

NEET(UG) 2023 EXAMINATION

Question Paper and Key

Date: 07-05-2023

Code: F4

Max Marks : 720M

PHYSICS

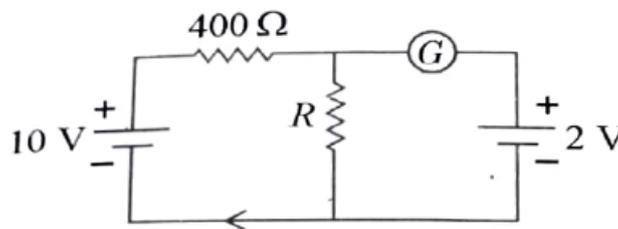
Max. Marks: 180

SECTION – A

You have to attempt all 35 questions from Section-A

Marking scheme: +4 for correct answer, -1 for Incorrect answer

1. If the galvanometer G does not show any deflection in the circuit shown, the value of R is given by:



- | | |
|----------|----------|
| 1) 50 Ω | 2) 100 Ω |
| 3) 400 Ω | 4) 200 Ω |

Key: 2

2. A full wave rectifier circuit consists of two p-n junction diodes, a centre-trapped transformer, capacitor and a load resistance. Which of these components remove the ac ripple from the rectified output?

- | | |
|------------------------|---------------------------------|
| 1) p-n junction diodes | 2) Capacitor |
| 3) Load resistance | 4) A centre-trapped transformer |

Key: 2

3. A Carnot engine has an efficiency of 50% when its source is at a temperature 327°. The temperature of the sink is:

- | | |
|----------|----------|
| 1) 15°C | 2) 100°C |
| 3) 200°C | 4) 27°C |

Key: 4

4. Light travels a distance x in time t_1 in air and $10x$ in time t_2 in another denser medium. What is the critical angle for this medium?

1) $\sin^{-1}\left(\frac{10t_2}{t_1}\right)$

2) $\sin^{-1}\left(\frac{t_1}{10t_2}\right)$

3) $\sin^{-1}\left(\frac{10t_1}{t_2}\right)$

4) $\sin^{-1}\left(\frac{t_2}{t_1}\right)$

Key: 3

5. The angular acceleration of a body, moving along the circumference of a circle, is:

- 1) along the radius towards the centre 2) along the tangent to its position
3) along the axis of rotation 4) along the radius, away from centre

Key: 3

6. The venturi-meter works on:

- 1) Bernoulli's principle 2) The principle of parallel axes
3) The principle of perpendicular axes 4) Huygen's principle

Key: 1

7. The half life of a radioactive substance is 20 minutes. In how much time, the activity of substance

drops to $\left(\frac{1}{16}\right)^{\text{th}}$ of its initial value?

- 1) 40 minutes 2) 60 minutes
3) 80 minutes 4) 20 minutes

Key: 3

8. The errors in the measurement which arise due to unpredictable fluctuations in temperature and voltage supply are:

- 1) Personal errors 2) Least count errors
3) Random errors 4) Instrumental errors

Key: 3

9. An electric dipole is placed at an angle of 30° with an electric field of intensity $2 \times 10^5 \text{NC}^{-1}$. It experiences a torque equal to 4 Nm. Calculate the magnitude of charge on the dipole, if the dipole length is 2 cm.

- 1) 6 mC 2) 4 mC
3) 2 mC 4) 8 mC

Key: 3

10. 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:

- 1) along northward 2) along north-east
3) along south-west 4) along eastward

- 1) Positive
3) Negative
- 2) Infinity
4) Zero

Key: 4

17. The amount of energy required to form a soap bubble of radius 2 cm from a soap solution is nearly :
(surface tension of soap solution = 0.03 N m^{-1})

- 1) $5.06 \times 10^{-4} \text{ J}$
3) $50.1 \times 10^{-4} \text{ J}$
- 2) $3.01 \times 10^{-4} \text{ J}$
4) $30.16 \times 10^{-4} \text{ J}$

Key: 2

18. 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:

- 1) W/A
3) Zero
- 2) W/2A
4) 2W/A

Key: 1

19. 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):

- 1) $-\frac{12Gm}{R}$
3) $-\frac{20Gm}{R}$
- 2) $-\frac{16Gm}{R}$
4) $-\frac{8Gm}{R}$

Key: 2

20. The temperature of a gas is -50°C . To what temperature the gas should be heated so that the rms speed is increased by 3 times?

- 1) 3295°C
3) 223 K
- 2) 3097 K
4) 669°C

Key: 1

21. Given below are two statements:

Statement I : Photovoltaic devices can convert optical radiation into electricity.

Statement II : Zener diode is designed to operate under reverse bias in breakdown region.

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

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

Key: 4

22. If $\oint_s \vec{E} \cdot d\vec{S} = 0$ over a surface, then :

- (1) the magnitude of electric field on the surface is constant.
- (2) all the charges must necessarily be inside the surface.
- (3) the electric field inside the surface is necessarily uniform.
- (4) the number of flux lines entering the surface must be equal to the number of flux lines leaving it.

Key: 4

23. In a series *LCR* circuit, the inductance *L* is 10mH, capacitance *C* is 1 μ F and resistance *R* is 100 Ω . The frequency at which resonance occurs is :

- (1) 15.9kHz
- (2) 1.59rad/s
- (3) 1.59kHz
- (4) 15.9rad/s

Key: 3

24. An ac source is connected to a capacitor *C*. Due to decrease in its operating frequency:

- (1) displacement current increases.
- (2) displacement current decreases.
- (3) capacitive reactance remains constant
- (4) capacitive reactance decreases.

Key: 2

25. A bullet is fired from a gun at the speed of 280 m s⁻¹ in the direction 30° above the horizontal. The maximum height attained by the bullet is ($g = 9.8 \text{ m s}^{-2}$, $\sin 30^\circ = 0.5$) :

- (1) 2000 m
- (2) 1000 m
- (3) 3000 m
- (4) 2800 m

Key: 2

26. A vehicle travels half the distance with speed *g* and the remaining distance with speed 2*g*. Its average speed is:

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

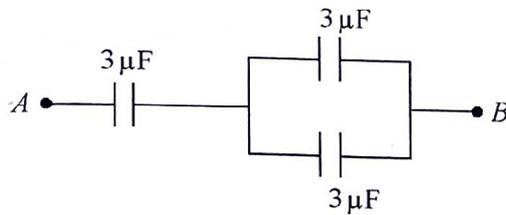
Key: 2

27. Resistance of a carbon resistor determined from colour codes is $(22000 \pm 5\%) \Omega$. The colour of third band must be :

- (1) Green
- (2) Orange
- (3) Yellow
- (4) Red

Key: 2

28. The equivalent capacitance of the system shown in the following circuit is:



- (1) $3\ \mu\text{F}$ (2) $6\ \mu\text{F}$
 (3) $9\ \mu\text{F}$ (4) $2\ \mu\text{F}$

Key: 4

29. The minimum wavelength of X-rays produced by an electron accelerated through a potential difference of V volts is proportional to:

- (1) $\frac{1}{V}$ (2) $\frac{1}{\sqrt{V}}$
 (3) V^2 (4) \sqrt{V}

Key: 1

30. The magnetic energy stored in an inductor of inductance $4\ \mu\text{H}$ carrying a current of 2 A is :

- (1) 4 mJ (2) 8 mJ
 (3) $8\ \mu\text{J}$ (4) $4\ \mu\text{J}$

Key: 3

31. For Young's double slit experiment, two statements are given below:

Statement I : If screen is moved away from the plane of slits, angular separation of the fringes remains constant.

