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## AIM - 720

*(Advanced INTENSIVE Mastery for 720)*

MM : 720

**CST-12**

Time : 3 Hrs. 20 Mins.

**Complete Syllabus of NEET**

**Instructions :**

- (i) There are two sections in each subject, i.e. Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.
- (ii) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.
- (iii) Use blue/black ballpoint pen only to darken the appropriate circle.
- (iv) Mark should be dark and completely fill the circle.
- (v) Dark only one circle for each entry.
- (vi) Dark the circle in the space provided only.
- (vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

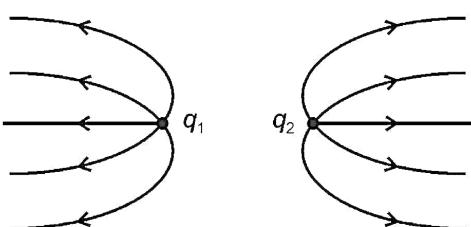
**TG :- @RFJH@RSH77**

**PHYSICS**

**Choose the correct answer :**

**SECTION - A**

1. The given figure gives electric lines of force due to two charges  $q_1$  and  $q_2$ . The sign of the two charges are



- (1)  $q_1$  is positive but  $q_2$  is negative
- (2)  $q_1$  is negative but  $q_2$  is positive
- (3) Both  $q_1$  and  $q_2$  are negative
- (4) Both  $q_1$  and  $q_2$  are positive

2. A charge  $q_2$  is placed at the centre of a circular path with radius  $r$ . Work done in carrying a charge  $q_1$  once around the path would be

- (1)  $\frac{q_1 q_2}{4\pi\epsilon_0 r^2}$
- (2)  $\frac{q_1 q_2}{4\pi\epsilon_0 r}$
- (3) Zero
- (4)  $\frac{-q_1 q_2}{4\pi\epsilon_0 r}$

3. The total energy of a particle executing simple harmonic motion is 100 J. The potential energy of the particle when it is at a distance of  $\frac{1}{4}$  of amplitude from the mean position.

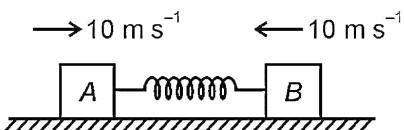
- (1)  $\frac{25}{4}$  J
- (2)  $\frac{5}{4}$  J
- (3) 20 J
- (4) 40 J

4. A closed organ pipe (closed at one end) is excited to support the second overtone. It is found that air column in the pipe has
- Three nodes and three antinodes
  - Four nodes and three antinodes
  - Three nodes and four antinodes
  - Four nodes and four antinodes
5. A man is spinning in free space, changes the shape of his body, e.g. by spreading his arms or by curling up. By doing this, he cannot change his
- Moment of inertia
  - Angular momentum
  - Angular velocity
  - Rotational kinetic energy
6. Choose the correct statements among the following.
- For a rotational motion, angular acceleration ( $\alpha$ ) and angular velocity ( $\omega$ ) need not be anti-parallel
  - For a rotational motion about a fixed axis, angular acceleration ( $\alpha$ ) and angular velocity ( $\omega$ ) are always parallel
  - For a translational motion, momentum ( $p$ ) and velocity ( $v$ ) are always perpendicular
  - For a translational motion, acceleration ( $a$ ) and velocity ( $v$ ) are always parallel
7. A satellite of mass  $m$  is revolving in a circular orbit of radius  $R$  about Earth. If mass of Earth is  $M$  then orbital speed of satellite is
- $\sqrt{\frac{2GM}{R}}$
  - $\sqrt{\frac{2Gm}{R}}$
  - $\sqrt{\frac{GM}{R}}$
  - $\sqrt{\frac{Gm}{R}}$
8. A copper and a steel wire of the same diameter are connected end to end. A deforming force  $F$  normal to cross-section is applied to this composite wire which causes a total elongation of 1 cm. The two wires will have
- Same stress and strain
  - Same stress but different strain
  - Same strain but different stress
  - Different strain and stress
9. If light of frequency  $4 \times 10^{10}$  Hz is used to heat 500 g of water from 10°C to 40°C then the number of photons needed will be (specific heat of water is 4.2 J/g°C)
- $2.39 \times 10^{26}$
  - $2.39 \times 10^{27}$
  - $2.39 \times 10^{28}$
  - $2.39 \times 10^{25}$
10. The required condition for nuclear fusion to occur is
- High temperature and low pressure
  - Low temperature and low pressure
  - Low temperature and high pressure
  - High temperature and high pressure
11. The number of electrons in the valence shell of a semiconductor element is
- 1
  - 2
  - 3
  - 4
12. Let  $n_p$  and  $n_e$  be the number of holes and conduction electrons in an intrinsic semiconductor then
- $n_p < n_e$
  - $n_p = n_e$
  - $n_p > n_e$
  - $n_p \neq n_e$
13. The resultant of three vectors  $\overrightarrow{OA}$ ,  $\overrightarrow{OB}$  and  $\overrightarrow{OC}$  as shown below is (assume the radius of the circle to be  $R$ )
- 
- $R\sqrt{2}$
  - $R(1 + \sqrt{2})$
  - $R(\sqrt{2} - 1)$
  - Zero

Space for Rough Work

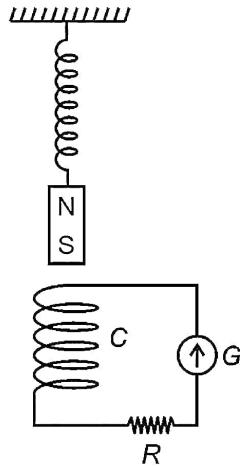
14. A police inspector in a jeep is chasing a pickpocket on a straight road. The jeep is going at a uniform speed of  $50 \text{ m s}^{-1}$  and the pickpocket rides on the motorcycle of a waiting friend when jeep is  $60 \text{ m}$  away. The motorcycle starts with a constant acceleration of  $30 \text{ m s}^{-2}$ . The time after which the pickpocket would be caught is
- $10 \text{ s}$
  - $20 \text{ s}$
  - Pickpocket would never be caught
  - $50 \text{ s}$
15. A ball is thrown vertically upward from ground with some velocity. During its motion, it passes through the same point at  $t = 4 \text{ s}$  and then again at  $t = 9 \text{ s}$ , then the time of flight of ball is
- $10 \text{ s}$
  - $12 \text{ s}$
  - $15 \text{ s}$
  - $13 \text{ s}$
16. A person is driving a vehicle at a uniform speed of  $5 \text{ m s}^{-1}$  on a level curved track of radius  $5 \text{ m}$ . The coefficient of static friction between tyres and road is  $0.1$ , then the maximum speed with which the person can take turn to avoid slipping is
- $\sqrt{5} \text{ m s}^{-1}$
  - $\sqrt{12} \text{ m s}^{-1}$
  - $\sqrt{6} \text{ m s}^{-1}$
  - $\sqrt{7} \text{ m s}^{-1}$
17. Corresponding to an ideal gas, the quantity  $\frac{P}{K_B T}$  represents (where symbols have their usual meaning)
- Mass of the gas
  - Number of molecules of gas
  - Number of moles of gas
  - Number of molecules per unit volume of gas
18. Two blocks  $A$  and  $B$  each of mass  $1 \text{ kg}$  connected by massless spring of natural length  $L$  and spring constant  $800 \frac{\text{N}}{\text{m}}$ . The blocks are initially resting on a smooth horizontal floor with the spring at its

natural length. The blocks are given velocity of  $10 \text{ m s}^{-1}$  towards each other as shown. At maximum compression, the velocity of block  $B$  is



