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## AIM - 720

(Advanced INTENSIVE Mastery for 720)

MM : 720

## CST - 15

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.

### BOTANY

#### SECTION-A

1. All are the characteristics of members of Rhodophyceae, **except**
  - (1) Red colour is due to the predominance of the r-phycoerythrin
  - (2) Cell wall is composed of cellulose, pectin and hydrocolloids
  - (3) Algin is obtained from its cell wall
  - (4) Food is stored in the form of floridean starch
2. Which of the following plants lacks vascular tissue?
 

(1) <i>Gelidium</i>	(2) <i>Pinus</i>
(3) <i>Cycas</i>	(4) <i>Adiantum</i>
3. Which of the following is **not** true for ecological niche?

(1) It represents functional role of an organism in an ecological system

(2) Each species has a distinct niche

(3) No two species are believed to occupy exactly the same niche

(4) Niche of an organism never get changed over a period of time.

4. Read the following statements and select the **correct** option.

**Statement A:** Alexander Fleming discovered Penicillin while working on *Staphylococci* bacteria.

**Statement B:** Chain and Florey established the full potential of Penicillin as an effective antibiotic.

(1) Only statement A is correct

(2) Only statement B is correct

(3) Both the statements A and B are correct

(4) Both the statements A and B are incorrect

5. Consider the following statements and state them as **True (T)** or **False (F)** and choose the **correct** option.
- Pyramid of number is upright in pond ecosystem.
  - Pyramid of biomass in terrestrial ecosystems is usually upright.
  - Pyramid of energy is inverted in grassland ecosystem.
- |     | <b>(a)</b> | <b>(b)</b> | <b>(c)</b> |
|-----|------------|------------|------------|
| (1) | T          | T          | F          |
| (2) | F          | F          | T          |
| (3) | T          | F          | T          |
| (4) | F          | T          | F          |
6. Meristem which occurs between mature tissues is
- Apical meristem
  - Intercalary meristem
  - Lateral meristem
  - Secondary meristem
7. Identify the **correct** anatomical features of monocot stem
- Vascular bundles are conjoint and open.
  - Generally smaller sized vascular bundles are present at periphery.
  - Water containing cavities are present within vascular bundles.
  - Collenchymatous hypodermis.
- (a), (b) and (c) only
  - (b) and (c) only
  - (a), (c) and (d) only
  - (c) and (d) only
8. Which of the following plant growth regulator is adenine derivative?
- Kinetin
  - IAA
  - GA<sub>3</sub>
  - ABA
9. Which of the following cells are situated at the chalazal end within the embryo sac?
- Synergids
  - Filiform apparatus
  - Antipodal cells
  - Central cell
10. In the light of given statements, select the **correct** option.
- Statement I:** Generative cell is spindle shaped with dense cytoplasm and a nucleus.
- Statement II:** In pollen grain, exine has prominent apertures called germ pores where sporopollenin is present.
- Only statement I is correct
  - Only statement II is correct
  - Both statements are correct
  - Both statements are incorrect
11. Chlorophyll pigments are found in
- Chloroplast
  - Elaeoplast
  - Leucoplast
  - Amyloplast
12. Which one is characteristic of prokaryotic cell?
- DNA with histones
  - Nuclear membrane present
  - Naked DNA
  - Presence of extensive cellular compartmentalisation
13. Which of the following set of cell structures are membrane bound?
- Lysosomes, vacuole and ribosomes
  - Lysosomes, golgi apparatus and mitochondria
  - Nucleolus, endoplasmic reticulum and ribosomes
  - Vacuole, chloroplast and ribosomes
14. In mitotic cell division, centromere splits during
- Anaphase II
  - Anaphase I
  - Anaphase
  - Metaphase I
15. Which of the following statements is **incorrect**?
- Meiosis increases the genetic variability
  - Meiosis leads to the formation of haploid gametes
  - Mitotic division occurs in meristematic cells
  - The growth of multicellular organisms is due to meiosis
16. If there are 20 chromosomes in G<sub>1</sub> phase then what will be the number of bivalents in zygote stage?
- 20
  - 10
  - 35
  - 40

Space for Rough Work

17. Read the following statements and choose the **correct** option.  
**Assertion (A):** Transcription and translation have to be tightly regulated in a cell.  
**Reason (R):** Transcription and translation are energetically very expensive.

  - 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

18. One of the hallmark of the double stranded helical structure of DNA proposed by Watson and Crick is

  - The presence of sugar phosphate backbone
  - Antiparallel polarity of two strands
  - Base pairing between the two strands of polynucleotide chains
  - The spacing between the base pairs

19. Less than 2% of human genome

  - Constitute repetitive sequences
  - Have only intronic sequences that can code for proteins
  - Codes for proteins
  - Is composed of 3164.7 billion bp

20. The negative regulation of transcriptionally regulated system described by Jacob and Monod, is facilitated via

  - Constitutively synthesized protein produced by a gene upstream to the structural gene
  - Protein responsible for increasing the permeability of the cell to  $\beta$ -galactosides
  - The protein responsible for the breakdown of lactose
  - The protein responsible for transferring acetyl group to  $\beta$ -galactosides

21. Plants having 'Kranz' anatomy can also be characterized by

  - Double  $\text{CO}_2$  fixation catalysed by RuBisCO enzyme
  - The formation of phosphoglycolate as first stable product
  - Presence of photorespiration
  - The presence of a 3C primary  $\text{CO}_2$  acceptor molecule

22. Which of the following is **not** an event of photochemical phase of photosynthesis?

  - Light absorption
  - Water splitting
  - Fixation of  $\text{CO}_2$  molecule
  - Oxygen release

23. How many different types of gamete are produced by an individual if it is heterozygous for three loci and homozygous for two loci?