Statement II : If the monochromatic source is replaced by another monochromatic source of larger wavelength, the angular separation of fringes decreases.

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

- (1) Both Statement I and Statement II are false.
 (2) Statement I is true but Statement II is false.
 (3) Statement I is false but Statement II is true.
 (4) Both Statement I and Statement II are true.

Key: 2

32. The ratio of radius of gyration of a solid sphere of mass M and radius R about its own axis to the radius of gyration of the thin hollow sphere of same mass and radius about its axis is :

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

Key: No Answer

33. In a plane electromagnetic wave travelling in free space, the electric field component oscillates sinusoidally at a frequency of 2.0×10^{10} Hz and amplitude 48Vm^{-1} . Then the amplitude of oscillating magnetic field is : (Speed of light in free space = $3 \times 10^8 \text{ m s}^{-1}$)

- (1) 1.6×10^{-8} T (2) 1.6×10^{-7} T
(3) 1.6×10^{-6} T (4) 1.6×10^{-9} T

Key: 2

34. A metal wire has mass (0.4 ± 0.002) g, radius (0.3 ± 0.001) mm and length (5 ± 0.02) cm. The maximum possible percentage error in the measurement of density will nearly be:

- (1) 1.3% (2) 1.6%
(3) 1.4% (4) 1.2%

Key: 4

35. The ratio of frequencies of fundamental harmonic produced by an open pipe to that of closed pipe having the same length is:

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

Key: 1

SECTION-B

Only 10 questions attempt from Section-B out of 15.

Marking scheme: +4 for correct answer, -1 for Incorrect answer

36. Two thin lenses are of same focal lengths (f), but one is convex and the other one is concave.

When they are placed in contact with each other, the equivalent focal length of the combination will be :

- (1) $f/4$ (3) Infinite
(2) $f/2$ (4) Zero

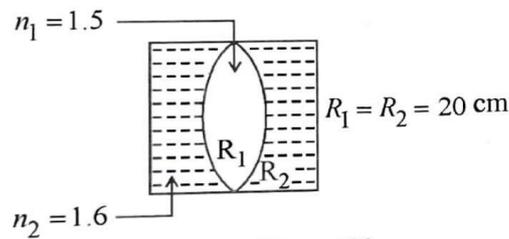
Key: 3

37. A satellite is orbiting just above the surface of the earth with period T . If d is the density of the earth and G is the universal constant of gravitation, the quantity $\frac{3\pi}{Gd}$ represents :

- (1) T^2 (2) T^3
(3) \sqrt{T} (4) T

Key: 1

38. In the figure shown here, what is the equivalent focal length of the combination of lenses (Assume that all layers are thin)?



- (1) -40 cm (2) -100 cm
 (3) -50 cm (4) 40 cm

Key: 2

39. 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 $\frac{u}{3}$. 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

- (1) 24 cm (2) 28 cm
 (3) 30 cm (4) 27 cm

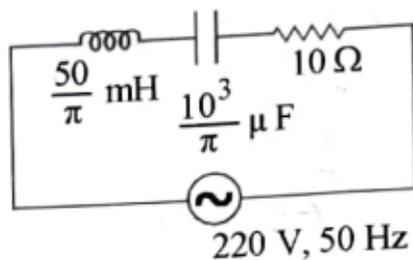
Key: 4

40. 10 resistors, each of resistance R are connected in series to a battery of emf E and negligible internal resistance. Then those are connected in parallel to the same battery, the current is increased n times. The value of n is :

- (1) 100 (2) 1
 (3) 1000 (4) 10

Key: 1

41. The net impedance of circuit (as shown in figure) will be:



- 1) 15Ω (2) $5\sqrt{5}\Omega$
 3) 25Ω (4) $10\sqrt{2}\Omega$

Key: 2

42. The x - t graph of particle performing simple harmonic motion is shown in the figure. The acceleration of the particle at $t=2$ s is:

1) $3 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$

2) $3 \times 10^{-2} \text{ } ^\circ\text{C}^{-1}$

3) $3 \times 10^{-1} \text{ } ^\circ\text{C}^{-1}$

4) $3 \times 10^{-4} \text{ } ^\circ\text{C}^{-1}$

Key: 246. A wire carrying a current I along the positive x -axis has length L . It is kept in a magnetic field $\vec{B} = (2\hat{i} + 3\hat{j} - 4\hat{k})\text{T}$. The magnitude of the magnetic force acting on the wire is

1) $\sqrt{5} IL$

2) $5 IL$

3) $\sqrt{3} IL$

4) $3 IL$

Key: 2

47. Calculate the maximum acceleration of a moving car so that body lying on the floor of the car remains stationary. The coefficient of static friction between the body and the floor is

$0.15 (g = 10\text{ms}^{-2})$

1) 150ms^{-2}

2) 1.5ms^{-2}

3) 50ms^{-2}

4) 1.2ms^{-2}

Key: 248. The radius of inner most orbit of hydrogen atom is $5.3 \times 10^{-11}\text{m}$. What is the radius of third allowed orbit of hydrogen atom?

1) 1.06\AA

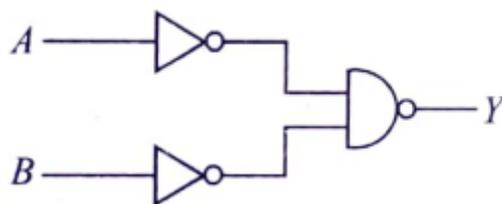
2) 1.59\AA

3) 4.77\AA

4) 0.53\AA

Key: 3

49. For the following logic circuit, the truth table is



A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

1)

A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

2)

<i>A</i>	<i>B</i>	<i>Y</i>
0	0	0
0	1	0
1	0	0
1	1	1

3)

<i>A</i>	<i>B</i>	<i>Y</i>
0	0	1
0	1	1
1	0	1
1	1	0

4)

Key: 1

50. A horizontal bridge is built across a river. A student standing on the bridge throws a small ball vertically upwards with a velocity 4ms^{-1} . The ball strikes the water surface after 4s. The height of bridge above water surface is (Take $g = 10\text{ms}^{-2}$)

1) 60 m

2) 64 m

3) 68 m

4) 56 m

Key: 2



SECTION – A

You have to attempt all 35 questions from Section-A

Marking scheme: +4 for correct answer, -1 for Incorrect answer

51 The relation between n_m , (n_m = the number of permissible values of magnetic quantum number (m)) for a given value of azimuthal quantum number (l), is

(1) $l = 2n_m + 1$

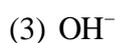
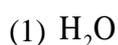
(2) $n_m = 2l^2 + 1$

(3) $n_m = l + 2$

(4) $l = \frac{n_m - 1}{2}$

Key: 4

52 Amongst the given options which of the following molecules/ion acts as a Lewis acid?



Key: 2

53 Which of the following statements are NOT correct?

A. Hydrogen is used to reduce heavy metal oxides to metals.

B. Heavy water is used to study reaction mechanism.

C. Hydrogen is used to make saturated fats from oils.

D. The H–H bond dissociation enthalpy is lowest as compared to a single bond between two atoms of any element.

E. Hydrogen reduces oxides of metals that are more active than iron.

Choose the most appropriate answer from the options given below

(1) B, D only

(2) D, E only

(3) A, B, C only

(4) B, C, D, E only

Key: 2

54. Which one of the following statements is correct?

(1) All enzymes that utilise ATP in phosphate transfer require Ca as the cofactor.