- Zero
- $1 \text{ m s}^{-1}$
- $5 \text{ m s}^{-1}$
- $10 \text{ m s}^{-1}$

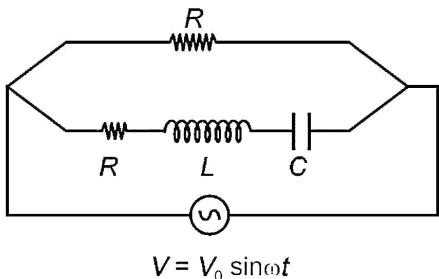
19. An object of mass  $1 \text{ kg}$  is at rest. Now a force  $\vec{F} = (t^2 \hat{i} + 2t \hat{j}) \text{ N}$  is applied, where  $t$  is in seconds. Kinetic energy of the particle at  $t = 3 \text{ s}$  is
- $162 \text{ J}$
  - $81 \text{ J}$
  - $40.5 \text{ J}$
  - $243 \text{ J}$
20. A magnet is suspended from an ideal spring and allowed to oscillate in and out of the coil  $C$ . If the coil is now connected to a galvanometer  $G$  as shown in the figure, then as the magnet oscillates the deflection in galvanometer



- Become zero
- Are in one side only
- To the left and right with constant amplitude
- To the left and right with amplitude decreasing

Space for Rough Work

21. In the circuit shown below rms current supplied by the source at resonance is



$$V = V_0 \sin \omega t$$



22. Which of the following relation is correct?  
(Symbols have usual meanings)

$$(1) \sqrt{\varepsilon_0} E_0 = \sqrt{\mu_0} B_0 \quad (2) E_0 = \sqrt{\mu_0 \varepsilon_0} B_0$$

$$(3) E_0 = B_0 \mu_0 \varepsilon_0 \quad (4) B_0 = \sqrt{\mu_0 \varepsilon_0} E_0$$

23. An interference pattern was made by using violet light. If the violet light is replaced by red light, the fringes will become

(1) Fainter                          (2) Wider  
(3) Narrower                        (4) Brighter





26. Which among the following physical quantities is dimensionless?

(1) Breaking stress      (2) Relative density  
(3) Relative velocity      (4) Both (2) and (3)

27. When a capillary is dipped into a liquid, the level of liquid inside and outside the capillary are equal. The angle of contact is



28. A liquid is filled in a vessel. The coefficient of apparent expansion of the liquid is  $\gamma$ . If the coefficient of linear expansion of vessel is  $\alpha$ , then the coefficient of real expansion of the liquid is

- (1)  $\gamma - 3\alpha$       (2)  $\gamma + 3\alpha$   
 (3)  $\gamma + 2\alpha$       (4)  $\gamma + \alpha$

29. Which law of thermodynamics applies the limitation on the efficiency of heat engine and on the coefficient of performance of refrigerator?

- (1) Zeroth law of thermodynamics
  - (2) First law of thermodynamics
  - (3) Second law of thermodynamics
  - (4) Third law of thermodynamics

30. Temperature of 2 moles of helium gas decreases from 280 K to 250 K while it is expanded through an adiabatic process. The work done by the gas is nearly



31. How many electrons are passed through a section of wire carrying a current of 0.32 A in a second?

- (1)  $1.6 \times 10^{19}$       (2)  $2 \times 10^{18}$   
 (3)  $2 \times 10^{19}$       (4)  $1.6 \times 10^{18}$

32. Electrical conductance of a conductor depends on  
(1) Dimensions              (2) Temperature  
(3) Nature of conductor    (4) All of these

33. A negatively charged particle has acceleration  $\vec{a} = (2\hat{i} + 5\hat{j}) \text{ m/s}^2$  in a magnetic field  $\vec{B} = (3\hat{i} + x\hat{j} - 2\hat{k}) \text{ T}$ . The value of  $x$  is

- (1)  $\frac{5}{6}$       (2)  $\frac{-6}{5}$   
 (3)  $\frac{-3}{5}$       (4) Zero

#### Space for Rough Work

34. **Assertion:** The net force on a closed current carrying loop placed in a uniform magnetic field is zero.

**Reason:** The torque on a closed current carrying loop placed in a uniform magnetic field is not necessarily zero.

In the light of above statements, select the most appropriate option.

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

35. A substance has a magnetic dipole moment of  $15 \times 10^{-5}$  J/T when a magnetic intensity of  $80 \times 10^3$  A/m is applied. If the substance is in the form of cube of side 1 cm, then its magnetic susceptibility is nearly equal to

- (1)  $1.8 \times 10^{-4}$
- (2)  $2.7 \times 10^{-4}$
- (3)  $1.8 \times 10^{-3}$
- (4)  $2.7 \times 10^{-3}$

### SECTION - B

36. A boy of mass 45 kg is standing stationary with respect to horizontal conveyor belt that is accelerating at  $2 \text{ m/s}^2$ . The magnitude of net force acting on man is

- (1) Zero
- (2) 90 N
- (3) 45 N
- (4) 60 N

37. Sixty four drops of same size are charged at 200 V. They combine to form a bigger drop. The potential of the bigger drop will be

- (1) 1600 V
- (2) 3200 V
- (3) 800 V
- (4) 2400 V

38. What is the flux through a cube of a side  $a$  if a point charge of  $q$  is at one of its corner?

- (1)  $\frac{q}{2\epsilon_0}$
- (2)  $\frac{q}{8\epsilon_0}$
- (3)  $\frac{q}{6\epsilon_0}$
- (4)  $\frac{q}{\epsilon_0}$

39. A fluid is flowing through a horizontal pipe. How does the pressure at a constriction in the pipe varies compare to the pressure before the constriction?

- (1) Increases
- (2) Decreases
- (3) Remains constant
- (4) Depends on viscosity of fluid

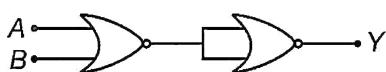
40. The coefficient of linear expansion for a material if a 2 m long rod expands by 0.02 metres when temperature is increased to  $50^\circ\text{C}$  from  $10^\circ\text{C}$  is

- (1)  $0.00025^\circ\text{C}^{-1}$
- (2)  $0.02^\circ\text{C}^{-1}$
- (3)  $0.03^\circ\text{C}^{-1}$
- (4)  $0.04^\circ\text{C}^{-1}$

41. The shortest wavelength of Paschen series of H-atom is

- (1)  $\frac{144}{7R}$
- (2)  $\frac{7R}{144}$
- (3)  $\frac{9}{R}$
- (4)  $\frac{R}{9}$

42. The output ( $Y$ ) of the logic circuit shown in figure will be



- (1)  $\overline{A+B}$
- (2)  $\bar{A}+\bar{B}$
- (3)  $A+B$
- (4)  $\bar{A}\cdot\bar{B}+AB$

43. A resistor and an inductor are connected to an ac supply of 200 V, 50 Hz in series. The current in the circuit is 4 A. If the power consumed in the circuit is 80 watt, the inductive reactance of the circuit is

- (1)  $\frac{3}{2}\sqrt{15} \Omega$
- (2)  $\frac{3}{2}\sqrt{25} \Omega$
- (3)  $\frac{5}{2}\sqrt{25} \Omega$
- (4)  $15\sqrt{11} \Omega$

44. The magnetic flux across a loop of resistance  $10 \Omega$  is given by  $\phi = (5t^2 - 4t + 1) \text{ Wb}$ . The charge flown in the loop form  $t = 0$  to  $t = 2 \text{ s}$  is

- (1) 1 C
- (2) 1.2 C
- (3) 0.6 C
- (4) 2.4 C

Space for Rough Work

45. In a Fraunhofer diffraction at single slit of width  $\alpha$  with incident light of wavelength  $4500 \text{ \AA}$ , the first minimum is observed, at an angle  $30^\circ$ . The first secondary maximum is observed at an angle

- (1)  $\sin^{-1}\left(\frac{3}{5}\right)$
- (2)  $\sin^{-1}\left(\frac{3}{4}\right)$
- (3)  $\sin^{-1}\left(\frac{2}{\sqrt{3}}\right)$
- (4)  $\sin^{-1}\left(\frac{4}{3}\right)$

46. Sun subtends an angle of  $0.6^\circ$  at the pole of a concave mirror of radius of curvature  $8 \text{ m}$ . The diameter of the image of the Sun formed by the mirror is nearly

- (1)  $4.2 \text{ cm}$
- (2)  $2.1 \text{ cm}$
- (3)  $8.4 \text{ cm}$
- (4)  $6 \text{ cm}$

47. Consider the following statements.

**Statement A:** Numerical value of a physical quantity changes necessarily on changing system of units.

**Statement B:** A dimensionless quantity will always be unitless.

**Statement C:** A physical quantity remains unaltered on changing system of units.

Which among the following option is **true**?