  - Ten
  - Five
  - Eight
  - Thirty two

24. Complex V of mitochondrial ETS

  - Consists of only one component
  - Is involved in production of ATP from ADP and inorganic phosphate
  - Is a mobile carrier for transfer of electrons
  - Have  $\text{F}_0$  particle as a peripheral membrane protein

25. Which among the following is **wrongly** matched pair?

(1) ZZ-ZW type of sex determination	– Birds
(2) Experimental verification of chromosomal theory of inheritance	– T.H. Morgan
(3) AB blood group	– Codominance
(4) The gene controlling starch synthesis in pea plant	– Has multiple allele

26. Which among the following character is **not** considered by Mendel in his experiment on pea plant?

  - Stem height
  - Shape of leaf
  - Shape of pod
  - Colour of flower

27. What percentage of global biodiversity is shared by India?

  - 50%
  - 20%
  - 1.2%
  - 8.1%

### **Space for Rough Work**

28. The transition zone is the 'A' part of the biosphere reserve which is an area of active cooperation between 'B' and the 'C'.

Choose the **correct** option for A, B and C

	<b>A</b>	<b>B</b>	<b>C</b>
(1)	Outermost	Local people	Tribal people
(2)	Innermost	Tribal people	Local people
(3)	Outermost	Reserve management	Local people
(4)	Innermost	Reserve management	Local people

29. Read the following statements and mark them as True (**T**) or False (**F**) and choose the **correct** option.

- A. Colour blindness defect is due to mutation in certain genes present on autosomes.
- B. A normal couple cannot have haemophilic child ever.
- C.  $\beta$  thalassemia is controlled by a single gene HBB on chromosome 11.

<b>A</b>	<b>B</b>	<b>C</b>
(1) F	F	F
(2) F	F	T
(3) T	T	T
(4) T	T	F

30. Read the following statements (a-d)

- (a) As we go from kingdom to species, the number of common characteristics goes on increasing.
- (b) Higher the taxa, more are the characteristics that the members within the taxon share.
- (c) *Musca domestica* belongs to order Insecta.
- (d) In case of plants, classes with a few similar characters are assigned to a higher category called phylum.

Select the option with all the **incorrect** statements.

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

31. Heterocyst in blue green algae
- (1) Have thin cell wall which allows oxygen to diffuse freely
  - (2) Lack PSII activities and CO<sub>2</sub> fixation is done only by vegetative cells
  - (3) Are specialised cell to carry out photosynthesis
  - (4) Are pigmented green cells

32. What is **correct** w.r.t. cyanobacteria?

- (a) *Spirulina* is edible, non-toxic fast growing cyanobacterium.
- (b) They are unicellular, colonial or filamentous.
- (c) They are photosynthetic eukaryotes, being the most primitive organisms to have oxygenic photosynthesis.

Select the **correct** option.

- (1) All (a), (b) and (c)
- (2) (a) and (c) only
- (3) (b) and (c) only
- (4) (a) and (b) only

33. A lateral branch with short internodes and each node bearing a rosette of leaves and a tuft of roots is seen in

- (1) Pineapple
- (2) Water hyacinth and *Pistia*
- (3) Mint and Jasmine
- (4) *Oxalis* and strawberry

34. Which of the following statement is **incorrect**?

- (1) In *Calotropis*, a pair of leaves arise at each node and lie opposite to each other
- (2) Leaves are small and long lived in Australian acacia
- (3) Leaves originate from shoot apical meristems and are arranged in an acropetal order
- (4) In some leguminous plants the leaf base may become swollen, which is called pulvinus

35. The flowers are zygomorphic in

- (a) Ground nut
- (b) Indigofera
- (c) Mustard
- (d) *Cassia*
- (e) Chilli

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

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

Space for Rough Work

**SECTION-B**

36. Select the **correctly** matched pair.
- Monocot stem – Phloem parenchyma present
  - Subsidiary cells – Specialised epidermal cells surrounding the guard cells
  - Parenchyma – Thick lignified cell walls
  - Dicot leaf – Radial vascular bundles
37. Both A and B promote cell division which shows their C effect on cell division.  
Choose the most suitable option for the blanks A, B and C.
- A → Abscisic acid, B → Gibberellins, C → Synergistic
  - A → Cytokinin, B → Auxin, C → Antagonistic
  - A → Auxin, B → Cytokinin, C → Synergistic
  - A → Abscisic acid, B → Auxin, C → Synergistic
38. Select the **correct** option w.r.t. pre-fertilization events in flowering plants.
- Maturation of ovule(s) into seed(s)
  - Meiosis in megasporangium
  - Zygote develops into an embryo
  - Development of embryo sac
- (b) only
  - (a), (c) and (d) only
  - (c) and (d) only
  - (b) and (d) only
39. Which of the following cell organelle is responsible for the storage of starch?
- Lysosome
  - Ribosome
  - Chloroplast
  - Mitochondrion
40. Anaphase I is characterised by
- Movement of homologous pair of chromosomes to same pole
  - Splitting of centromere
  - Congression event
  - Movement of chromosomes of each homologous pair to their respective poles

41. Catalytic RNA molecule used during prokaryotic translation is transcribed by
- RNA polymerase III
  - RNA polymerase II
  - DNA dependent RNA polymerase
  - Reverse transcriptase
42. Polycistronic gene is usually found in
- Yeast
  - Human
  - Mice
  - E. coli*
43. Which among the following enzyme is **not** found in mitochondrial matrix?
- Citrate synthase
  - Fumiarase
  - Succinate dehydrogenase
  - Malic dehydrogenase
44. Match the following column I with column II and choose the **correct** option.

	<b>Column I</b>		<b>Column II</b>
A.		i.	Consanguineous mating
B.		ii.	Mating between male and female
C.		iii.	Sex unspecified
D		iv.	Parents with male child affected with disease

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

45. Laughing till death disease in humans is caused by an agent which have
- Free DNA without protein coat
  - Abnormally folded protein
  - Cellular structure
  - ssRNA with capsomeres

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46. Match the family in column I with their respective examples in column II

	<b>Column I</b>		<b>Column II</b>
a.	Asteraceae	(i)	Radish
b.	Brassicaceae	(ii)	Marigold
c.	Fabaceae	(iii)	Zea mays
d.	Gramineae	(iv)	Ground nut

Select the **correct** option.