(2) The bone in human body is an inert and unchanging substance.

(3) Mg plays roles in neuromuscular function and interneuronal transmission.

(4) The daily requirement of Mg and Ca in the human body is estimated to be 0.2–0.3 g

Key: 4

55. Homoleptic complex from the following complexes is

(1) Diamminechloridonitrito - N platinum (II)

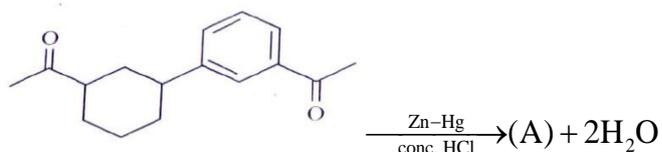
(2) Pentaamminecarbonatocobalt (III) chloride

(3) Triamminetriaquachromium (III) chloride

(4) Potassium trioxalatoaluminate (III)

Key: 4

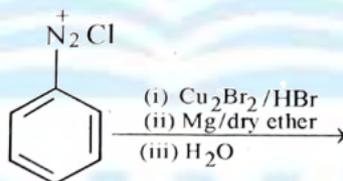
56 Identify product (A) in the following reaction:



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

Key: 4

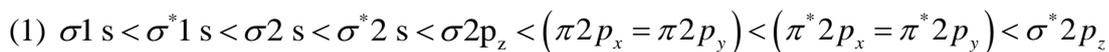
57 Identify the product in the following reaction:

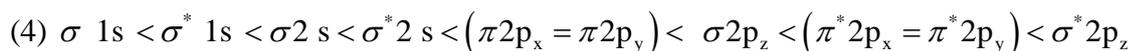
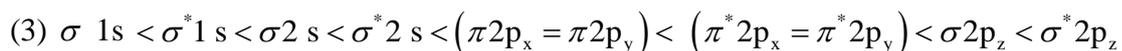


- (1)
- (2)
- (3)
- (4)

Key: 1

58. The correct order of energies of molecular orbitals of N_2 molecule is





Key: 4

59 For a certain reaction, the rate = $k[A]^2[B]$, when the initial concentration of A is tripled keeping concentration of B constant, the initial rate would

- (1) increase by a factor of six.
- (2) increase by a factor of nine.
- (3) increase by a factor of three.
- (4) decrease by a factor of nine.

Key: 2

60 Given below are two statements : one is labelled as Assertion **A** and the other is labelled as Reason **R** :

Assertion **A** : In equation $\Delta_r G = -nFE_{\text{cell}}$, value of $\Delta_r G$ depends on n .

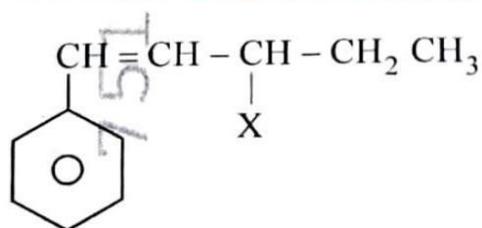
Reasons **R** : E_{cell} is an intensive property and $\Delta_r G$ is an extensive property.

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

- (1) Both **A** and **R** are true and **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**.

Key: 1

61. The given compound

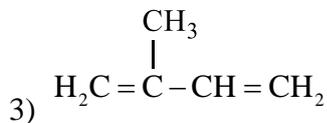
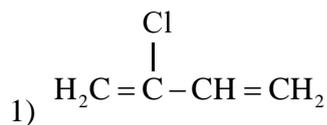


is an example of _____

- | | |
|-------------------|--------------------|
| 1) aryl halide | 2) allylic halide |
| 3) vinylic halide | 4) benzylic halide |

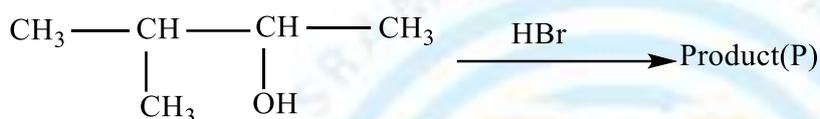
Key: 2

62. Which amongst the following molecules on polymerization produces neoprene?

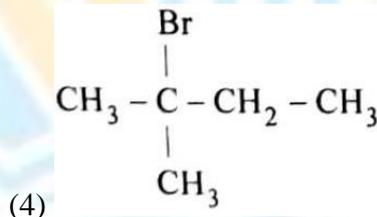
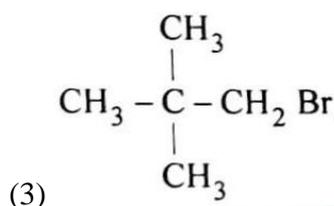
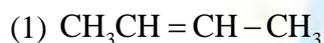


Key: 1

63. Consider the following reaction and identify the product (P)



3- Methylbutan-2-ol



Key: 4

64. The conductivity of centimolar solution of KCl at 25°C is 0.0210 $\text{ohm}^{-1} \text{cm}^{-1}$ and the resistance of the cell containing the solution at 25°C is 60 ohm. The value of cell constant is

1) 3.28 cm^{-1}

2) 1.26 cm^{-1}

3) 3.34 cm^{-1}

4) 1.34 cm^{-1}

Key: 2

65. Match List-I with List-II

List-I

- A. Coke
- B. Diamond
- C. Fullerece
- D. Graphite

List-II

- I. Carbon atoms are sp^3 hybridisation
- II. Used as a dry lubricant
- III. Used as a reducing agent
- IV. Cage like molecules

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

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

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

Assertion **A** : A reaction can have zero activation energy.

Reasons **R** : The minimum extra amount of energy absorbed by reactant molecules so that their energy becomes equal to threshold value, is called activation energy.

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

- (1) Both **A** and **R** are true and **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** .

Key: 2

77. A compound is formed by two elements **A** and **B** . The element **B** forms cubic close packed structure and atoms of **A** occupy $1/3$ of tetrahedral voids. If the formula of the compound is A_xB_y , then the value of $x + y$ is in option

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

Key: 4

78. The stability of Cu^{2+} is more than Cu^+ salts in aqueous solution due to -

- (1) enthalpy of atomization.
- (2) hydration energy.
- (3) second ionisation enthalpy.
- (4) first ionisation enthalpy.

Key: 2

79. Select the **correct** statements from the following :

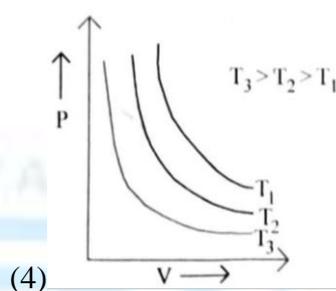
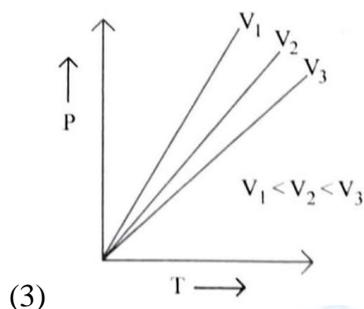
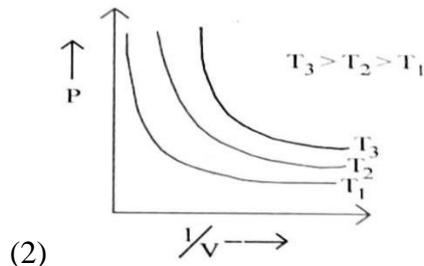
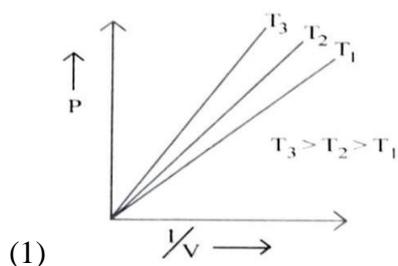
- A. Atoms of all elements are composed of two fundamental particles.
- B. The mass of the electron is 9.10939×10^{-31} kg .
- C. All the isotopes of a given element show same chemical properties.
- D. Protons and electrons are collectively known as nucleons.
- E. Dalton's atomic theory, regarded the atom as an ultimate particle of matter.