- (1) Statement A and C are true while statement B is false
- (2) Statement A and B are false while statement C is true
- (3) Statement A, B and C all are false
- (4) Statement A and B are true while statement C is false

48. Match the column I (rotation of different bodies) with column II (their moment of inertia) and select the correct answer from the codes given below.

	Column I		Column II
A.	Circular disc of radius $R$ about an axis passing through the diameter	(i)	$\frac{MR^2}{4}$
B.	Hollow cylinder of radius $R$ about its geometrical axis	(ii)	$MR^2$
C.	Solid cylinder of radius $R$ about its geometrical axis	(iii)	$\frac{MR^2}{2}$
D.	Solid sphere of radius $R$ about an axis passing through its diameter	(iv)	$\left(\frac{2}{5}\right)MR^2$

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

49. The period of revolution of a surface satellite around a planet of radius  $R$  is  $T$ . The period of another satellite around the same planet in an orbit of radius  $3R$  is

- (1)  $T$
- (2)  $3T$
- (3)  $3\sqrt{3}T$
- (4)  $9T$

50. The drift speed of electrons in a wire is  $v$  when current  $I$  is flowing through it. If  $2I$  current flows through another wire of same material and length but twice cross-sectional area, then the drift speed of the electrons will be

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

Space for Rough Work

**BOTANY****SECTION - A**

51. According to law of segregation
- The alleles show blending but both the characters are recovered in  $F_1$  generation
  - Ratio of genotypes in monohybrid cross is always 3 : 1 at  $F_2$  generation.
  - During gamete formation, factors or alleles of a pair segregate from each other
  - If dissimilar pair of factors are present then one member of the pair dominates the other
52. Sickle cell anaemia is
- Sex linked recessive disease
  - Caused by substitution of valine by glutamic acid at sixth position of beta globin chain of haemoglobin
  - Caused due to substitution of a base of the alpha globin chain of haemoglobin
  - Caused when beta globin gene changes from GAG to GUG
53. Temperate regions have less biodiversity than the tropics due to many reasons. Which of the following is one amongst them?
- Temperate regions have high temperature throughout the year
  - Less solar energy is available in temperate regions
  - Temperate regions have higher amount of minerals in the soil
  - Temperate regions have constant environment
54. Who popularised the term biodiversity to describe the combined diversity at all the levels of biological organisation?
- David Tilman
  - Paul Ehrlich
  - Edward Wilson
  - Alexander von Humboldt

55. Select the **incorrect** statements among the following.
- Each plant part can take care of its own gas exchange needs
  - Plants do not present great demand for gas exchange
  - Tight packing of parenchymatous cells in leaves provide easy gas exchange
  - In general, roots, stems and leaves respire at rates far lower than animals do
56. All of the following traits are inherited as autosomal recessive traits, **except**
- Haemophilia
  - Thalassemia
  - Phenylketonuria
  - Sickle cell anaemia
57. A couple is expecting their third child. They already have a son and a daughter. What is the probability of their third child to be a female?
- $\frac{3}{4}$
  - $\frac{2}{3}$
  - $\frac{1}{4}$
  - $\frac{1}{2}$
58. Find out the true (T) or false (F) statements and choose the **correct** option.
- Genera are aggregation of closely related species. For example, potato and brinjal are two different species but both belong to the genus *Solanum*.
  - Solanum*, *Petunia* and *Datura* are placed in the family Solanaceae.
  - Cats belong to family Canidae.
  - Generally, order and other higher taxonomic categories are identified based on the aggregates of characters.
- | I     | II | III | IV |
|-------|----|-----|----|
| (1) T | T  | F   | F  |
| (2) T | F  | T   | T  |
| (3) T | T  | F   | T  |
| (4) F | T  | T   | F  |

Space for Rough Work

59. Read the following statements and choose the **correct** option.
- Statement A :** Bladderwort and Venus fly trap are examples of insectivorous plants.
- Statement B :** Morels and truffles are edible and are considered delicacies.
- Only statement A is correct
  - Both statements A and B are incorrect
  - Only statement B is correct
  - Both statements A and B are correct
60. Read the following statements.
- They are commonly known as imperfect fungi because only the asexual or vegetative phases of these fungi are known.
  - They reproduce by asexual spores known as conidia.
  - Once perfect sexual stages of the members are discovered they are often moved to sac-fungi and club-fungi.
  - The mycelium is aseptate and unbranched.
- Regarding deuteromycetes the **correct** ones are
- (a), (b) and (d)
  - (b), (c) and (d)
  - (a), (b) and (c)
  - (a), (c) and (d)
61. Multiple or composite fruit is one which develops from
- Multicarpellary syncarpous gynoecium
  - Complete inflorescence
  - Polycarpellary apocarpous gynoecium
  - Multicarpellary perigynous ovary
62. Which of the following floral characters is **not** true w.r.t. family to which makoi plant belongs?
- Flower is bisexual and actinomorphic
  - Androecium contain five stamens and are epipetalous
  - Gynoecium is bicarpellary, syncarpous and ovary is superior
  - Calyx have five sepals which are fused and show twisted aestivation

63. Match the column I with column II.

	Column I		Column II
(a)	Leaf modification	(i)	<i>Piper nigrum</i>
(b)	Free central placentation	(ii)	<i>Helianthus tuberosus</i>
(c)	Edible underground stem	(iii)	Pitcher of <i>Nepenthes</i>
(d)	Persistent nucellus	(iv)	<i>Dianthus</i>

Select the **correct** answer from the option given below.