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

47. Which of the following statements is **incorrect** w.r.t. gymnosperm?

- (1) They have vascular tissue
- (2) Megasporophylls are compactly arranged to form female strobili
- (3) Microsporophylls are compactly arranged on a central axis to form a male strobili
- (4) Stems are branched in *Cycas*

48. Which of the following microbe is used for ripening of Roquefort cheese?

- (1) *Penicillium roqueforti*
- (2) *Penicillium camemberti*
- (3) *Propionibacterium shermanii*
- (4) *Saccharomyces cerevisiae*

49. Orchids and bees are the example of

- (1) Mutualism
- (2) Competition
- (3) Commensalism
- (4) Parasitism

50. Primary successions can be observed in all of the given area, **except**

- (1) Cooled volcanic lava
- (2) Barren area, never having vegetation
- (3) Burned or cut forest
- (4) Igneous rocks

## ZOOLOGY

### SECTION-A

51. All of the following hormones are produced by pars distalis portion of adenohypophysis, **except**
- (1) TSH
  - (2) LH
  - (3) PRL
  - (4) MSH

52. Select the **incorrect** statement.

- (1) There are some nucleic acids that behave like enzymes.
- (2) An active site of an enzyme is a pocket into which substrate fits.
- (3) Inorganic catalysts cannot work efficiently at high temperatures and pressures.
- (4) Thermal stability at higher temperature is an important quality of enzymes isolated from thermophilic organisms.

53. Enzymes are divided into 'X' classes, each with 'Y' subclasses and named accordingly by a four-digit number.

Select the option that correctly identifies 'X' and 'Y'.

	'X'	'Y'
(1)	4	4–13
(2)	5	10–11
(3)	6	9–10
(4)	6	4–13

54. Select the **correct** option w.r.t. R group of serine.

- (1) H
- (2) CH<sub>3</sub>
- (3) CH<sub>2</sub> – OH
- (4) CH<sub>2</sub> – CH<sub>2</sub> – COOH

55. Read the statements given below and select the **correct** option.

**Statement (A):** Cancer cells show the property of contact inhibition and thus, show uncontrolled growth.

**Statement (B):** Treatment of AIDS with anti-retroviral drugs is only partially effective.

- (1) Both statements (A) and (B) are correct
- (2) Only statement (B) is correct
- (3) Both statements (A) and (B) are incorrect
- (4) Only statement (A) is correct

Space for Rough Work

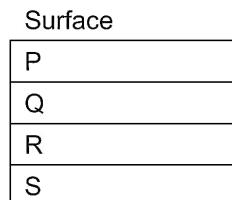
## Space for Rough Work

64. When a stimulus is applied at a point 'P' on the depolarised part of the axonal membrane of a nerve fibre, it  
 (1) Becomes polarised  
 (2) Becomes repolarised  
 (3) Becomes hyperpolarised  
 (4) Does not respond to stimulus
65. Choose the **correct** option to complete the analogy w.r.t humans.  
 Cerebrum : Forebrain :: Cerebral aqueduct :  
 \_\_\_\_\_  
 (1) Forebrain (2) Midbrain  
 (3) Hindbrain (4) Hypothalamus
66. Foreskin is a loose fold of skin which covers the enlarged end of  
 (1) Vagina (2) Scrotum  
 (3) Penis (4) Labia minora
67. All of the following are true for the primary sex organ present in human females, **except**  
 (1) It produces ova during the fertile age  
 (2) It is about 2–4 cm in length  
 (3) It is connected to the pelvic wall by ligament  
 (4) Its cortex is divisible into outer stroma and inner medulla
68. Match column I with column II w.r.t. percentage amount of different cells of total WBCs in a healthy human.
- |    | <b>Column I</b> |       | <b>Column II</b> |
|----|-----------------|-------|------------------|
| a. | Eosinophils     | (i)   | 60–65 %          |
| b. | Basophils       | (ii)  | 20–25 %          |
| c. | Neutrophils     | (iii) | 0.5–1 %          |
| d. | Lymphocytes     | (iv)  | 2–3 %            |
- Select the **correct** option.  
 (1) a(iv), b(iii), c(ii), d(i) (2) a(iv), b(iii), c(i), d(ii)  
 (3) a(ii), b(i), c(iv), d(iii) (4) a(i), b(ii), c(iii), d(iv)
69. How many features given below are related to the members of class Aves?  
 (a) Endoskeleton is fully ossified  
 (b) Presence of crop and gizzard  
 (c) Hind limbs are without scales  
 (d) Heart is completely four-chambered  
 (e) Viviparous  
 Select the **correct** option.  
 (1) Five (2) Three  
 (3) Two (4) Four
70. Select the unpaired structure w.r.t. human respiratory system.  
 (1) Nostrils (2) Epiglottis  
 (3) Lungs (4) Bronchi
71. The functioning of the human kidneys is efficiently monitored and regulated by hormonal feedback mechanisms. Select the **correct** option which represents the structures involved in its regulation.  
 (1) Hypothalamus, JGA, Heart  
 (2) Adenohypophysis, Glomerulus, JGA  
 (3) Pars intermedia, Medulla oblongata, Heart  
 (4) Pars nervosa, Hippocampus, Lungs
72. Which of the following sets of factors are favourable for dissociation of oxygen from the oxyhaemoglobin?  
 (1) Low pH, low pO<sub>2</sub>, low temperature, high H<sup>+</sup>  
 (2) Low pO<sub>2</sub>, high pCO<sub>2</sub>, high H<sup>+</sup>, high temperature  
 (3) High pO<sub>2</sub>, high pH, high temperature, low H<sup>+</sup>  
 (4) High H<sup>+</sup>, low pO<sub>2</sub>, low pCO<sub>2</sub>, high temperature
73. The two core techniques that enabled the birth of modern biotechnology are  
 (a) Genetic engineering  
 (b) Gel electrophoresis  
 (c) Bioprocess engineering  
 (d) Chemical engineering  
 Select the **correct** option.  
 (1) (a) and (b) (2) (b) and (c)  
 (3) (a) and (c) (4) (b) and (d)