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

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

Key: 3

80. Which amongst the following options is **correct** graphical representation of Boyle's Law?



Key: 1

81. Intermolecular forces are forces of attraction and repulsion between interacting particles that will include:

- | | |
|--------------------------|----------------------------------|
| A. dipole-dipole forces. | B. dipole- induced dipole forces |
| C. hydrogen bonding | D. covalent bonding |
| E. dispersion forces | |

Choose the most appropriate answer from the given below:

- | | |
|----------------------------|----------------------------|
| 1) A, B, C, D are correct, | 2) A, B, C, D are correct, |
| 3) A, C, D, E are correct, | 4) B, C, D, E are correct. |

Key: 1

82. Weight (g) of two moles of the organic compound, which is obtained by heating sodium ethanoate with sodium hydroxide in presence of calcium oxide is:

- | | | | |
|-------|-------|-------|-------|
| 1) 32 | 2) 30 | 3) 18 | 4) 16 |
|-------|-------|-------|-------|

Key: 1

83. Which one is an example of heterogenous catalysis?

- 1) Hydrolysis of sugar catalyzed by H^+ ions.
- 2) Decomposition of ozone in presence of nitrogen monoxide.
- 3) Combination between dinitrogen and dihydrogen to form ammonia in the presence of finely divided iron.
- 4) Oxidation of sulphur dioxide into Sulphur trioxide in the presence of oxides of nitrogen.

Key: 3

84. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason B**:

Assertion A: Metallic sodium dissolves in liquid ammonia giving a deep blue solution, which is paramagnetic.

Reasons **R** : The deep blue solution is due to the formation of amide.

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 but **R** is the correct explanation of **A**

Key: 2

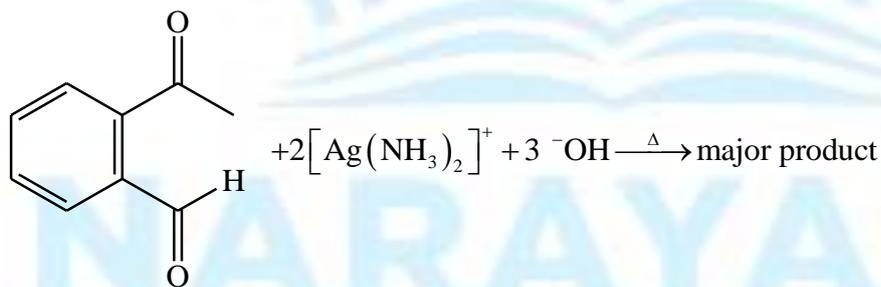
85. Amongst the following, the total number of species NOT having eight electrons around central atom in its outer most shell, is

$NH_3, AlCl_3, BeCl_2, CCl_4, PCl_5$:

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

Key: 3

86. Identify the major product obtained in the following reaction.



- 1) CC(=O)c1ccccc1CO
- 2) CC(=O)c1ccccc1C(=O)[O-]
- 3) CC(O)c1ccccc1C(=O)[O-]
- 4) CC(O)c1ccccc1CO

Key: 2

87. Match List –I with List- II:

List-I (Oxoacids of Sulphur)

- A. Peroxidisulphuric acid
- B. Sulphuric acid
- C. Pyrosulphuric acid
- D. Sulphurous acid

List-II(Bonds)

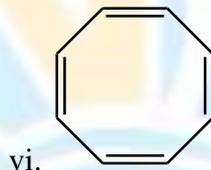
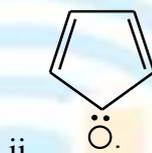
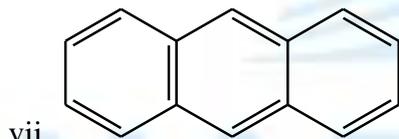
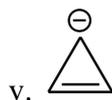
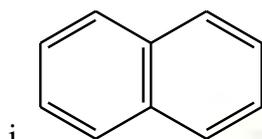
- I. Two S- OH, Four S=O, One S-O-S
- II. Two S-OH, One S=O
- III. Two S-OH, Four S=O, One S-O-O-S
- IV. Two S-OH, Two S=O

Choose the Correct answer form the options given below:

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

Key: 1

88. Consider the following compounds/ species



The number of compounds/species which obey Huckel's rules is _____

- 1) 6
- 2) 2
- 3) 5
- 4) 4

Key: 4

89. Pumice stone is an example of-

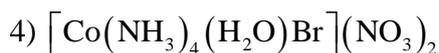
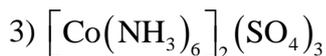
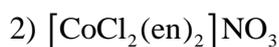
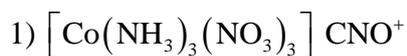
- 1) gel
- 2) solid sol
- 3) foam
- 4) sol

Key: 3

90. Which amongst the following options is the correct relation between change in enthalpy and change in internal energy?

- 1) $\Delta H = \Delta U + \Delta n_g RT$
- 2) $\Delta H - \Delta U = -\Delta n RT$
- 3) $\Delta H + \Delta U = \Delta n R$
- 4) $\Delta H = \Delta U - \Delta n_g RT$

Key: 1

**Key: 2**

95. What fraction of one edge centred octahedral void lies in one unit cell of fcc?

1) $\frac{1}{3}$

2) $\frac{1}{4}$

3) $\frac{1}{12}$

4) $\frac{1}{2}$

Key: 2

96. Which of the following statements are INCORRECT?

A. All the transition metals except scandium form MO oxides which are ionic.

B. The highest oxidation number corresponding to the group number in transition metal oxides is attained in Sc_2^+O_3 to Mn_2O_7 C. Basic character increases from V_2O_3 to V_2O_4 to V_2O_5 .D. V_2O_4 dissolves in acids to give VO_4^{3-} salts.E. CrO is basic but Cr_2O_3 is amphoteric. Choose the correct answer from the options given below :

1) B and D only

2) C and D only

3) B and C only

4) A and E only

Key: 297. The equilibrium concentrations of the species in the reaction $\text{A} + \text{B} \rightleftharpoons \text{C} + \text{D}$ are 2, 3, 10 and 6 mol L^{-1} , respectively at 300 K. ΔG° for the reaction is ($R = 2 \text{ cal / molK}$)

1) -137.26 cal

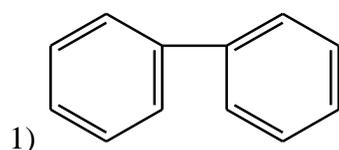
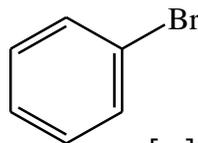
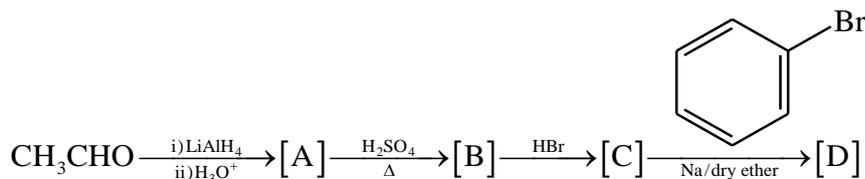
2) -1381.80 cal

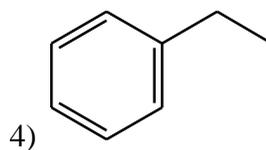
3) -13.73 cal

4) 1372.60 cal

Key: 2

98. Identify the final product [D] obtained in the following sequence of reactions.





Key: 4

99. Given below are two statements :

Statement I : The nutrient deficient water bodies lead to eutrophication.

