(iii),c (i),d (ii)
(4)a (iv) ,b(iii),c (ii),d (i)

SECTION – B : (Maximum Marks : 40)

- This section contains **FIFTEEN (15)** questions. **You have attempt any 10 Questions. If a student attempts more than 10 questions, then only first 10 questions which he has attempted will be checked.**
- Each question has **FOUR** options (1), (2), (3) and (4) **ONLY ONE** of these four option is correct
- Marking scheme :
  - Full Marks : **+4** If ONLY the correct option is chosen.
  - Zero Marks : **0** If none of the options is chosen (i.e. the question is unanswered).
  - Negative Marks : **–1** In all other cases

151. In class Amphibia for which cloaca serves as common opening
(1) Urinary & reproductive tract
(2) Alimentary canal & urinary
(3) Urinary, Reproductive tract & Alimentary canal
(4) Reproductive & Alimentary canal

152. In earthworm, female genital pore
(1) is one pair & present in 18^{th} segment
(2) is only one & present an 14^{th} segment
(3) is one pair & present an 14^{th} segment
(4) is only one & present an 15^{th} segment

153. In cockroack respiration occurs through trachea. The openings of these tracheae are called.
(1) Spiral valves
(2) Spiracles
(3) Dermal pores
(4) slit pores

154. Match the column
(1) Four digits (i) Hind limbs
(2) Vocal sac (ii) Fore limbs
(3) Copulatory pad (iii) Male frog
(4) Five digits (iv) Fore limbs
(1) A - iii, B - ii, C - iv, D - i
(2) A - iii, B - i, C - iii, D - ii
(3) A - iv, B - iii, C - ii, D - i
(4) A - i, B - iv, C - iii, D – ii

155. In frog
(1) Fertilization is external & development is direct
(2) Fertilization is external & development is indirect
(3) Fertilization is internal & development is direct
(4) Fertilization is internal & development is indirect

156. Match the true pair
(1) The alimentary canal is short - Frog is herbivores
(2) The alimentary canal is short - Frog is omnivores
(3) The alimentary canal is long - Frog is omnivores
(4) The alimentary canal is short - Frog is carnivores

157. Match the column

	Organ		**Segments**
A	Testes	(i)	17^{th}-19^{th}
B	Spermathecae	(ii)	18^{th}
C	Male genital Pore	(iii)	10^{th}-11^{th}
D	Accessory glands	(iv)	6^{th}-9^{th}

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

158. The main function of compound epithelium is
(1) To provide protection
(2) Ultrafiltration
(3) Secrete mucus
(4) To line the endothelium of blood vessels

159. Select the correct one
(1) In Urochordata only head region has notochord.
(2) In Urochordata only in adults, notochord is present.
(3) In Urochordata only in larval tail has notochord
(4) In urochordata notochord is absent

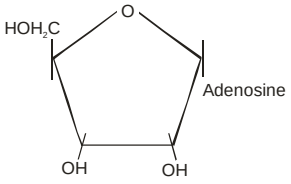
160. The fundamental characterstic of chordata is presence of nerve cord, which is
(1) dorsal & solid (2) Ventral & hollow
(3) Ventral & solid (4) Dorsal hollow

161. Here are certain statement about Cl_3.C.COOH experiment, in which we isolate micro molecules and macromolecules. Select the statement, which is incorrect
(1) Filtrate fraction is called acid soluble pool
(2) Any tissue from any organism could be subjected to this analysis
(3) Only few organic compounds are present in acid soluble pool
(4) Lipids, due to their solubility properties, will be present in acid insoluble pool

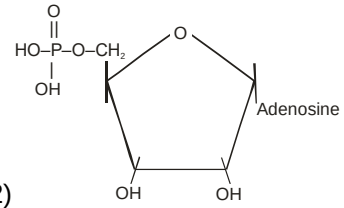
162. Here are certain statements about amino acids how many of these are incorrect?
(A) Contain an amino group and an acidic group as substituents on different carbon i.e. the α-carbon
(B) Protein amino acids are called α-amino acids.
(C) Based on the nature of R group, there are twenty amino acids
(D) If R group is hydroxy methyl, the amino acid is alanine.
(E) Chemical and physical properties of amino acid is based on R group, amino group and carboxyl group
(1) One (2) Two
(3) Three (4) Four

163. Which of the following chemical structure, correctly depicts adenylic acid molecule

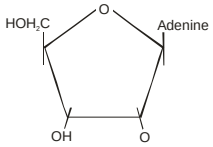
(1)