Space for Rough Work

74. Comprehend the given statements and select the **correct** option.
- Statement (A):** *E.coli* cannot be modified to carry resistance against any antibiotic.
- Statement (B):** *rop* codes for the proteins involved in replication of the plasmid.
- Both statements (A) and (B) are correct
  - Both statements (A) and (B) are incorrect
  - Only statements (B) is correct
  - Only statement (A) is correct
75. *Balanoglossus* shows similarity to *Periplaneta* with respect to
- Presence of open circulatory system
  - Internal fertilisation
  - Absence of excretory system
  - Presence of notochord
76. During urine formation, the tubular cells secrete substances like
- $H^+$ ,  $K^+$  and ammonia into filtrate
  - Only  $H^+$  and  $K^+$  into filtrate
  - $H^+$ ,  $K^+$  and ammonia into medullary interstitium
  - Only ammonia into lumen of renal tubules
77. The cloning vector pBR322 can be made sensitive to the tetracycline antibiotic by ligating a foreign DNA at the restriction site for enzyme 'X'.  
Select the **correct** option for 'X'.
- It was isolated from *Escherichia* genus.
  - It produces sticky ends.
  - It recognises the recognition sequence of three base pairs.
  - It was the first restriction endonuclease to be isolated in the year 1997.
78. For transformation of host cell with rDNA, the heat shock is usually given at
- 73°C
  - 42°C
  - 94°C
  - 10°C
79. Select the correct pair of contractile proteins present in the skeletal muscles of humans.
- Actin and myosin
  - Myosin and troponin
  - Troponin and tropomyosin
  - Actin and troponin

80. Consider the features given below:
- Presence of gap junctions
  - Presence of thick and thin filaments
  - Presence of 'A' bands and 'I' bands
- Select the type of muscles that possess (a) and (b) but lack (c) in them.
- Cardiac muscles
  - Skeletal muscles
  - Smooth muscles
  - Striated muscles
81. Given below is a diagrammatic representation of strata labelled as P – S in a sedimentary rock.



Identify the stratum that contains most recently extinct organisms and select the **correct** option.

- Q
- P
- R
- S

82. **Assertion (A):** Evolution is not a directed process in the sense of determinism.  
**Reason (R):** Evolution is based on chance events in nature and chance mutation in the organisms.  
In the light of above statements, select the **correct** option.
- 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, (R) is false
  - (A) is false, (R) is true
83. Select the **incorrect** statement w.r.t. STIs.
- Diseases transmitted through unprotected sexual intercourse are collectively called venereal diseases.
  - Trichomoniasis is one of the completely curable STIs if detected early and treated properly.
  - Early symptoms of most of the STIs include itching, fluid discharge, swelling, etc., in the genital region.
  - AIDS and hepatitis-B are complications that appear due to untreated bacterial STIs.

Space for Rough Work

84. Which of the following age group individuals are most vulnerable towards STIs?  
 (1) 25–30 years      (2) 15–24 years  
 (3) 09–14 years      (4) 45–50 years
85. One can be free of the STIs by following all the simple principles given below, **except**  
 (1) Avoid sex with unknown partners  
 (2) Always try to use condoms during coitus  
 (3) In case of doubt, one should go to a qualified doctor for early detection  
 (4) Always try to use cervical caps during coitus
- SECTION-B**
86. At present, about 30 recombinant therapeutics have been approved for human use the world over. How many of these recombinant therapeutics presently are not being marketed in India?  
 (1) 30      (2) 12  
 (3) 18      (4) 4
87. In humans, which of the following hormones does not reach at its peak during the ovulatory phase of the menstrual cycle?  
 (1) Estrogen  
 (2) Progesterone  
 (3) Luteinizing hormone  
 (4) Follicle stimulating hormone
88. Read the following statements carefully w.r.t. human brain.  
 (a) It is the site for processing of vision only.  
 (b) It is the central information processing organ of the body.  
 (c) It is well protected by the skull.  
 (d) It controls the voluntary movements and functioning of vital involuntary organs of the body.
- How many of the above given statement(s) is/are **correct**?  
 (1) Three      (2) Four  
 (3) One      (4) Two
89. Select the option with the **correct** increasing order of respiratory capacities/volumes w.r.t normal humans.  
 (1) TV < IRV < ERV < RV  
 (2) FRC < IRV < ERV < EC  
 (3) ERV < EC < IRV < VC  
 (4) IRV < ERV < EC < TLC

90. The four DNA fragments 'a', 'b', 'c' and 'd' are obtained after restriction enzyme digestion. The size of 'd' is twice as that of 'b' but less than 'a' and 'c'. The size of 'c' is greater than that of 'a'. After gel electrophoresis, the DNA fragment closest to the cathode will be  
 (1) b      (2) c  
 (3) a      (4) d
91. Match column I with column II and select the **correct** option w.r.t. humans.
- |    | <b>Column I</b>    |       | <b>Column II</b>       |
|----|--------------------|-------|------------------------|
| a. | Temporal, parietal | (i)   | Paired facial bones    |
| b. | Nasal, maxilla     | (ii)  | Paired cranial bones   |
| c. | Sphenoid, ethmoid  | (iii) | Unpaired skull bones   |
| d. | Mandible, hyoid    | (iv)  | Unpaired cranial bones |
- (1) a(i), b(ii), c(iii), d(iv)  
 (2) a(iv), b(i), c(iii), d(ii)  
 (3) a(ii), b(i), c(iv), d(iii)  
 (4) a(iii), b(ii), c(i), d(iv)
92. In a Hardy-Weinberg population with two alleles *B* and *b*, the frequency of allele *b* is 0.4. What is the frequency of individuals with *Bb* genotype?  
 (1) 0.48      (2) 0.24  
 (3) 0.40      (4) 0.52
93. Select the **correct** match among the following.
- |     |      |   |  |
|-----|------|---|--|
| (1) | ZIFT | — | Embryo with upto 16 blastomeres is transferred into the fallopian tube     |
| (2) | IUT  | — | Embryo with more than 8 blastomeres is transferred into the fallopian tube |
| (3) | IUI  | — | Zygote is directly introduced into the uterus                              |
| (4) | IUT  | — | Embryo with more than 8 blastomeres is transferred into the uterus         |
94. HIV belongs to which group of viruses?  
 (1) Bacteriophages      (2) DNA viruses  
 (3) Retroviruses      (4) Rhino viruses