Statement II : Eutrophication leads to decrease in the level of oxygen in the water bodies.

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

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

Key: 3

100. The reaction that does NOT take place in a blast furnace between 900 K to 1500 K temperature range during extraction of iron is :

- | | |
|---|--|
| 1) $\text{FeO} + \text{CO} \rightarrow \text{Fe} + \text{CO}_2$ | 2) $\text{C} + \text{CO}_2 \rightarrow 2\text{CO}$ |
| 3) $\text{CaO} + \text{SiO}_2 \rightarrow \text{CaSiO}_3$ | 4) $\text{Fe}_2\text{O}_3 + \text{CO} \rightarrow 2\text{FeO} + \text{CO}_2$ |

Key: 4

BOTANY

Max. Marks: 180

SECTION – A

You have to attempt all 35 questions from Section-A

Marking scheme: +4 for correct answer, -1 for Incorrect answer

101. Among eukaryotes, replication of DNA takes place in -

- 1) S phase
- 2) G₁ phase
- 3) G₂ phase
- 4) M phase

Key: 1

102. Cellulose does not form blue colour with Iodine because

- 1) It is a helical molecule.
- 2) It does not contain complex helices and hence cannot hold iodine molecules.
- 3) It breaks down when iodine reacts with it.
- 4) It is a disaccharide.

Key: 2

103. In gene gun method used to introduce alien DNA into host cells, microparticles of metal are used.

- 1) Zinc
- 2) Tungsten or gold
- 3) Silver
- 4) Copper

Key: 2

104. What is the function of tassels in the corn cob?

- 1) To trap pollen grains
- 2) To disperse pollen grains
- 3) To protect seeds
- 4) To attract insects

Key: 1

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

Assertion A : Late wood has fewer xylary elements with narrow vessels.

Reason R : Cambium is less active in winters.

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.

Key: 4

106. The historic Convention on Biological Diversity, 'The Earth Summit' was held in Rio de Janeiro in the year :

- 1) 1992
- 2) 1986
- 3) 2002
- 4) 1985

Key: 1

107. What is the role of RNA polymerase III in the process of transcription in Eukaryotes?

- 1) Transcription of tRNA, 5 srRNA and SnRNA
- 2) Transcription of precursor of mRNA
- 3) Transcription of only snRNAs
- 4) Transcription of rRNAs (28S, 18S and 5.8S)

Key: 1

108. Identify the pair of heterosporous pteridophytes among the following :

- 1) *Selaginella* and *Salvinia*
- 2) *Psilotum* and *Salvinia*
- 3) *Equisetum* and *Salvinia*
- 4) *Lycopodium* and *Selaginella*

Key: 1

109. Given below are two statements :

Statement I : The forces generated by transpiration can lift a xylem-sized column of water over 130 meters height.

Statement II : Transpiration cools leaf surfaces sometimes 10 to 15 degrees, by evaporative cooling.

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

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

Key: 4

110. The reaction centre in PS II has an absorption maxima at

- 1) 700 nm
- 2) 660 nm
- 3) 780 nm
- 4) 680 nm

Key: 4

111. Among 'The Evil Quartet', which one is considered the most important cause driving extinction of species?

- 1) Over exploitation for economic gain
- 2) Alien species invasions
- 3) Co-extinctions
- 4) Habitat loss and fragmentation

Key: 4

112. Which of the following stages of meiosis involves division of centromere?

- 1) Metaphase II
- 2) Anaphase II
- 3) Telophase
- 4) Metaphase I

Key: 2

113. Spraying of which of the following phytohormone on juvenile conifers helps in hastening the maturity period, that leads to early seed production?

- | | |
|---------------------|--------------------------|
| 1) Gibberellic Acid | 2) Zeatin |
| 3) Abscisic Acid | 4) Indole-3-Butyric Acid |

Key: 1

114. Identify the correct statements:

- A. Detrivores perform fragmentation.
- B. The humus is further degraded by some microbes during mineralization.
- C. Water soluble inorganic nutrients go down into the soil and get precipitated by a process called leaching.
- D. The detritus food chain begins with living organisms.
- E. Earthworms break down detritus into smaller particles by a process called catabolism.

Choose the correct answer from the options given below :

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

Key: 4

115. Which micronutrient is required for splitting of water molecule during photosynthesis?

- | | |
|---------------|--------------|
| 1) Molybdenum | 2) Magnesium |
| 3) Copper | 4) Manganese |

Key: 4

116. Large, colourful, fragrant flowers with nectar are seen in:

- | | |
|---------------------------|-----------------------------|
| 1) bird pollinated plants | 2) bat pollinated plants |
| 3) wind pollinated plants | 4) insect pollinated plants |

Key: 4

117. Movement and accumulation of ions across a membrane against their concentration gradient can be explained by

- | | |
|--------------------------|----------------------|
| 1) Facilitated Diffusion | 2) Passive Transport |
| 3) Active Transport | 4) Osmosis |

Key: 3

118. The thickness of ozone in a column of air in the atmosphere is measured in terms of :

- | | |
|-------------|-----------------|
| 1) Decibels | 2) Decameter |
| 3) Kilobase | 4) Dobson units |

Key: 4

119. Upon exposure to UV radiation, DNA stained with ethidium bromide will show

- | | |
|-------------------------|-------------------------|
| 1) Bright blue colour | 2) Bright yellow colour |
| 3) Bright orange colour | 4) Bright red colour |

Key: 3

120. Unequivocal proof that DNA is the genetic material was first proposed by

- | | |
|------------------------------------|--------------------------------|
| 1) Alfred Hershey and Martha Chase | 2) Avery, Macleod and McCarthy |
| 3) Wilkins and Franklin | 4) Fredrick Griffith |

Key: 1

121. In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus. This phenomenon may be called as:

- | | |
|----------------------|--------------------|
| 1) Dedifferentiation | 2) Development |
| 3) Senescence | 4) Differentiation |

Key: 1

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

Assertion A: ATP is used at two steps in glycolysis.

Reason R: First ATP is used in converting glucose into glucose-6-phosphate and second ATP is used in conversion of fructose-6-phosphate into fructose-1-6-diphosphate.

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.

Key: 4

123. The process of appearance of recombination nodules occurs at which substage of prophase I in meiosis?

- | | |
|---------------|--------------|
| 1) Pachytene | 2) Diplotene |
| 3) Diakinesis | 4) Zygotene |

Key: 2

124. In the equation $GPP - R = NPP$

GPP is Gross Primary Productivity NPP is Net Primary Productivity R here is _____.