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

64. All of the following are characteristics of gymnosperms, **except**
- The female gametophyte does not have an independent free-living existence
  - The roots are generally tap roots
  - These are seeded plants without fruits
  - Endosperm is triploid
65. Which one of the following statements about *Pinus* is **incorrect**?
- It has branched stems
  - Roots have fungal association in the form mycorrhiza
  - The male or female reproductive structures are born on same tree
  - Its coralloid roots are associated with blue green algae
66. Which one of the following statements is **incorrect** w.r.t. microbes?
- They are present even at sites where no life form could possibly exist
  - Virus, viroids and prions are also included among microbes
  - They can be used for commercial production of enzymes
  - They can also be used in recycling of nutrients which is called biocontrol

Space for Rough Work

67. Which one of the following biome is characterised by maximum rainfall?  
 (1) Desert  
 (2) Temperate forest  
 (3) Tropical forest  
 (4) Grassland
68. All are the characteristics of secondary succession, **except**  
 (1) Start in an area, such as burned forests which leads to loss of the living organisms that existed there.  
 (2) The species that invade depend on the environment and also the seeds and propagules present.  
 (3) It takes a less time to reach climax.  
 (4) It starts where no living organism ever existed.
69. Bast fibres are made up of  
 (1) Sclerenchymatous cells  
 (2) Parenchymatous cells  
 (3) Meristematic cells  
 (4) Collenchymatous cells
70. Regarding the differentiating features of dicot and monocot leaves, select the **correct** option.
- | Character            | Dicot leaf                                   | Monocot leaf                              |
|----------------------|--|---|
| (1) Stomata          | Equal in number on lower and upper epidermis | Usually more in number on lower epidermis |
| (2) Vascular bundles | Differ in size                               | Nearly similar in size                    |
| (3) Bulliform cells  | Present                                      | Absent                                    |
| (4) Leaf type        | Isobilateral                                 | Dorsiventral                              |
71. Select the **odd** one out w.r.t. chemical inhibitor promoting seed dormancy?  
 (1) Phenolic acids      (2) Abscisic acid  
 (3) Gibberellins      (4) Para-ascorbic acid
72. A typical angiospermic anther is  
 (1) Single lobed, tetrasporangiate  
 (2) Bilobed, tetrasporangiate  
 (3) Trilobed, bisporangiate  
 (4) Bilobed, bisporangiate
73. Examine the figure given below and select the **correct** option for labelled parts 'A' and 'B'.
- 
- (1) A – Coleoptile; B – Epiblast  
 (2) A – Epiblast; B – Scutellum  
 (3) A – Scutellum; B – Epiblast  
 (4) A – Coleorrhiza; B – Scutellum
74. Mitochondrial matrix contains all, **except**  
 (1) Single circular DNA  
 (2) 80S ribosomes  
 (3) Few RNA molecules  
 (4) Components required for protein synthesis
75. Which of the following cell organelles is bounded by a single membrane?  
 (1) Chloroplast  
 (2) Mitochondria  
 (3) Vacuole  
 (4) Nucleus

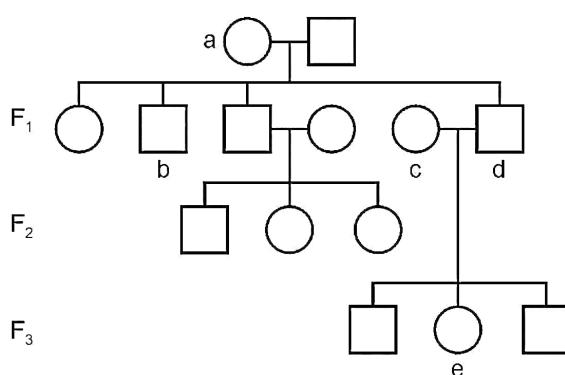
Space for Rough Work

76. Read the following statements and mark them as **true (T)** or **false (F)** then choose the **correct** option.
- Vacuoles contains water, sap, excretory products and other material not useful for the cell.
  - Vacuoles facilitates the transport of materials across membrane into it only along the concentration gradient.
  - Vacuoles in animal cells are very large and permanent.
- | <b>A</b> | <b>B</b> | <b>C</b> |
|----------|----------|----------|
| (1) T    | T        | T        |
| (2) T    | F        | F        |
| (3) F    | T        | T        |
| (4) F    | F        | F        |
77. How many meiotic divisions are required to produce 64 pollen grains in a typical flowering plant?
- 32
  - 16
  - 48
  - 64
78. In which of the following stages of cell cycle spindle fibres attach to kinetochores of chromosomes?
- Metaphase
  - Prophase
  - Anaphase
  - Telophase
79. Read the following statements and choose the **correct** option.
- Statement A :** DNA synthesis occurs only during a specific phase of the cell cycle.
- Statement B :** Cell growth in terms of cytoplasmic increase is a discontinuous process.
- Only statement A is correct
  - Only statement B is correct
  - Both the statements A and B are correct
  - Both the statements A and B are incorrect
80. Identify the **correct** statement.
- The process of splicing represents the dominance of RNA world.
  - In tailing, adenylate residues are added at 3' end in template dependent manner.
- (3) If two uncharged tRNAs are brought close enough, the formation of peptide bond between them would be favoured energetically.
- (4) In prokaryotes, control of the rate of translational initiation is the predominant site for control of gene expression.
81. Which of the following products will be synthesized by *lac* operon even if the product of *lac i* gene irreversibly bind to operator region?
- Transacetylase
  - Repressor
  - $\beta$ -galactosidase
  - Permease
82. Which of the following options is describing the reason that why both strands of DNA are not copied during transcription?
- If both strands act as a template, they would code for RNA molecule with different sequences.
  - Both strands code for same type of proteins.
  - The two newly synthesized RNA molecules are not complimentary to each other.
  - It will allow higher expression of proteins.
83. VNTRs
- Belong to micro-satellite
  - Vary in size from 0.1 to 20 kb
  - Show very less degree of polymorphism
  - Copy number remains same among different chromosomes of a cell in an individual
84. Photosystem II
- Is found in both grana and stroma lamellae
  - Has reaction centre with absorption maxima at 680 nm
  - Participates in both cyclic as well as non-cyclic flow of electrons
  - Is not associated with splitting of water
85. Chemiosmosis process for ATP synthesis require all of the following, **except**
- Membrane
  - Electron gradient
  - Proton pump
  - Proton gradient

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## SECTION-B

86.



Consider the above pedigree for a particular trait and choose the **incorrect** statement w.r.t. it.

- (1) The individual d would be carrier for that particular trait
  - (2) The above pedigree shows genetic disorder, like phenylketonuria
  - (3) This pedigree is true for autosomal dominant traits
  - (4) This pedigree is not true for Y linked disorder
87. Respiratory quotient
- (1) Of fatty acid is more than 1
  - (2) Is the ratio of volume of O<sub>2</sub> consumed to volume of CO<sub>2</sub> evolved
  - (3) Depends on the type of respiratory substrate used
  - (4) Of proteins would be about 0.7
88. Which of the following statements about prions is **not** correct?
- (1) They have proteinaceous outer covering called capsid
  - (2) They cause neurological diseases such as Kuru disease which is also called as 'laughing death' disease in humans
  - (3) These are similar in size to viruses, but do not have any nucleic acid
  - (4) These are called proteinaceous infectious particles

89. Which of the following statements is/are **correct** w.r.t. monocotyledonous seed?
- (a) Seeds of orchids are endospermic.
  - (b) Plumule and radicle are enclosed in sheaths which are called coleoptile and coleorhiza respectively.
  - (c) It consists of one large and shield shaped cotyledon known as scutellum and a short axis with a plumule and a radicle.
  - (d) Embryo consist of an embryonal axis and two cotyledons.

Mark the **correct** option.

- (1) Only (b) and (c)
- (2) Only (a) and (d)
- (3) (a), (b) and (c)
- (4) Only (d)

90. Which of the following statements is **incorrect** regarding bryophytes?
- (1) Antheridium is surrounded by a sterile jacket which encloses mass of sperm mother cells.
  - (2) The female sex organ is flask shaped.
  - (3) Zygote undergoes meiosis immediately after its formation.
  - (4) The antherozoids are biflagellated.

91. Puffed-up appearance of dough used in preparation of bread is due to production of
- (1) CH<sub>4</sub>
  - (2) CO<sub>2</sub>
  - (3) O<sub>2</sub>
  - (4) C<sub>2</sub>H<sub>5</sub>OH

92. Read the following statements and select the **correct** option.
- Statement A :** Mimicry refers to the resemblance of one organism to another or to the natural objects among which it lives.
- Statement B :** Monarch butterfly is avoided by its predators due to presence of a special chemical in its body which makes it highly distasteful.
- (1) Only statement A is correct.
  - (2) Only statement B is correct.
  - (3) Both statements A and B are correct.
  - (4) Both statements A and B are incorrect.