Space for Rough Work

95. Frogs possess all the below mentioned structures, except  
 (1) Brain box  
 (2) Webbed digits  
 (3) Nictitating membrane  
 (4) External ears
96. Two systems 'A' and 'B' jointly coordinate and regulate the physiological functions in the human body. 'A' is responsible for providing a point to point rapid coordination among organs but its coordination is fast and short lived. Select the option that **correctly** identifies 'A'.  
 (1) Endocrine system (2) Digestive system  
 (3) Neural system (4) Excretory system
97. The company 'X' prepared Humulin (human insulin) in the year 1983.  
 Identify 'X' and select the **correct** option.  
 (1) Syngenta (2) GEAC  
 (3) Gene tech (4) Eli Lilly
98. Catecholamines increase the cardiac output. From which of the following sites, these catecholamines are secreted?  
 (1) Zona glomerulosa (2) Adrenal medulla  
 (3) Zona fasciculata (4) Adrenal cortex
99. How many of the organisms given in the box below are characterised by the presence of cnidoblast and are sessile in nature?
- Sea anemone, Sea pen, Sea hare, Sea cucumber, Sea lily, Sea fan
- Select the **correct** option.  
 (1) Four (2) Five  
 (3) Three (4) Two
100. Seed ferns gave rise to all of the following, **except**  
 (1) Cycads (2) Conifers  
 (3) Dicotyledons (4) Monocotyledons

## PHYSICS

### SECTION-A

101. The energy needed by a body of 500 kg to just escape from the earth's surface is about ( $g = 9.8 \text{ m/s}^2$ , radius of earth =  $6.4 \times 10^6 \text{ m}$ )  
 (1)  $9.8 \times 10^6 \text{ J}$  (2)  $6.4 \times 10^8 \text{ J}$   
 (3)  $3.1 \times 10^{10} \text{ J}$  (4)  $27.4 \times 10^{12} \text{ J}$
102. If a sphere is rotating about a fixed axis passing through its diameter, then  
 (1) Particles on the surface of the sphere do not have any linear acceleration  
 (2) Particles on its axis of rotation do not have any linear acceleration  
 (3) Different particles on the surface have different angular speeds  
 (4) All the particles on the surface have same linear speed
103. When a ceiling fan is switched off, its angular velocity falls to half while it makes 36 rotations. How many more rotations will it make before coming to rest (Assume uniform angular retardation)?

- (1) 36 (2) 24  
 (3) 18 (4) 12
104. A constant force  $F_0$  is applied on a uniform elastic rod placed over a smooth horizontal surface as shown in figure. Young's modulus of rod is  $Y$  and area of cross-section is  $S$ . The strain produced in the rod in the direction of force is
- 
- (1)  $\frac{F_0 Y}{S}$  (2)  $\frac{F_0}{SY}$   
 (3)  $\frac{F_0}{2SY}$  (4)  $\frac{F_0 Y}{2S}$
105. The ratio of de Broglie wavelength of molecules of hydrogen gas at  $127^\circ\text{C}$  to the helium at  $327^\circ\text{C}$  respectively is  
 (1)  $\sqrt{2}:\sqrt{3}$  (2)  $2:\sqrt{3}$   
 (3)  $3:1$  (4)  $\sqrt{3}:1$

Space for Rough Work

106. In the reaction



The energy released is:

$$\text{Given } m({}_2^4\text{He}) = 4.002603 \text{ u}, m(\text{n}) = 1.008665 \text{ u}$$

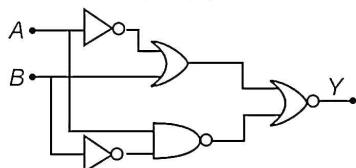
$$m({}_1^2\text{H}) = 2.014102 \text{ u}, m({}_1^3\text{H}) = 3.016049 \text{ u}$$

- (1) 10.01 MeV      (2) 17.59 MeV  
 (3) 23.23 MeV      (4) 12.22 MeV

107. The electrical conductivity of a semiconductor increases when electromagnetic radiation of wavelength shorter than 775 nm is incident on it. The band gap of the semiconductor is

- (1) 16 eV      (2) 1 eV  
 (3) 1.6 eV      (4) 0.5 eV

108. Figure shown below gives a system of logic gates. From the study of truth table it can be found that to produce low output (0) at Y, we must have



- (a) A = 0, B = 0      (b) A = 0, B = 1  
 (c) A = 1, B = 0      (d) A = 1, B = 1

Choose the **correct** option

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

109. Water rises to height 20 mm in a capillary of certain radius. If the radius of the capillary is made  $\left(\frac{1}{4}\right)^{\text{th}}$  of its previous value then the new height of the capillary rise is

- (1) 20 mm      (2) 30 mm  
 (3) 60 mm      (4) 80 mm

110. A metallic and a wooden solid sphere of same mass are initially at the same temperature. If the same amount of heat is supplied to both, then which sphere will experience greater increase in temperature

- (1) Metallic

- (2) Wooden

- (3) Both will have the same increase in temperature

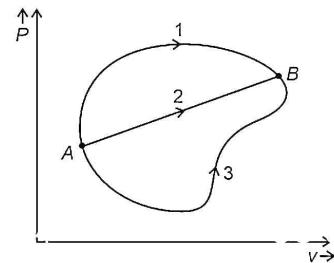
- (4) It is independent of the specific heat capacities of materials

111. Column I contains various thermodynamic process while Column II contains corresponding bulk modulus. Match the columns and choose the **correct** option (Symbols have their usual meaning)

	<b>Column I</b>		<b>Column II</b>
A.	isothermal process	P	$\gamma$ (pressure)
B.	Adiabatic	Q	Zero
C.	Isobaric process	R	Infinite
D.	Isochoric process	S	Pressure

- (1) A → S; B → P; C → R; D → Q  
 (2) A → S; B → P; C → Q; D → R  
 (3) A → P; B → S; C → R; D → Q  
 (4) A → P; B → S; C → Q; D → R

112. If a thermodynamic system ( $P - V$  graph) changes from an initial equilibrium state A to final equilibrium state B through three different paths 1, 2 and 3, then choose the correct option (Symbols have usual meaning)



- (1)  $Q_1 - W_1 = Q_2 - W_2$   
 (2)  $Q_1 + Q_3 = W_1 + W_3$   
 (3)  $Q_1 + Q_2 = W_1 + W_2$   
 (4)  $\Delta U_1 \neq \Delta U_2$