- | | |
|----------------------------|--|
| 1) Respiratory quotient | 2) Respiratory loss |
| 3) Reproductive allocation | 4) Photosynthetically active radiation |

Key: 2

125. The phenomenon of pleiotropism refers to

- 1) presence of two alleles, each of the two genes controlling a single trait.
- 2) a single gene affecting multiple phenotypic expression.
- 3) more than two genes affecting a single character.
- 4) presence of several alleles of a single gene controlling a single crossover.

Key: 2

126. During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out

- | | |
|--------------------|-------------|
| 1) DNA | 2) Histones |
| 3) Polysaccharides | 4) RNA |

Key: 1

127. In angiosperm, the haploid, diploid and triploid structures of a fertilized embryo sac sequentially are:

- 1) Antipodals, synergids, and primary endosperm nucleus
- 2) Synergids, Zygote and Primary endosperm nucleus
- 3) Synergids, antipodals and Polar nuclei
- 4) Synergids, Primary endosperm nucleus and zygote.

Key: 2

128. Axile placentation is observed in

- | | |
|----------------------------------|-----------------------------------|
| 1) China rose, Beans and Lupin | 2) Tomato, Dianthus and Pea |
| 3) China rose, Petunia and Lemon | 4) Mustard, Cucumber and Primrose |

Key: 3

129. Which hormone promotes internode/petiole elongation in deep water rice?

- | | |
|------------|--------------------|
| 1) Kinetin | 2) Ethylene |
| 3) 2, 4-D | 4) GA ₃ |

Key: 2

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

Assertion A: The first stage of gametophyte in the life cycle of moss is protonema stage.

Reason R: Protonema develops directly from spores produced in capsule.

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

- 1) Both A and R are correct but R is NOT the correct explanation of A

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

Key: 1

131. Frequency of recombination between gene pairs on same chromosome as a measure of the distance between genes to map their position on chromosome, was used for the first time by

- 1) Sutton and Boveri
- 2) Alfred Sturtevant
- 3) Henking
- 4) Thomas Hunt Morgan

Key: 2

132. Family Fabaceae differs from Solanaceae and Liliaceae. With respect to the stamens, pick out the characteristics specific to family Fabaceae but not found in Solanaceae or Liliaceae.

- 1) Polyadelphous and Monothealous
- 2) Monoadelphous and Monothealous anthers
- 3) Epiphyllous and Dithealous anthers
- 4) Diadelphous and Dithealous anthers

Key: 4

133. How many ATP and NADPH_2 are required for the synthesis of one molecule of Glucose during Calvin cycle?

- 1) 18ATP and 12 NADPH_2
- 2) 12ATP and 16 NADPH_2
- 3) 18ATP and 16 NADPH_2
- 4) 12ATP and 12 NADPH_2

Key: 1

134. Expressed Sequence Tags (ESTs) refers to

- 1) All genes that are expressed as proteins.
- 2) All genes whether expressed or unexpressed.
- 3) Certain important expressed genes.
- 4) All genes that are expressed as RNA.

Key: 4

135. Given below are two statements:

Statement I: Endarch and exarch are the terms often used for describing the position of secondary xylem in the plant body.

Statement II: Exarch condition is the most common feature of the root system.

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

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

Key: 3

SECTION-B

Only 10 questions attempt from Section-B out of 15.

Marking scheme: +4 for correct answer, -1 for Incorrect answer

136. Which of the following combinations is required for chemiosmosis?

- 1) membrane, proton pump, proton gradient, NADP synthase
- 2) proton pump, electron gradient, ATP synthase
- 3) proton pump, electron gradient, NADP synthase
- 4) membrane, proton pump, proton gradient, ATP synthase

Key: 4

137. How many different proteins does the ribosome consist of?

- | | |
|-------|-------|
| 1) 60 | 2) 20 |
| 3) 40 | 4) 80 |

Key: 4

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

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** .

Key: 4

139. Match List I with List II:

List I

- A. M Phase
- B. G₂ Phase

List II

- I. Proteins are synthesized.
- II. Inactive phase

C. Quiescent

III. Interval between stage mitosis and initiation of DNA replication

D. G₁ Phase

IV. Equational division

Choose the correct answer from the options given below.

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

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

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

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

Key: 2

140. Main steps in the formation of Recombinant DNA are given below. Arrange these steps in a correct sequence.

A. Insertion of recombinant DNA into the host cell.

B. Cutting of DNA at specific location by restriction enzyme.

C. Isolation of desired DNA fragment.

D. Amplification of gene of interest using PCR.

Choose the correct answer from the options given below:

1) C, A, B, D

2) C, B, D, A

3) B, D, A, C

4) B, C, D, A

Key: 2

141. Given below are two statements:

Statement-I: Gause's 'competitive Exclusion Principle' states that two closely related species competing for the same resources cannot co-exist indefinitely and competitively inferior one will be eliminated eventually.

Statement-II: In general, carnivores are more adversely affected by competition than herbivores.

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

1) Both statement-I and statement-II are false

2) Statement-I is correct abut statement-II is false

3) Statement-I is incorrect abut statement-II is true

4) Both statement-I and statement-II are true

Key: 2

142. Match list-I with List-II

List-I	List-II
A. Cohesion	I. more attraction in liquid phase
B. Adhesion	II. mutual attraction among water molecules

C. Surface tension	III. Water loss in liquid phase
D. Guttation	IV. Attraction towards polar surfaces

Choose the correct answer form the options given below:

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

Key: 4

143. Melonate inhibits the growth of pathogenic bacteria by inhibiting the activity of

- 1) Amylase
- 2) Lipase
- 3) Dinitrogenase
- 4) Succinic dehydrogenase

Key: 4

144. Match List-I with List-II

List-I	List-II
A. Oxidative decarboxylation	I. Citrate synthase
B. Glycolysis	II. Pyruvate dehydrogenase
C. Oxidative phosphorylation	III. Electron transport system
D. Tricarboxylic acid cycle	IV. EMP pathway

Choose the correct answer form the options given below:

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

Key: 3

145. Which of the following statements are correct about Klinefelter's syndrome?

- A. This disorder was first described by Langdon Down (1866)
- B. Such an individual has overall masculine development. However. The feminine development is also expressed.
- C. The affected individual is short statured.
- D. Physical psychomotor and mental development is retarded.
- E. Such individuals are sterile.

- 1) C and D only
- 2) B and E only
- 3) A and F only
- 4) A and B only

Key: 2

146. Which of the following statements is **NOT** correct?

- 1) Algal blooms caused by excess of organic matter in water improve water quality and promote fisheries.
- 2) Water hyacinth grows abundantly in eutrophic water bodies and leads to an imbalance in the ecosystem dynamics of the water body.
- 3) The amount of some toxic substances of industrial waste water increases in the organisms at successive trophic levels.
- 4) The micro-organisms involved in biodegradation of organic matter in a sewage polluted water body consume a lot of oxygen causing the death of aquatic organisms.

Key: 1

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

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

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

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** .

Key: 2

148. Match List I with List II :

List-I	List-II
A. Iron	I. Synthesis of auxin
B. Zinc	II. Component of nitrate reductase
C. Boron	III. Activator of catalase
D. Molybdenum	IV. Cell elongation and differentiation

Choose the correct answer from the options given below :

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

Key: 2

149. Match List II with List III:

List I (Interaction)	List II (Species A and B)
A. Mutualism	I. $+(A),0(B)$
B. Commensalism	II. $-(A),0(B)$
C. Amensalism	III. $+(A),-(B)$
D. Parasitism	IV. $+(A),+(B)$

Choose the correct answer from the options given below :

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

Key: 1

150. Identify the correct statements :

- A. Lenticels are the lens-shaped openings permitting the exchange of gases.
B. Bark formed early in the season is called hard bark.
C. Bark is a technical term that refers to all tissues exterior to vascular cambium.
D. Bark refers to periderm and secondary phloem.
E. Phellogen is single-layered in thickness.