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93. Which of the following statements is **incorrect** regarding carbon cycle?
- Fossil fuel also represent a reservoir of carbon
  - According to one estimate  $4 \times 10^{13}$  kg of carbon is fixed annually in the biosphere through photosynthesis
  - 71 percent carbon is found dissolved in the ocean
  - It is the example of sedimentary cycle
94. In the light of given statements, choose the **correct** option.
- Statement I :** When bulliform cells are turgid, they make the leaves curl inwards.
- Statement II :** Phellogen, phellem and phelloderm are collectively known as periderm.
- Only statement I is correct
  - Only statement II is correct
  - Both the statements are correct
  - Both the statements are incorrect
95. Select the **incorrectly** matched pair
- |                                       |   |
|---------------------------------------|---|
| (1) H. H. Cousins                     | – Confirmed release of volatile substance from ripened oranges  |
| (2) Miller et al.                     | – Identified and crystallised cytokinesis promoting active substance  |
| (3) E. Kurosawa                       | – Isolated auxin from tips of coleoptiles of oat seedlings  |
| (4) Charles Darwin and Francis Darwin | – Observed coleoptiles of canary grass responded to unilateral illumination by growing towards light source |
96. Read the following statements and select the **correct** option.
- Assertion (A) :** Being a monoecious plant, papaya has male and female flowers on same plant.
- Reason (R) :** Dioecious condition prevents autogamy but not geitonogamy.
- Both (A) and (R) are true and (R) is the correct explanation of (A).
  - Both (A) and (R) are true but (R) is not the correct explanation of (A).
  - (A) is true but (R) is false.
  - Both (A) and (R) are false.
97. The pigments, chlorophyll and carotenoids are found to be present in
- Chloroplast
  - Amyloplast
  - Leucoplast
  - Aleuroplast
98. All of the following are features of M-phase, **except**
- Assembly of mitotic apparatus
  - Centrosome duplication
  - Reformation of nucleolus
  - Dissolution of nuclear envelope
99. Which of the following codon aids in the termination of translation?
- AUG
  - UUU
  - UGA
  - CUG
100. All of the following scientists contributed to the biochemical characterization of transforming principle, **except**
- Avery
  - MacLeod
  - McCarty
  - Griffith

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**ZOOLOGY****SECTION - A**

101. If a protein is imagined as a straight line then what is represented by its right end?
- First amino acid
  - Last amino acid
  - Second amino acid
  - Second last amino acid
102. The body is externally and internally divided into segments with a serial repetition of at least some organs in the organisms of the phylum
- Mollusca
  - Annelida
  - Coeleterata
  - Platyhelminthes
103. The *Nereis* is similar to the *Anopheles* w.r.t.
- Habits and habitat
  - Presence of coelomic cavity
  - Dioecious nature
  - Presence of ventral nerve cord
- Select the **correct** option.
- (a), (b) and (c)
  - (b), (c) and (d)
  - (a), (c) and (d)
  - (a), (b) and (d)
104. The type of epithelium present in the ducts of glands and tubular parts of nephron is
- Columnar epithelium
  - Compound epithelium
  - Ciliated epithelium
  - Cuboidal epithelium
105. Which of the following is the pacemaker of human heart?
- AV bundle
  - Sino-atrial node
  - AV node
  - Purkinje fibres
106. In adult human beings, the skeletal system is made up of 206 bones. Out of these, how many bones comprise the axial skeleton?
- 106
  - 80
  - 126
  - 90

107. Complete the analogy and select the **correct** option w.r.t. antagonistic hormones.

Insulin : Glucagon : : Parathyroid hormone :

---

(1) Thymosins

(2) Thyrocalcitonin

(3) Thyroxine

(4) Thyroid stimulating hormone

108. Which among the following structures is present in the mantle cavity of molluscs?

(1) Sensory tentacles

(2) Feather-like gills

(3) Radula

(4) Muscular foot

109. Match the column I with column II and select the **correct** option w.r.t. glands and diseases associated with them.

	<b>Column I</b>		<b>Column II</b>
a.	Pituitary gland	(i)	Addison's disease
b.	Pancreas	(ii)	Graves' disease
c.	Adrenal gland	(iii)	Diabetes mellitus
d.	Thyroid gland	(iv)	Gigantism

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

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

110. Which of the following is **not** true for transgenic animals?

(1) They are used in conventional method of diagnosis of diseases.

(2) Used in the study of normal physiology and development

(3) Used in the production of useful biological products

(4) Used in testing toxicity of drugs

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111. Consider the following statements.

**Statement (A):** Adenosine, thymidine, uracil are nucleosides.

**Statement (B):** Adenylic acid, thymidylic acid and cytidylic acid are nucleic acids.

Select the **correct** option.

- (1) Both statements (A) and (B) are true
- (2) Statement (A) is true but statement (B) is false
- (3) Both statements (A) and (B) are false
- (4) Statement (A) is false but statement (B) is true

112. During gel electrophoresis, the separated fragments can be visualised only after staining with 'X' followed by exposure to 'Y'. Select the option that **correctly** identifies 'X' and 'Y' respectively.

- (1) Ethidium bromide, X-rays
- (2) Methylene blue, Visible light
- (3) Methylene blue, UV rays
- (4) Ethidium bromide, UV rays

113. \_\_\_\_\_ is absent in frog's brain but present in human's brain. Select the **correct** option to fill in the blank.

- (1) Cerebellum                   (2) Medulla oblongata
- (3) Pons                          (4) Optic lobes

114. Read the following statements w.r.t. human respiratory system.

- a. Human beings have a significant ability to maintain and moderate the respiratory rhythm to suit the demands of the body tissues.
- b. Pressure contributed by an individual gas in a mixture of gases is called the partial pressure of that gas.
- c. The role of oxygen in the regulation of respiratory rhythm is quite significant.

Choose the most appropriate option.

- (1) a, b and c are correct
- (2) a and b are correct
- (3) Only a is correct
- (4) b and c are correct

115. Select the **incorrect** statement w.r.t. considered grounds for medical termination of pregnancies.

- (1) If the continuation of pregnancy involves a risk to the life of the pregnant woman.
- (2) If the continuation of pregnancy involves a risk of grave injury to physical or mental health of the pregnant woman.
- (3) There is substantial risk that if the child is born, will suffer from physical abnormalities.
- (4) If the child born will be physically and mentally healthy.

116. Which of the following secondary metabolites are placed under the category of alkaloids?

- (1) Carotenoids                   (2) Gums
- (3) Rubber                       (4) Codeine

117. In humans, at resting state, the axoplasm inside the axon does not contain

- (1) High concentration of K<sup>+</sup>
- (2) High concentration of Na<sup>+</sup>
- (3) High concentration of negatively charged proteins
- (4) Low concentration of Na<sup>+</sup>

118. Select the **correct** range of blood glucose level in a normal healthy individual.

- (1) 7.2 mmol/L – 7.4 mmol/L
- (2) 6.1 mmol/L – 7.4 mmol/L
- (3) 4.2 mmol/L – 6.1 mmol/L
- (4) 6.2 mmol/L – 7.4 mmol/L

119. Choose the **incorrect** match.

(1)	Atherosclerosis	–	Coronary Artery Disease
(2)	Heart failure	–	Heart unable to pump blood effectively
(3)	Cardiac arrest	–	Also called congestive heart failure
(4)	Heart attack	–	Heart muscle suddenly damaged by inadequate blood supply

Space for Rough Work

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(4)	Heart attack	–	Heart muscle suddenly damaged by inadequate blood supply