Space for Rough Work

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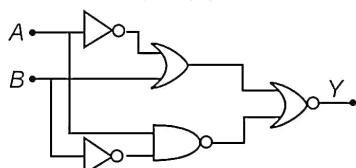
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- (a) A = 0, B = 0      (b) A = 0, B = 1  
 (c) A = 1, B = 0      (d) A = 1, B = 1

Choose the **correct** option

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

109. Water rises to height 20 mm in a capillary of certain radius. If the radius of the capillary is made  $\left(\frac{1}{4}\right)^{\text{th}}$  of its previous value then the new height of the capillary rise is

- (1) 20 mm      (2) 30 mm  
 (3) 60 mm      (4) 80 mm

110. A metallic and a wooden solid sphere of same mass are initially at the same temperature. If the same amount of heat is supplied to both, then which sphere will experience greater increase in temperature

- (1) Metallic

- (2) Wooden

- (3) Both will have the same increase in temperature

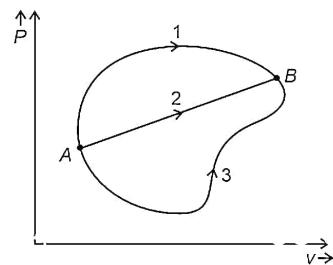
- (4) It is independent of the specific heat capacities of materials

111. Column I contains various thermodynamic process while Column II contains corresponding bulk modulus. Match the columns and choose the **correct** option (Symbols have their usual meaning)

	<b>Column I</b>		<b>Column II</b>
A.	isothermal process	P	$\gamma$ (pressure)
B.	Adiabatic	Q	Zero
C.	Isobaric process	R	Infinite
D.	Isochoric process	S	Pressure

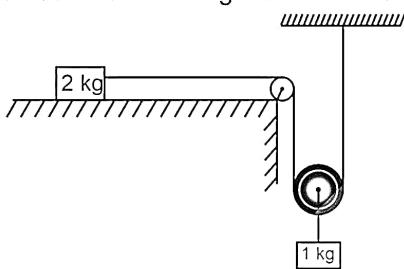
- (1) A  $\rightarrow$  S; B  $\rightarrow$  P; C  $\rightarrow$  R; D  $\rightarrow$  Q  
 (2) A  $\rightarrow$  S; B  $\rightarrow$  P; C  $\rightarrow$  Q; D  $\rightarrow$  R  
 (3) A  $\rightarrow$  P; B  $\rightarrow$  S; C  $\rightarrow$  R; D  $\rightarrow$  Q  
 (4) A  $\rightarrow$  P; B  $\rightarrow$  S; C  $\rightarrow$  Q; D  $\rightarrow$  R

112. If a thermodynamic system ( $P$  –  $V$  graph) changes from an initial equilibrium state A to final equilibrium state B through three different paths 1, 2 and 3, then choose the correct option (Symbols have usual meaning)



- (1)  $Q_1 - W_1 = Q_2 - W_2$   
 (2)  $Q_1 + Q_3 = W_1 + W_3$   
 (3)  $Q_1 + Q_2 = W_1 + W_2$   
 (4)  $\Delta U_1 \neq \Delta U_2$

Space for Rough Work



- (1)  $50 \mu\text{J}$       (2)  $25 \mu\text{J}$   
 (3)  $100 \mu\text{J}$       (4)  $300 \mu\text{J}$

118. A thin uniform circular disc of mass  $M$  and radius  $R$  is rotating in a horizontal plane about an axis passing through its centre and perpendicular to its plane with an angular velocity  $\omega$ . Another disc of same dimension but of mass  $M/4$  is placed gently on the first disc (coaxially) and they start rotating together later on. The angular velocity of the system now is

(1)  $\frac{2\omega}{\sqrt{5}}$       (2)  $\frac{3\omega}{7}$   
 (3)  $\frac{4\omega}{5}$       (4)  $\frac{\omega}{\sqrt{2}}$

119. The diameter of a taut string is increased by 2% keeping the tension constant, then the velocity of transverse wave will

(1) Increases by 2%      (2) Decreases by 2%  
 (3) Increases by 1%      (4) Decreases by 1%

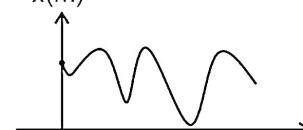
120. For a particle executing S.H.M. along x-axis, the force on it is given by (where symbols have their usual meaning)

(1)  $-kx$       (2)  $A \cos kx$   
 (3)  $Ae^{-kx}$       (4)  $Akx$

121. Speed of a particle as a function of time is given by  $v = At + Bt^2$ , where  $A$  and  $B$  are dimensional constants, the dimension of  $\frac{A}{B}$  is

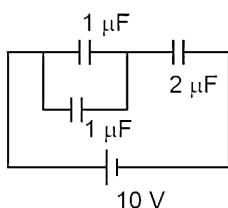
(1) [LT]      (2) [LT<sup>-1</sup>]  
 (3) [L<sup>0</sup>T]      (4) [L<sup>0</sup>T<sup>2</sup>]

122. The variation in position of a particle moving along the x-axis as a function of time is shown below



Based upon the above information the number of times the particle comes to rest is

(1) Zero      (2) Two  
 (3) Six      (4) Five



Space for Rough Work

123. Consider the following statements and choose the **correct** option

**Statement 1:** If two frames are moving with respect to each other with uniform velocity, acceleration of a body is same in both the frames.

**Statement 2:** If two frames are moving with respect to each other with uniform velocity, the velocity of body is same in both the frames.