Choose the correct answer from the options given below :

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

Key: 1

NARAYANA
COACHING CENTER

SECTION – A

You have to attempt all 35 questions from Section-A

Marking scheme: +4 for correct answer, -1 for Incorrect answer

151. Once the undigested and unabsorbed substances enter the caecum, their backflow is prevented by-

- | | |
|------------------------|-----------------------------------|
| 1) Ileo - caecal valve | 2) Gastro - oesophageal sphincter |
| 3) Pyloric sphincter | 4) Sphincter of Oddi |

Key: 1

152. In which blood corpuscles, the HIV undergoes replication and produces progeny viruses?

- | | |
|------------------|-------------------------|
| 1) B-lymphocytes | 2) Basophils |
| 3) Eosinophils | 4) T _H cells |

Key: 4

153. Broad palm with single palm crease is visible in a person suffering from-

- | | |
|----------------------|---------------------------|
| 1) Turner's syndrome | 2) Klinefelter's syndrome |
| 3) Thalassemia | 4) Down's syndrome |

Key: 4

154. Which one of the following common sexually transmitted diseases is completely curable when detected early and treated properly?

- | | |
|------------------|-------------------|
| 1) Gonorrhoea | 2) Hepatitis-B |
| 3) HIV Infection | 4) Genital herpes |

Key: 1

155. Match List I with List II.

List I(Interacting species)	List II (Name of Interaction) Competition parasitism
A. A Leopard and a Lion in a forest/ grassland	I. Competition
B. A Cuckoo laying egg in a Crow's nest	II. Brood parasitism
C. Fungi and root of a higher plant in Mycorrhizae	III. Mutualism
D. A cattle egret and a Cattle in a field	IV. Commensalism

Choose the correct answer from the options given below:

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

Key: 4

156. Match List I with List II.

List I (Cells)	List II (Secretion)
A. Peptic cells	I. Mucus
B. Goblet cells	II. Bile juice
C. Oxyntic cells	III. Proenzyme pepsinogen
D. Hepatic cells	IV. HCl and intrinsic factor for absorption of vitamin B ₁₂

Choose the correct answer from the options given below:

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

Key: 2

157. Given below are two statements:

Statement I: A protein is imagined as a line, the left end represented by first amino acid (C-terminal) and the right end represented by last amino acid (N-terminal).

Statement II: Adult human haemoglobin, consists of 4 subunits (two subunits of α type and two subunits of β type.)

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

- 1) Both Statement I and Statement II are false.
- 2) Statement I is true but Statement II is false.
- 3) Statement I is false but Statement II is true
- 4) Both Statement I and Statement II are true.

Key: 3

158. Given below are two statements:

Statement I: RNA mutates at a faster rate.

Statement II: Viruses having RNA genome and shorter life span mutate and evolve faster.

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

- 1) Both Statement I and Statement II are false.
- 2) Statement I is true but Statement II is false.
- 3) Statement I false but Statement II is true.
- 4) Both Statement I and Statement II are true.

Key: 4

162. Given below are two statements:

Statement I: Vas deferens receives a duct from seminal vesicle and opens into urethra as the ejaculatory duct.

Statement II: The cavity of the cervix is called cervical canal which along with vagina forms birth canal.

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

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

Key: 4

163. Which one of the following techniques does not serve the purpose of early diagnosis of a disease for its early treatment?

- 1) Serum and Urine analysis
- 2) Polymerase Chain Reaction (PCR) technique
- 3) Enzyme Linked Immuno-Sorbent Assay (ELISA) technique
- 4) Recombinant DNA Technology

Key: 1

164. Which of the following are NOT considered as the part of endomembrane system?

- | | |
|-----------------|--------------------------|
| A. Mitochondria | B. Endoplasmic Reticulum |
| C. Chloroplasts | D. Golgi complex |
| E. Peroxisomes | |

Choose the most appropriate answer from the options given below:

- | | |
|--------------------|-----------------|
| 1) A, C and E only | 2) A and D only |
| 3) A, D and E only | 4) B and D only |

Key: 1

165. Match List I with List II.

List I

- A. Heroin
- B. Marijuana
- C. Cocaine
- D. Morphine

List II

- I. Effect on cardiovascular system
- II. Slow down body function
- III. Painkiller
- IV. Interfere with transport of dopamine

Choose the correct answer from the options given below:

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

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

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

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

Key: 4

166. Given below are two statements:

Statement I: Low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.

Statement II: When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor. In the light of the above statements, choose the correct answer from the options given below:

(1) Both Statement I and Statement II are false.

(2) Statement I is true but Statement II is false.

(3) Statement I is false but Statement II is true.

(4) Both Statement I and Statement II are true.

Key: 4

167. Which of the following functions is carried out by cytoskeleton in a cell?

(1) Protein synthesis

(2) Motility

(3) Transportation

(4) Nuclear division

Key: 2

168. Given below are two statements:

Statement I: Ligaments are dense irregular tissue.

Statement II: Cartilage is dense regular tissue.

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

(1) Both Statement I and Statement II are false.

(2) Statement I is true but Statement II is false.

(3) Statement I is false but Statement II is true.

(4) Both Statement I and Statement II are true.

Key: 1

169. Match List I with List II.

List I

(Type of Joint)

A. Cartilaginous Joint

B. Ball and Socket Joint

List II

(Found between)

I. Between flat skull bones

II. Between adjacent vertebrae in vertebral column

C. Fibrous Joint

III. Between carpal and metacarpal of thumb

D. Saddle Joint

IV. Between Humerus and Pectoral girdle

Choose the correct answer from the options given below:

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

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

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

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

Key: 1

170. Match List I with List II.

List I

A. Gene 'a'

B. Gene 'y'

C. Gene 'i'

D. Gene 'z'

List II

I. β -galactosidase

II. Transacetylase

III. Permease

IV. Repressor protein

Choose the correct answer from the options given below:

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

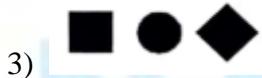
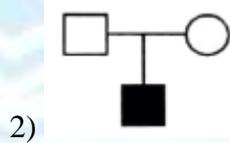
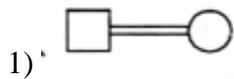
(2) A-III, B-IV, C-I, D-II

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

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

Key: 1

171. Which one of the following symbols represents mating between relatives in human pedigree analysis?



Key: 1

172. Given below are two statements: one is labelled as Assertion: A and the other is labelled as Reason R

Assertion A: Endometrium is necessary for implantation of blastocyst

Reason R: In the absence of fertilization, the corpus luteum degenerates that causes disintegration of endometrium.

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 but R is the correct explanation of A

Key: 1

173. Given below are statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**
Assertion A: Nephrons are of two types Cortical & Juxta medullary, based on their relative position in cortex and medulla.

Reason R: Juxta medullary nephrons have short loop of Henle whereas, cortical nephrons have longer loop of Henle.

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 but **R** is the correct explanation of **A**.