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## Space for Rough Work

132. Choose the tissue whose fibres show contraction in response to a stimulus and then relax and return to their uncontracted state in a coordinated fashion.
- Compound epithelial tissue
  - Neural tissue
  - Muscular tissue
  - Simple epithelial tissue
133. The organisation which is responsible for making decisions regarding the validity of GM research and the safety of introducing GM-organisms for public services is
- Genetics and Ethical Issue Action Committee
  - Genetic Engineering Approval Committee
  - Genome Environment Action Committee
  - Genetic Environment Approval Committee
134. Select the **odd** one w.r.t. *in-vitro* fertilisation.
- |          |          |
|----------|----------|
| (1) IUT  | (2) ICSI |
| (3) ZIFT | (4) GIFT |
135. Which variety of rice was patented by a U.S. company even after when its 27 documented varieties are grown in India?
- Bt rice
  - Golden rice
  - Sharbati rice
  - Basmati rice
- SECTION - B**
136. When forelimbs of cheetah and bat were analysed, it was observed that
- They are not anatomically similar structures but perform the same function i.e., locomotion
  - They represent analogy that is a result of divergent evolution
  - Both of them have humerus, radius, ulna, carpals, metacarpals and phalanges
  - Both represent homology which is based on convergent evolution
137. AV bundle passes through \_\_\_\_\_ to emerge on the top of inter-ventricular septum and immediately divides into a right and left bundle. Select the **correct** answer to fill in the blank.
- Bundle of His
  - Atrio-ventricular node
  - Atrio-ventricular septa
  - Inter-atrial septum
138. 'X' is a bacterium that has the oncogenic effect on the plant cells just as the retroviruses have on the animal cells. Identify 'X' and select the **correct** option.
- Meloidogyne incognita*
  - Salmonella typhimurium*
  - Agrobacterium tumefaciens*
  - Escherichia coli*
139. Consider the given statements and select the **incorrect** one.
- 'Good humor' hypothesis was disproved by William Harvey.
  - Though AIDS is completely curable still prevention is the best option.
  - Tobacco smoking can cause lung cancer.
  - Psoriasis is an autoimmune disorder
140. Seminal plasma is rich in all of the following substances, **except**
- |              |                     |
|--------------|---------------------|
| (1) Fructose | (2) Calcium         |
| (3) Sperms   | (4) Certain enzymes |
141. Read the following statements.
- Cyclostomes are marine but migrate for spawning to fresh water.
  - Mouth is dorsally located in *Scoliodon*.
  - Snakes and lizards shed their scales as skin cast.
- In the light of above statements, choose the most appropriate option.
- (a), (b) and (c) are correct
  - Only (b) is correct
  - Only (a) and (c) are correct
  - Only (a) and (b) are correct

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142. Match the column I with column II w.r.t. human female reproductive system and choose the correct answer.

	<b>Column I</b>		<b>Column II</b>
A.	Hymen	(i)	A cushion of fatty tissue
B.	Mons pubis	(ii)	A component of external genitalia
C.	Clitoris	(iii)	Middle thick layer of uterus
D.	Myometrium	(iv)	A tiny finger-like structure

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
(1)	(i)	(ii)	(iii)	(iv)
(2)	(iii)	(iv)	(ii)	(i)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(iv)	(iii)	(ii)	(i)

143. Which of the following is a set of aromatic amino acids?

- (1) Valine, Phenylalanine
- (2) Tyrosine, Tryptophan
- (3) Glutamic acid, Phenylalanine
- (4) Glycine, Serine

144. Listed below are certain reasons.

- (i) Psychological
- (ii) Immunological
- (iii) Drugs
- (iv) Congenital diseases

How many of the above is/are true reason(s) for infertility in humans?

- (1) One
- (2) Two
- (3) Three
- (4) Four

145. The possible permanent cure of the genetic defect "ADA deficiency" is

- (1) Enzyme replacement therapy
- (2) Infusion of genetically engineered lymphocytes having functional ADA cDNA periodically
- (3) Introduction of gene isolated from marrow cells producing ADA at early embryonic stage
- (4) Bone marrow transplantation in later stages of life

146. Select the **odd** one w.r.t. the genital pouch of a female cockroach and structures/pores associated with it.

- (1) Colieterial glands
- (2) Gonopore
- (3) Spermathecal pores
- (4) Left phallomere

147. Active sites for binding of actin is present on the

- (1) Globular head of HMM
- (2) Tail
- (3) Short arm of LMM
- (4) Globular part of thin filament

148. Choose the correct option w.r.t. toxicity of nitrogenous wastes.

- (1) Ammonia < Urea < Uric acid
- (2) Urea < Uric acid < Ammonia
- (3) Uric acid < Urea < Ammonia
- (4) Uric acid < Ammonia < Urea

149. Limbic system is not concerned with

- (1) Olfaction
- (2) Autonomic responses
- (3) Motivation
- (4) Gastric secretions

150. How many hormone(s) present in the box given below is/are peptide/polypeptide/protein in nature?

Epinephrine, Thyroxine, Insulin, GH, GnRH, Cortisol, Progesterone

Select the **correct** option.

- (1) One
- (2) Five
- (3) Three
- (4) Four

Space for Rough Work

**CHEMISTRY****SECTION - A**

151. Match List-I with List-II and choose the **correct** code.

	<b>Column-I</b> Element		<b>Column-II</b> Group Number
a.	Z = 35	(i)	13
b.	Z = 49	(ii)	17
c.	Z = 59	(iii)	3
d.	Z = 37	(iv)	1

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

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

**Assertion (A):** First member of a group of elements in the s-and p-blocks shows different chemical behaviour compared to that of the subsequent members in the same group.

**Reason (R):** The maximum covalency of the first member of each group is greater than 4.

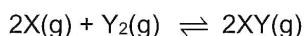
In the light of above statements choose the **correct** answer.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)  
 (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)  
 (3) (A) is true but (R) is false  
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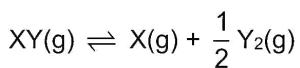
153. An aqueous solution contains 0.1 M benzoic acid and 0.5 M sodium benzoate. The pH of the solution will be [pK<sub>a</sub>(benzoic acid) = 4.76]

- (1) 4.76 (2) 5.46  
 (3) 4.06 (4) 3.92

154. If the value of equilibrium constant for the following reaction is K<sub>1</sub>



Then the value of equilibrium constant for the reaction given below is



- (1) K<sub>1</sub> (2)  $\frac{K_1}{2}$   
 (3)  $\frac{1}{\sqrt{K_1}}$  (4)  $\sqrt{K_1}$

155. The weight of silver displaced by a quantity of electricity which displaces 11200 mL of O<sub>2</sub> at STP will be

[At. weight of Ag = 108]

- (1) 216 g (2) 108 g  
 (3) 162 g (4) 324 g

156. Hybridisation and shape of IF<sub>5</sub> is

- (1) sp<sup>3</sup>d<sup>2</sup> and square pyramidal respectively  
 (2) sp<sup>3</sup>d<sup>2</sup> and octahedral respectively  
 (3) sp<sup>3</sup>d and trigonal bipyramidal respectively  
 (4) sp<sup>3</sup>d and see-saw respectively

157. The number of bonding electron pairs in N<sub>2</sub> on the basis of molecular orbital theory is

- (1) 10 (2) 4  
 (3) 5 (4) 2

158. 10 g of a non-volatile, non-electrolytic solute when dissolved in 100 g water lowers the freezing point by 1.2°C. Calculate molecular weight of the solute if molal depression constant of water is 1.86 K kg mol<sup>-1</sup>.