(2)



(3)



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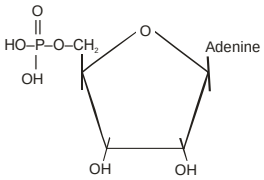


164. When an enzyme contains protein as well as non-protein parts, it is called conjugate enzyme, in such cases, protein part is called
(1) Apoenzyme (2) Coenzyme
(3) Holoenzyme (4) Proenzyme

165. Lecithin is
(1) Fatty acid
(2) Heteropolysaccharide
(3) Derivative of chitin
(4) Phospholipid

166. Macromolecules are formed by polymerization of monomers. Which of the following macromolecule is not composed of monomers?
(1) Protein (2) Polysaccharide
(3) Nucleic acid (4) Lipids

167. Here are some statements about nucleic acids, select the incorrect one
(1) Adenine and Guanine are purines, while cytosine, Thymine and Uracil are pyrimidines.
(2) The sugar found in polynucleotides is either ribose or 2' deoxyribose
(3) There are more than a dozen forms of DNA
(4) In B–DNA rise per base pair is 3.4A^o

168. It is said that elemental composition of living organisms and that of inanimate objects (like earth's crust) are similar in the sense that all the major elements are present in both. Then what would be the difference between these two groups? Choose a correct answer from among the following:
(1) Living organisms have more gold in them than inanimate objects
(2) Living organisms have more water in their body than inanimate objects
(3) Living organisms have more carbon, oxygen and hydrogen per unit mass than inanimate objects.
(4) Living organisms have more calcium in them than inanimate objects.

169. Glycogen is a homopolymer made of
(1) Glucose units
(2) Galactose units
(3) Ribose units
(4) Amino acids

170. Many organic substances are negatively charged e.g., acetic acid, while others are positively charged e.g., ammonium ion. An amino acid under certain conditions would have both positive and negative charges simultaneously in the same molecule. Such a form of amino acid is called
(1) Positively charged form
(2) Negatively charged form
(3) Neutral form
(4) Zwitter ionic form

171. Which of the following is component of cell walls of cell in plants. Fungi and also of the exoskeleton of arthropods?
(1) Polysaccharide (2) Protein
(3) Lipids (4) Disaccharide

172. **Assertion :** Adenine cannot pair with cytosine.
Reason : Because there would be two hydrogen atoms one at the bonding position and one at the other.
(1) Both Assertion and Reason are true and Reason is correct explanation of Assertion.
(2) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
(3) Assertion is true, but Reason is false.
(4) Assertion is false, but Reason is true.

173. Read the given statements and select the correct option.
Statement 1: Haemoglobin is an example of quaternary structure of proteins.
Statement 2: Haemoglobin molecule is composed of four polypeptide chains –two α–chains and two β–chains.
(1) Both statements 1 and 2 are correct and statement 2 is the correct explanation of statement 1.
(2) Both statements 1 and 2 are correct but statement 2 is not the correct explanation of statement 1.
(3) Statement 1 is correct and statement 2 is incorrect.
(4) Both statements 1 and 2 are incorrect.

174. **Assertion :** The primary character of chordates is the presence of dorsal hollow nerve cord.
Reason : Vertebral column is derived from the notochord
(1) Both Assertion and Reason are true and Reason is correct explanation of Assertion.
(2) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
(3) Assertion is true, but Reason is false.
(4) Assertion is false, but Reason is true.

175. Hind limbs of aves are adapted for –
(1) Walking (2) Swimming
(3) Perching (4) All

176. Select the incorrect statement–
(1) All vertebrates are chordates
(2) All chordates are vertebrates
(3) All urochordates are protochordates
(4) All cyclostomes are agnathans.

177. Tympanum represents ear in
(1) Bird and mammal
(2) Reptile and Mammal
(3) Amphibia and reptile
(4) Osteichthyes and amphibia

178. Here are some characters of birds, find the incorrect one
(1) Most of the birds can fly except fightless birds
(2) Hind limbs possess scales
(3) Skin dry, without glands, except oil gland at hind part of tail
(4) Endoskeleton is fully ossified and the long bones are hollow with air cavities.