Key: 2

174. Radial symmetry is NOT found in adults of phylum _____

- | | |
|------------------|----------------|
| 1) Hemichordata | 2) Colenterata |
| 3) Echinodermata | 4) Ctenophora |

Key: 1

175. Match List I with List II with respect to human eye.

List I

- A.** Fovea
- B.** Iris

- C.** Blind spot
- D.** Sclera

List II

- I. Visible coloured portion of eye that regulates
- II. External layer of eye formed of dense connective tissue
- III. Point of greatest visual acuity of resolution.
- IV. Point where optic nerve leaves the eyeball and photoreceptor cells are absent

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

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

Key: 4

176. Which of the following statements is correct?

- 1) Biomagnification refers to increase in concentration of the toxicant at successive trophic levels
- 2) Presence of large amount of nutrients in water restricts 'Algal Bloom'
- 3) Algal Bloom decreases fish mortality
- 4) Eutrophication refers to increase in domestic sewage and waste water in lakes.

Key: 1

177. Which of the following statements are correct regarding female reproductive cycle?

- A. In non-primate mammals cyclical changes during reproduction are called oestrus cycle.
- B. First menstrual cycle begins at puberty and is called menopause.
- C. Lack of menstruation may be indicative of pregnancy.

- 1) Both **A** and **R** are true and **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** .

Key: 3

182. which of the following is not a cloning vector?

- | | |
|----------|-----------|
| 1) YAC | 2) pBR322 |
| 3) Probe | 4) BAC |

Key: 3

183. Given below are two statements:

Statement I: Electrostatic precipitator is most widely used in thermal power plant

Statement II: Electrostatic precipitator in thermal power plant removes ionising raditions

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

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

Key: 2

184. Match List I with List III.

List I

- A. P-wave
- B. Q-wave
- C. QRS complex
- D. T-wave.

List II

- I. Beginning of systole
- II. Repolarisation of ventricles
- III. Depolarisation of atria
- IV. Depolarisation of ventricles

Choose the correct answer from the options given below:

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

Key: 4

185. Vital capacity of lung is

- | | |
|------------------------|-------------------------|
| 1) IRV + ERV + TV + RV | (2) IRV + ERV + TV – RV |
| 3) IRV + ERV + TV | (4) IRV + ERV |

Key: 3

186. Given below are two statements:

Statement I: During G_0 phase of cell cycle, the cell is metabolically inactive.

Statement II: The centrosome undergoes duplication during S phase of interphase.

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

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

Key: 3

187. The parts of human brain that helps in regulation of sexual behaviour, expression of excitement, pleasure, rage, fear etc. are :

- (1) Corpora quadrigemina & hippocampus
- (2) Brain stem & epithalamus
- (3) Corpus callosum and thalamus
- (4) Limbic system & hypothalamus

Key: 4

188. In cockroach, excretion is brought about by

- A. Phallic gland B. Ureose gland
C. Nephrocytes D. Fat body
E. Collateral glands

Choose the correct answer from the options given below:

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

Key: 2

189. Which of the following statements are correct?

- A. An excessive loss of body fluid from the body switches off osmoreceptors
B. ADH facilitates water reabsorption to prevent diuresis.
C. ANF causes vasodilation.
D. ADH causes increase in blood pressure.
E. ADH is responsible for decrease in GFR.

Choose the correct answer from the options given below:

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

Key: 1

190. Which one of the following is NOT an advantage of inbreeding?

- (1) It exposes harmful recessive genes that are eliminated by selection.
- (2) Elimination of less desirable genes and accumulation of superior genes takes place due to it.
- (3) It decreases the productivity of inbred population, after continuous inbreeding.
- (4) It decreases homozygosity.

Key: 3

191. Which of the following statements are correct regarding skeletal muscle?

- A. Muscle bundles are held together by collagenous connective tissue layer called fascicle.
- B. Sarcoplasmic reticulum of muscle fibre is a store house of calcium ions.
- C. Striated appearance of skeletal muscle fibre is due to distribution pattern of actin and myosin proteins.
- D. M line is considered as functional unit of contraction called sarcomere.

Choose the most appropriate answer from the options given below:

- | | |
|------------------|---------------------|
| (1) B and C only | (2) A, C and D only |
| (3) C and D only | (4) A, B and C only |

Key: 1

192 Match List I with List II.

List I

- A. Logistic growth
- B. Exponential growth
- C. Expanding age pyramid
- D. Stable age pyramid

List II

- I. Unlimited resource availability condition
- II. Limited resource availability condition
- III. The percent individuals of pre-reproductive age is largest followed by reproductive and post reproductive age groups
- IV. The percent individuals of pre-reproductives and reproductive age group are same

Choose the correct answer from the options given below:

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

Key: 4

193. Which one of the following is the sequence on corresponding coding strand, if the sequence on mRNA formed is as follows 5' AUCGAUCGAUCGAUCGAUCG AUCG AUCG 3'?

- 1) 3'UAGCUAGCUAGCUAGCUA GCUAGCUAGC 5'
- 2) 5' ATCGATCGATCGATCGATCG ATCGATCG 3'
- 3) 3' ATCGATCGATCGATCGATCG ATCGATCG 5,
- 4) 5' UAGCUAGCUAGCUAGCUA GCUAGC UAGC 3'

Key: 2

194. Which of the following statements are correct?

- A. Basophils are most abundant cells of the total WBCs
- B. Basophils secrete histamine, serotonin and heparin
- C. Basophils are involved in inflammatory response
- D. Basophils have kidney shaped nucleus
- E. Basophils are agranulocytes

Choose the correct answer from the options given below:

- 1) C and E only
- 2) B and C only
- 3) A and B only
- 4) D and E only

Key: 2

195. Match List I with List II.

List I

- A. Mast cells-
- B. Inner surface
of bronchiole

C. Blood

D. Tubular parts of nephron

List II

I. Ciliated epithelium

II. Areolar connective tissue

III. Cuboidal epithelium

IV. specialised connective tissue

Choose the correct answer from the options give below:

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

Key: 2

196. Which of the following is characteristic feature of cockroach regarding sexual dimorphism ?

- 1) Presence of anal styles
- 2) Presence of sclerites
- 3) Presence of anal cerci
- 4) Dark brown body colour and anal cerci

Key: 1

197. Which of the following are NOT under the control of thyroid hormone?

- A. Maintenance of water and electrolyte balance
- B. Regulation of basal metabolic rate
- C. Normal rhythm of sleep-wake cycle
- D. Development of immune system
- E. Support the process of R.B.Cs formation

Choose the correct answer from the options given below:

- 1) B and C only
- 2) C and D only
- 3) D and E only
- 4) A and D only

Key: 2

198. Select the correct statements.

- A. Tetrad formation is seen during Leptotene.
- B. During Anaphase, the centromeres split and chromatids separate.
- C. Terminalization takes place during Pachytene.
- D. Nucleolus, Golgi complex and ER are reformed during Telophase.
- E. Crossing over takes place between sister chromatids of homologous chromosome.

Choose the correct answer from the options given below:

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

Key: 1

199. The unique mammalian characteristics are:

- 1) hairs, pinna and mammary glands
- 2) hairs, pinna and indirect development
- 3) pinna, monocondylic skull and mammary glands
- 4) hairs, tympanic membrane and mammary glands

Key: 1

200. Select the correct statements with reference to chordates.

- A. Presence of a mid-dorsal, solid and double nerve cord.
- B. Presence of closed circulatory system.
- C. Presence of paired pharyngeal gillslits.
- D. Presence of dorsal heart
- E. Triploblastic pseudocoelomate animals.

Choose the correct answer from the options given below:

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

Key: 1