- (1) 175 g mol<sup>-1</sup> (2) 155 g mol<sup>-1</sup>  
 (3) 135 g mol<sup>-1</sup> (4) 120 g mol<sup>-1</sup>

Space for Rough Work

159. Which of the following pairs of solution will be isotonic at the same temperature? (Consider 100% dissociation of the electrolytes)

- 0.1 M NaCl and 0.1 M Na<sub>2</sub>SO<sub>4</sub>
- 0.1 M NaCl and 0.1 M Urea
- 0.1 M NaCl and 0.1 M KCl
- 0.1 M Urea and 0.1 M KCl

160. Identify the **correct** statement among the following

- Hybridisation of chromium in chromate ions is  $sp^2$
- Acidified K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> with hydrogen peroxide gives deep blue solution of CrO<sub>5</sub>
- Gun metal contains Cu, Ag, Zn
- K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> is coloured due to *d-d* transition

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

**Assertion (A):**  $\Delta U$  does not discriminate between reversible and irreversible processes, whereas  $\Delta S$  does.

**Reason (R):** For both, reversible and irreversible expansion of an ideal gas, under isothermal condition  $\Delta U = 0$ .

In the light of above statements choose the **correct** answer.

- Both (A) and (R) are true and (R) is the correct explanation of (A)
- Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (A) is true but (R) is false
- Both (A) and (R) are false

162. Which among the following is optically inactive amino acid?

- |             |            |
|-------------|------------|
| (1) Serine  | (2) Lysine |
| (3) Glycine | (4) Valine |

163. Consider the following statements

- Ethyne on passing through red hot iron tube at 873 K undergoes cyclic polymerisation to form benzene.
- Ethyne decolourises the reddish orange colour of bromine solution taken in carbon tetrachloride.
- Acidic nature of acetylene is more than ethanol.

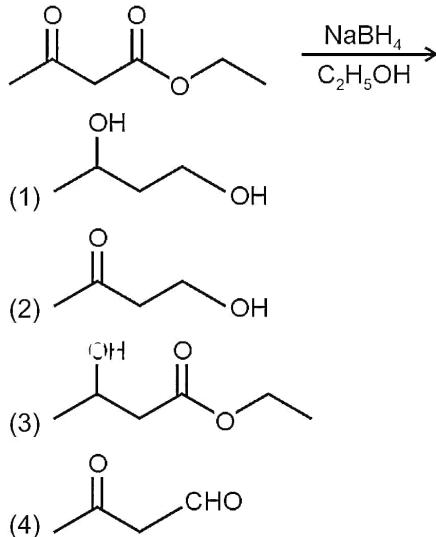
The **correct** statements are

- (a) and (b) only
- (b) and (c) only
- (a) and (c) only
- (a), (b) and (c)

164. The compound which does not show geometrical isomerism is

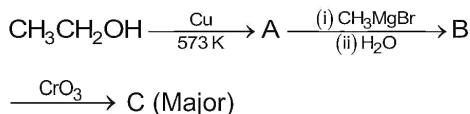
- FCH = CHF
- CH<sub>3</sub>CH = CHC<sub>2</sub>H<sub>5</sub>
- (CH<sub>3</sub>)<sub>2</sub>C = CHCH<sub>3</sub>
- CIFC = CBrF

165. Major product of the given reaction is

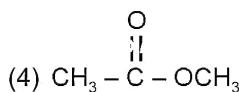
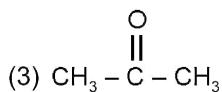
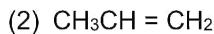


Space for Rough Work

166. Consider the following reaction sequence

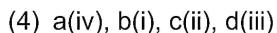
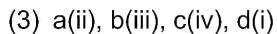
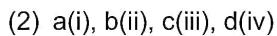
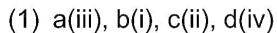


Major product C is



167. Match list-I with list-II and choose the correct code.

	<b>List-I</b>		<b>List-II</b>
a.		(i)	Stephen reaction
b.		(ii)	Rosenmund reduction
c.		(iii)	Etard reaction
d.		(iv)	Gattermann Koch reaction



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

**Assertion (A):** o-methylbenzoic acid is more acidic than p-methylbenzoic acid.

**Reason (R):** Due to steric inhibition in resonance ortho-substituted benzoic acid is more acidic than para-substituted benzoic acid.

In the light of above statements choose the **correct** answer.

- (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)

169. Mass of  $\text{H}_2\text{O}$  produced on mixing 2 g  $\text{H}_2$  and 8 g  $\text{O}_2$  will be

- (1) 10 g
- (2) 8 g
- (3) 9 g
- (4) 4.5 g

170. Which among the following is not a group IV cation?

- (1)  $\text{Pb}^{2+}$
- (2)  $\text{Ni}^{2+}$
- (3)  $\text{Zn}^{2+}$
- (4)  $\text{Co}^{2+}$

171. Cation that gives brown precipitate with Nessler's reagent is

- (1)  $\text{Cu}^{2+}$
- (2)  $\text{Zn}^{2+}$
- (3)  $\text{NH}_4^+$
- (4)  $\text{Mg}^{2+}$

172. The frequency of yellow radiation having wavelength 5800 Å is

- (1)  $4 \times 10^{12} \text{ s}^{-1}$
- (2)  $1.2 \times 10^{12} \text{ s}^{-1}$
- (3)  $7.5 \times 10^{14} \text{ s}^{-1}$
- (4)  $5.2 \times 10^{14} \text{ s}^{-1}$

173. Oxidation state and covalency of N in  $\text{N}_2\text{O}_5$  are

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

Space for Rough Work

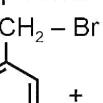
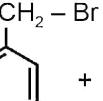
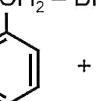
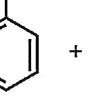
174. Which among the following has the highest bond dissociation enthalpy?

  - $\text{F}_2$
  - $\text{Cl}_2$
  - $\text{Br}_2$
  - $\text{I}_2$

175. The **correct** order of basic nature in aqueous medium is

  - $(\text{C}_2\text{H}_5)_2\text{NH} > \text{C}_2\text{H}_5\text{NH}_2 > (\text{C}_2\text{H}_5)_3\text{N} > \text{NH}_3$
  - $(\text{C}_2\text{H}_5)_3\text{N} > (\text{C}_2\text{H}_5)_2\text{NH} > \text{C}_2\text{H}_5\text{NH}_2 > \text{NH}_3$
  - $(\text{C}_2\text{H}_5)_2\text{NH} > (\text{C}_2\text{H}_5)_3\text{N} > \text{C}_2\text{H}_5\text{NH}_2 > \text{NH}_3$
  - $\text{NH}_3 > \text{C}_2\text{H}_5\text{NH}_2 > (\text{C}_2\text{H}_5)_2\text{NH} > (\text{C}_2\text{H}_5)_3\text{N}$

176. Which of the following reactions gives toluene as major product?

  -  +  $\text{H}_2\text{O} \longrightarrow$
  -  +  $\text{LiAlH}_4 \longrightarrow$
  -  +  $\text{NaOH(aq)} \longrightarrow$
  -  +  $\text{NH}_3 \longrightarrow$

177. Consider the following statements.

**Statement I:** Enantiomers differ only with respect to the rotation of plane polarised light.

**Statement II:** Enantiomers possess different physical properties namely, melting point, boiling point etc.

In the light of above statements choose the **correct** answer.