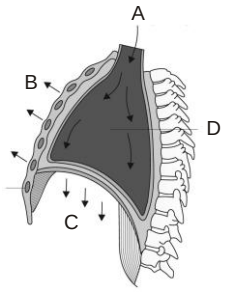
179. A characteristic common to all chordates that is lacking in other animal groups is
(1) the appearance of pharyngeal gill slits
(2) the presence of three germ layers
(3) the presence of vertebrae
(4) a true coelom

180. Match column-I (type of epithelium) with column-II (Description) and choose the correct option.

Column-I (Types of epithelium)	Column-II (Description)
A. Squamous	I. It is composed of a epithelium single-layer of cube-like cells
B. Cuboidal	II. Having cilia on their free epithelium surface
C. Columnar	III. It is composed of a single epithelium layer of tall and slender cells
D. Ciliated	IV. It is made up of a single thin epithelium layer of flattened cells with irregular boundaries

(1) A – IV; B – I; C – III; D – II
(2) A – I; B – IV; C – III; D – II
(3) A – IV; B – I; C – II; D – III
(4) A – IV; B – III; C – I; D – II

181. The figure given below depicts the mechanism of breathing. In which one of the options given below, the parts A, B, C and D are **correctly** identified.



(1) A – Air entering lungs
B – Ribs and sternum returned to original position
C – Diaphragm relaxed
D – Volume of thorax decreased

(2) A – Air expelled from lungs
B – Ribs and sternum returned to original position
C – Diaphragm relaxed
D – Volume of thorax decreased

(3) A – Ribs and sternum returned to original position
B – Air entering lungs
C – Diaphragm contracted
D – Volume of thoracic cavity increased

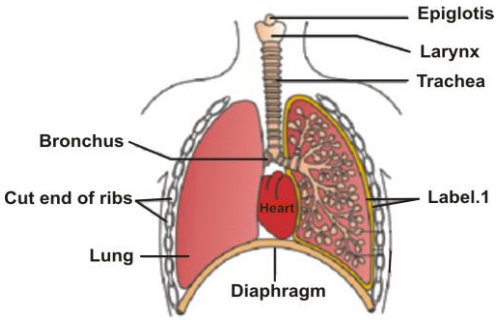
(4) A – Air entering into the lungs
B – Ribs and sternum raised
C – Diaphragm contracted
D – Volume of thoracic cavity increased

182. Match the items in Column-I with those in Column-II :

Column-A	**Column-B**
A. Aquatic Molluscs	1. Moist cuticle
B. Birds	2. Lungs
C. Insects	3. Gills
D. Earthworm	4. Tracheal tubes

(1) A $\rightarrow$ 3, B $\rightarrow$ 2, C $\rightarrow$ 4, D $\rightarrow$ 1
(3) A $\rightarrow$ 3, B $\rightarrow$ 2, C $\rightarrow$ 1, D $\rightarrow$ 4
(2) A $\rightarrow$ 2, B $\rightarrow$ 3, C $\rightarrow$ 4, D $\rightarrow$ 1
(4) A $\rightarrow$ 2, B $\rightarrow$ 3, C $\rightarrow$ 1, D $\rightarrow$ 4

183. Undergiven diagram is of lungs in thoracic cavity, identify thew structure marked as label-1



(1) alveoli
(2) pleural membranes
(3) cuboidal cells
(4) diaphragm

184. Which of the following sequences are correct to initiate expiration?
I. Relaxation of external intercostal muscles and return of diaphragm and sternum to their normal position
II. Air expelled from lungs.
III. Volume of thorax decreases
IV. Intrapulmonary pressure increases
(1) I, III, IV, II (2) II, IV, III, I
(3) IV, III, II, I (4) I, II, III, IV

185. The narrowest and most numerous tubes of lungs are termed as
(1) hilum (2) bronchus
(3) alveoli (4) bronchioles

SECTION – B : (Maximum Marks : 40)

- This section contains **FIFTEEN (15)** questions. **You have attempt any 10 Questions. If a student attempts more than 10 questions, then only first 10 questions which he has attempted will be checked.**
- Each question has **FOUR** options (1), (2), (3) and (4) **ONLY ONE** of these four option is correct
- Marking scheme :
  - Full Marks : **+4** If ONLY the correct option is chosen.
  - Zero Marks : **0** If none of the options is chosen (i.e. the question is unanswered).
  - Negative Marks : **–1** In all other cases

186. Muscles related to inspiration are
(1) External intercoastal muscles
(2) Internal intercoastal muscles
(3) Ciliary muscles
(4) Cardiac muscle

187. Match the followings correctly

Animals	**Respiratory Organs**
A. Earthworms	I. Lungs
B. Aquatic arthropods	II. Trachea
C. Fishes	III. Gills
D. Birds / Reptiles	IV. Moist cuticle
E. Insects	