- (1) Both statement 1 and 2 are correct
- (2) Both statement 1 and 2 are incorrect
- (3) Statement 1 is correct while statement 2 is incorrect
- (4) Statement 1 is incorrect while statement 2 is correct

124. The impulse on a body is equal to

- (1) Change in momentum
- (2) Rate of change of momentum
- (3) Force  $\times$  velocity
- (4)  $\frac{\text{Force}}{\text{Velocity}}$

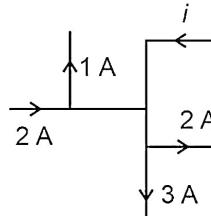
125. The equation of trajectory of a projectile from the ground is given as  $y = 2x - \frac{x^2}{2}$ . The range of the projectile is (where symbols have their usual meaning and all quantities are in S.I. unit)
- (1) 4 m
  - (2) 1 m
  - (3) 2 m
  - (4) 8 m

126. The rms velocity of oxygen molecule at 27°C is nearly
- (1) 380 m s<sup>-1</sup>
  - (2) 483 m s<sup>-1</sup>
  - (3) 630.5 m s<sup>-1</sup>
  - (4) 520.5 m s<sup>-1</sup>

127. An ideal battery does 540 J work to drive 2 A current for 3 minutes. The emf of the battery is

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

128. Figure shows the part of a circuit. The value of  $i$  is



- (1) 1 A
- (2) 2 A
- (3) 4 A
- (4) Zero

129. A straight wire of length  $l$  carries a constant current. It is bent into a circle of one turn and the magnetic field at its centre is  $B_0$ , then it is bent into a circular loop of  $n$  turns. The new magnetic field at the centre of the loop will be

- (1)  $nB_0$
- (2)  $2nB_0$
- (3)  $B_0$
- (4)  $n^2B_0$

130. An electron is placed at the origin of a cartesian coordinate system at rest. A uniform electric field and uniform magnetic field is switched on simultaneously towards +ve x-axis. The initial direction of motion of the electron will be
- (1) Towards positive y axis
  - (2) Towards negative y axis
  - (3) Towards positive z axis
  - (4) Towards negative x-axis

131. Three bar magnets have pole strengths in the ratio 1 : 2 : 3 and lengths in the ratio 1 : 2 : 1. Their magnetic moment will be in the ratio
- (1) 1 : 4 : 3
  - (2) 1 : 3 : 4
  - (3) 4 : 3 : 1
  - (4) 1 : 2 : 4

132. The sun of diameter  $D$  subtends an angle  $\theta$  radian at the pole of a concave mirror of focal length  $f$ . The diameter of the image of sun formed by mirror is
- (1)  $f\theta$
  - (2)  $fD$
  - (3)  $\frac{f\theta}{2}$
  - (4)  $\frac{fD}{2}$

133. For an angle of incidence  $\theta$  on an equilateral prism of refractive index  $\sqrt{2}$ , the refracted ray is parallel to the base of the prism. The value of  $\theta$  is
- (1) 90°
  - (2) 60°
  - (3) 30°
  - (4) 45°

Space for Rough Work

134. In Young's double slit experiment, angular width of fringes is  $0.08^\circ$  for sodium light of wavelength  $6000 \text{ \AA}$ . If complete system is dipped in water of refractive index  $\frac{4}{3}$ , then angular width of fringes becomes

- (1)  $0.06^\circ$       (2)  $0.04^\circ$   
 (3)  $0.02^\circ$       (4)  $0.08^\circ$

135. According to Maxwell's hypothesis, a changing electric field gives rise to

- (1) Magnetic field  
 (2) Pressure gradient  
 (3) Charge  
 (4) Gravitational field

### SECTION-B

136. Which of the following statements is **correct** about an electric dipole in a uniform electric field?

- (1) Torque is always non-zero  
 (2) Net force may be non-zero  
 (3) Torque is always zero  
 (4) Net force is always zero

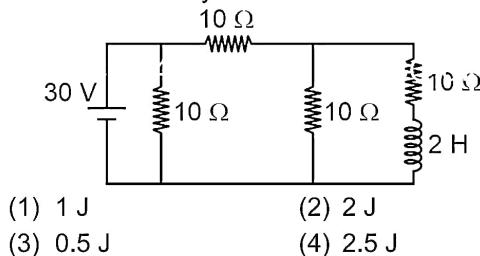
137. Two charges  $3 \mu\text{C}$  and  $12 \mu\text{C}$  are separated by  $6 \text{ cm}$ . The neutral point is located at

- (1)  $4 \text{ cm}$  from  $3 \mu\text{C}$       (2)  $1 \text{ cm}$  from  $12 \mu\text{C}$   
 (3)  $3 \text{ cm}$  from  $12 \mu\text{C}$       (4)  $2 \text{ cm}$  from  $3 \mu\text{C}$

138. In a series LCR circuit, the voltage across  $R$  is  $200 \text{ V}$  and  $R = 10 \text{ k}\Omega$  with  $C = 1 \mu\text{F}$ . The resonating frequency is  $100 \text{ rad/s}$ . At resonance, voltage across inductor  $L$  is (All the symbols have their usual meaning)

- (1)  $20 \text{ V}$       (2)  $100 \text{ V}$   
 (3)  $200 \text{ V}$       (4)  $10 \text{ V}$

139. In the circuit given below the energy stored in the inductor at steady state is

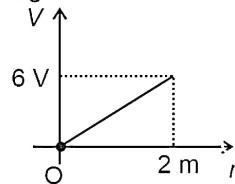


- (1)  $1 \text{ J}$       (2)  $2 \text{ J}$   
 (3)  $0.5 \text{ J}$       (4)  $2.5 \text{ J}$

140. Time period of revolution of a satellite around a planet of radius  $R$  near its surface is  $T$ . Its period of revolution around another planet having radius  $3R$  and same density (near the surface) will be

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

141. Potential ( $V$ ) versus distance ( $r$ ) graph is shown in diagram for a region, then magnitude of electric field in that region is



- (1)  $6 \text{ V/m}$       (2)  $12 \text{ V/m}$   
 (3)  $4 \text{ V/m}$       (4)  $3 \text{ V/m}$

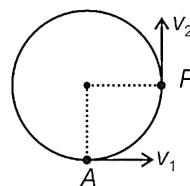
142. A soap bubble is formed with a radius  $R$ . If the surface tension of the soap solution is increased, by adding some impurities then the radius of the soap bubble will

- (1) Increase  
 (2) Remain unchanged  
 (3) Decrease  
 (4) May increase or decrease

143. In a pot of boiling water on a stove, heat is transferred through the process of convection. Thermally excited water molecules inside the pot

- (1) Move from bottom to top  
 (2) Move from top to bottom  
 (3) Stay there at rest  
 (4) Move sideways

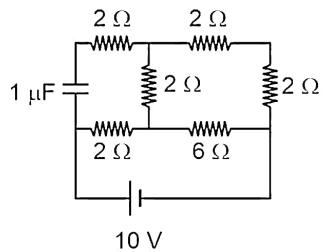
144. A particle of mass  $2 \text{ kg}$  is moving in a circular path with a constant speed of  $20 \text{ m/s}$ . The change in magnitude of velocity when particle travels from  $A$  to  $P$  will be



- (1)  $20\sqrt{2} \text{ ms}^{-1}$       (2)  $40 \text{ ms}^{-1}$   
 (3) Zero      (4)  $40\sqrt{2} \text{ ms}^{-1}$

Space for Rough Work

145. The power dissipation in the following circuit in steady state will be





146. Distance travelled by a body moving with constant acceleration 'a' in a time interval  $t$  is  $x$ . Which of the following option is correct?