  - Statement I is incorrect but statement II is correct
  - Statement I is correct but statement II is incorrect

(3) Both the statement I and statement II are correct

(4) Both the statement I and statement II are incorrect

178. The correct IUPAC name of  $[\text{NiCl}_2(\text{PPh}_3)_2]$  is

  - Dichloridodi(triphenylphosphine)nickel(II)
  - Dichloridobis(triphenylphosphine)nickelate(II)
  - Bis(triphenylphosphine)dichloronickel(II)
  - Dichloridobis(triphenylphosphine)nickel(II)

179. The number of significant figures in  $4.005 \times 10^4$  is

  - 8
  - 5
  - 6
  - 4

180. Mass of NaOH in gram required to make 500 mL of 0.5 M aqueous NaOH solution is

  - 10 g
  - 20 g
  - 5 g
  - 40 g

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

**Assertion (A):** Sulphur( $\text{S}_8$ ) undergoes disproportionation in alkaline medium.

**Reason (R):** Sulphur( $\text{S}_8$ ) gets oxidised to thiosulphate ion in which sulphur is in +6 oxidation state.

In the light of above statements choose the **correct** answer.

  - Both (A) and (R) are true and (R) is the correct explanation of (A)
  - Both (A) and (R) are true but (R) is not the correct explanation of (A)
  - (A) is true but (R) is false
  - Both (A) and (R) are false

182. The species in which nitrogen is in the least oxidation state is

  - $\text{NO}$
  - $\text{NH}_3$
  - $\text{HNO}_3$
  - $\text{HNO}_2$

### Space for Rough Work

183. Which of the given order of group 13 elements is **incorrect** with respect to the physical property given in the bracket?

- (1) B > Ga > Al > In (First ionisation enthalpy)
- (2) B > In > Ga > Al (Electronegativity)
- (3) In > Ga > Al > B (Density)
- (4) In > Ga > Al > B (Atomic radii)

184. Choose the **incorrect** statement.

- (1) Hyperconjugation and electromeric effects are permanent effect
- (2) Hyperconjugation is also possible in alkenes and alkylarenes
- (3) When inductive and electromeric effects operate in opposite directions, the electromeric effect predominates
- (4) Magnitude of inductive effect diminishes as the number of intervening bonds increases

185. Which of the following mixtures can easily be separated by simple distillation?

- (1) Aniline and water mixture
- (2) Chloroform and aniline mixture
- (3) Glycerol from spent lye
- (4) Fractions of crude oil in petroleum

#### SECTION - B

186. Match List-I with List-II and choose the **correct** code.

	<b>List-I</b>		<b>List-II</b>
a.	A paste of KOH and ZnO is used as an electrolyte	(i)	Fuel cell
b.	Ammonia is produced at cathode	(ii)	Dry cell
c.	38% H <sub>2</sub> SO <sub>4</sub> solution is used as an electrolyte	(iii)	Mercury cell
d.	H <sub>2</sub> and O <sub>2</sub> are bubbled through porous carbon electrodes into conc.NaOH	(iv)	Lead storage battery

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

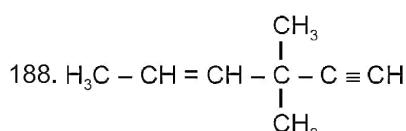
187. Given below are two statements: One is labelled as Assertion (A) and the other is labelled as Reason (R).

**Assertion (A):** HI is more acidic than HCl.

**Reason (R):** Bond strength of HI is less than HCl.

In the light of above statements choose the **correct** answer.

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



Hybridisation of C<sub>1</sub>, C<sub>3</sub>, C<sub>5</sub> and C<sub>6</sub> is

- (1) sp<sup>2</sup>, sp<sup>2</sup>, sp<sup>3</sup> and sp respectively
- (2) sp, sp<sup>3</sup>, sp<sup>2</sup> and sp<sup>3</sup> respectively
- (3) sp, sp<sup>2</sup>, sp<sup>3</sup> and sp respectively
- (4) sp<sup>3</sup>, sp, sp<sup>3</sup> and sp<sup>2</sup> respectively

189. The temperature of 10 mL of HCl increases by 3°C when 10 mL NaOH is added to it. If 3 mL of each are mixed, then temperature should increase by

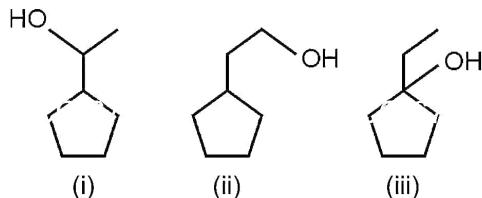
- (1) 6°C
- (2) 3°C
- (3) 0.3°C
- (4) 1°C

Space for Rough Work

190. Which one of the following elements exhibits only +4 oxidation state?

- U
- Am
- Np
- Th

191. The relative ease of dehydration of given alcohols in acidic medium is



- (ii) > (iii) > (i)
- (i) > (iii) > (ii)
- (iii) > (i) > (ii)
- (ii) > (i) > (iii)

192. The compound which does not show mutarotation is

- Glucose
- Lactose
- Sucrose
- Maltose

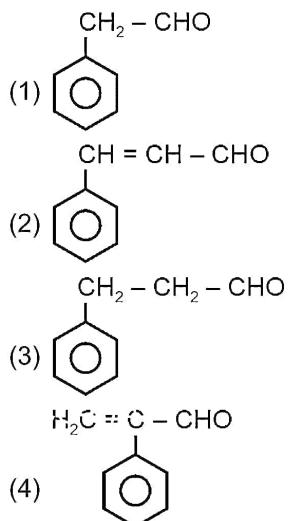
193. Number of structural isomers possible for  $C_6H_{14}$  and  $C_7H_{16}$  respectively are

- 5 and 8
- 5 and 9
- 6 and 8
- 5 and 7

194. If rate of a chemical reaction  $A + B \rightarrow C$  doubles on doubling the concentration of [A], keeping [B] constant and remains unchanged if concentration of both [A] and [B] is doubled, then order of reaction with respect to A and B respectively are

- |           |           |
|-----------|-----------|
| (1) 0, 0  | (2) 1, 0  |
| (3) 1, -1 | (4) -1, 1 |

195. Which among the following is cinnamaldehyde?



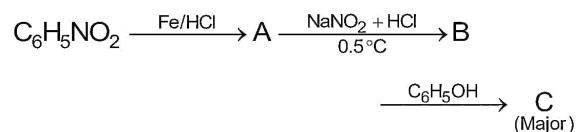
196. Consider the following statements.

**Statement I:** Greater the number of alkyl groups present in the carbanion, more will be the stability.

**Statement II:** Methyl anion is pyramidal in shape. Choose the **correct** option.

- Both the statement I and statement II are correct
- Both the statement I and statement II are incorrect
- Statement I is correct but statement II is incorrect
- Statement I is incorrect but statement II is correct

197. Consider the following reaction sequence



The colour and IUPAC nomenclature of the product C respectively are

- Orange colour, p-Hydroxyazobenzene
- Yellow colour, m-Hydroxyazobenzene
- Orange colour, o-Hydroxyazobenzene
- Yellow colour, p-Hydroxyazobenzene

Space for Rough Work

198. Consider the following statements.

**Statement I:**  $[\text{CrCl}_2(\text{Ox})_2]^{3-}$  shows geometrical isomerism.

**Statement II:** trans- $[\text{CrCl}_2(\text{Ox})_2]^{3-}$  is an optically active entity.

Choose the **correct** option.

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

199. In a sample of H atom, total number of spectral lines obtained during transition of electron from 5<sup>th</sup> excited state to the ground state is

- |        |        |
|--------|--------|
| (1) 15 | (2) 5  |
| (3) 4  | (4) 10 |

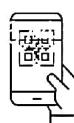
200. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

**Assertion (A):** When HCl reacts with finely powdered iron, it forms ferrous chloride and not ferric chloride.

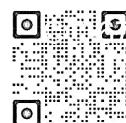
**Reason (R):** Liberation of hydrogen prevent the formation of ferric chloride.

In light of above statement choose the **correct** option.

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



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