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

188. Vital capacity of lung is equal to
(1) IRV + ERV + TV
(2) IRV + ERV + TV -RV
(3) IRV + ERV + TV + RV
(4) IRV + ERV

189. Volume of air remaining in lungs after maximal expiratory effort is :
(1) Vital capacity (2) Total lung capacity
(3) Tidal volume (4) Residual volume

190. In comparison to solubility of O_2, in blood the solubility of CO_2 is
(1) 20 - 25 times lesser
(2) Slightly higher
(3) Slightly lower
(4) 20 - 25 times higher

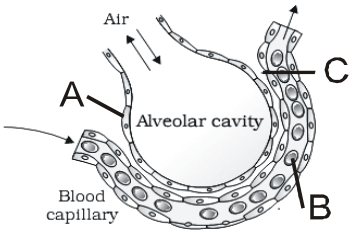
191. The partial pressure of oxygen in alveolar air and oxygenated blood respectively.
(1) 40 mm Hg, 45 mm Hg
(2) 104 mm Hg, 95 mm Hg
(3) 159 mm Hg, 104 mm Hg
(4) 104 mm Hg, 40 mm Hg

192. Match the column-A with column-B

	Column A		**Column B**
i	IRV	a	1200 ml
ii	ERV	b	1000 ml
iii	TV	c	2500 ml
iv	RV	d	500 ml

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

193.



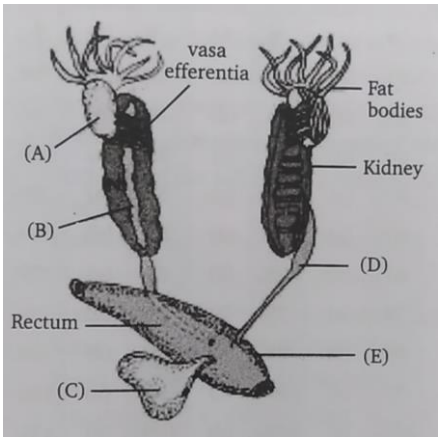
Identifiy A, B & C
(1) A = Alveolar wall, B = basement membrane, C = R.B.C
(2) A = Alveolar wall, B = R.B.C, C = basement membrane
(3) A = basement membrane, B = Alveolar wall, C = R.B.C
(4) A =R.B.C, B = basement membrane, C = Alveolar wall

194. Which of the following factors favour the formation of oxyhaemoglobin in lungs ?
(1) $PO_2 \downarrow$, PCO_2 , = , H^+ = , Temperature
(2) PO_2 = , PCO_2 , $H^+ = \downarrow$, Temperature
(3) PO_2 = , $PCO_2 = \downarrow$, pH = or $H^+ = \downarrow$, Temperature = $\downarrow$
(4) $PO_2 = \downarrow$, PCO_2 = , pH = , Temperature= $\downarrow$

195. Inflammation of the lung covering causing , severe chest pain is
(1) Emphysema (2) Pleurisy
(3) Asphyxia (4) Hypoxia

196. Assertion : Oxyhaemoglobin dissociates near the organ tissue due to Bohr effect and O_2 is released.
Reason : Increased CO_2 concentration reduces the affinity of haemoglobin for oxygen.
(1) Both Assertion and Reason are true and Reason is correct explanation of Assertion.
(2) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
(3) Assertion is true, but Reason is false.
(4) Assertion is false, but Reason is true.

197. Identify the structures labelled as



	A	B	C	D	E
(	Tes	Cloa	Adre glan	Urinary bladder	Urinogenital duct
(	Tes	Cloa	Adre glan	Adrenal gland	Urinogenital duct
(	Tes	Adre glan	Urin blad	Urinogenital duct	Cloaca
(	Tes	Adre glan	Adre glan	Cloaca	Urinogenital duct

198. Read the given statements and select the correct option.
Statement 1 : Low temperature destroys enzymes by causing their denaturation.
Statement 2 : High temperature preserves the enzymes in their inactive stage.
(1) Both statements 1 and 2 are correct and statement 2 is the correct explanation of statement 1.
(2) Both statements 1 and 2 are correct but statement 2 is not the correct explanation of statement 1.
(3) Statement 1 is correct and statement 2 is incorrect.
(4) Both statements 1 and 2 are incorrect.

199. Most abundant enzyme is
(1) Catalase (2) Rubisco
(3) Nitrogenase (4) Invertase.

200. In the modern system of nomenclature which one of the following enzyme occupies 1st position
(1) Oxidoreductase (2) Transferase (3) Hydrolase (4) Ligase