- (1) Dimensional formula of  $\frac{dx}{dt}$  is  $[M^0 L^1 T^2]$

(2) Dimensional formula of  $\frac{d^2x}{dt^2}$  is  $[M^0 L^1 T^{-2}]$

(3) Dimensional formula of is  $\frac{d^2x}{dt^2}$   $[M^0 L^2 T^{-2}]$

(4) Dimensional formula of  $\left(\frac{dx}{dt}\right)^2$  is  $[M^0 L^2 T^2]$

147. For a doubly ionised lithium atom (atomic number  $Z = 3$ ). The wavelength of the radiation required to

excite an electron from the first to the fourth Bohr orbit is nearly equal to



148. A semiconductor has an electron concentration of  $0.56 \times 10^{12} \text{ m}^{-3}$  and a hole concentration of  $6.0 \times 10^{20} \text{ m}^{-3}$ , calculate its conductivity.

Given: electron mobility =  $0.175 \text{ m}^2 \text{ V}^{-1} \text{ s}^{-1}$

Hole mobility = 0.052 m<sup>2</sup> V<sup>-1</sup> s<sup>-1</sup>

- (1)  $[2.992 \Omega^{-1} m^{-1}]$       (2)  $[1.84 \Omega^{-1} m^{-1}]$   
 (3)  $[6.43 \Omega^{-1} m^{-1}]$       (4)  $[4.992 \Omega^{-1} m^{-1}]$

149. For compound microscope  $f_o = 2 \text{ cm}$ ,  $f_e = 3 \text{ cm}$ . An object is placed at distance 3 cm from objective lens, the value of length of microscope for normal adjustment will be (All the symbols have their usual meaning)



150. The ratio of intensities of successive maxima in the diffraction pattern due to the single slit is

- (1)  $1 : 4 : 9$       (2)  $1 : \frac{4}{9\pi^2} : \frac{4}{25\pi^2}$   
 (3)  $1 : \frac{4}{\pi^2} : \frac{9}{\pi^2}$       (4)  $1 : 9 : 16$

## **CHEMISTRY**

## **SECTION-A**

151. Match compounds in List-1 with their name in List-2 and choose the **correct** option.

List-1		List-2	
(i)	$\text{CH}_2 = \text{CHCHO}$	(a)	Crotonaldehyde
(ii)	$\text{H}_3\text{C}-\text{CH}=\text{CH}-\text{CHO}$	(b)	Acetophenone
(iii)	$\begin{array}{c} \text{O} \\    \\ \text{CH}_3-\text{C}-\text{C}_6\text{H}_5 \end{array}$	(c)	Benzophenone
(iv)	$\begin{array}{c} \text{O} \\    \\ \text{H}_5\text{C}_6-\text{C}-\text{C}_6\text{H}_5 \end{array}$	(d)	Acrolein

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

152.  $\text{CH}_3\text{COCl}$  with excess of  $\text{CH}_3\text{MgBr}$  followed by hydrolysis gives major product as:

- (1) 2° alcohol
  - (2) Acetaldehyde
  - (3) 1° alcohol
  - (4) 3° alcohol

Space for Rough Work

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

**Assertion (A) :** On addition of catalyst rate of chemical reaction increases.

**Reason (R) :** Addition of catalyst gives an alternate path to the reaction with higher 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 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 (A)

154. Match List-1 with List-2 for given balanced chemical reaction and choose the **correct** option.



List-1		List-2	
(i)	x	(a)	10
(ii)	y	(b)	2
(iii)	z	(c)	5
(iv)	u	(d)	16

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

155. If enthalpy of neutralization of a weak acid HA with NaOH is  $-49.86 \text{ kJ/mol}$  then the enthalpy of ionization of HA is

- (1)  $10.54 \text{ kJ/mol}$
- (2)  $-8.76 \text{ kJ/mol}$
- (3)  $-7.24 \text{ kJ/mol}$
- (4)  $7.24 \text{ kJ/mol}$

156. Given below are two statements.

**Statement-I :** First ionization enthalpy of Sodium is lower than that of Magnesium.

**Statement-II :** First ionization enthalpy of Nitrogen is higher than that of Oxygen.

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

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

157. The **correct** increasing order for negative electron gain enthalpy of the following elements is

- (1) O < S < Cl < F
- (2) O < S < F < Cl
- (3) S < O < Cl < F
- (4) S < O < F < Cl

158. The highest electrical conductivity among the following aqueous solution is of

- (1) 0.1 M fluoroacetic acid
- (2) 0.1 M difluoroacetic acid
- (3) 0.1 M acetic acid
- (4) 0.1 M chloroacetic acid

159. The pH of 0.1M  $\text{NH}_4\text{Cl}$  solution is 5.13. The dissociation constant of  $\text{NH}_4\text{OH}$  will be

- (1)  $10^{-5.89}$
- (2)  $10^{-3.89}$
- (3)  $10^{-2.67}$
- (4)  $10^{-4.74}$

160. Which of the following is not a Lewis base?

- (1)  $\text{H}_2\text{O}$
- (2)  $\text{NH}_3$
- (3)  $\text{Mg}^{2+}$
- (4)  $\text{CN}^-$

161. Given below are two statements.

**Statement I :** Higher the value of Henry's law constant lower is the solubility of the gas in the liquid.

**Statement II :** The  $K_H$  values for both  $\text{N}_2$  and  $\text{O}_2$  increases with increase of temperature.

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

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

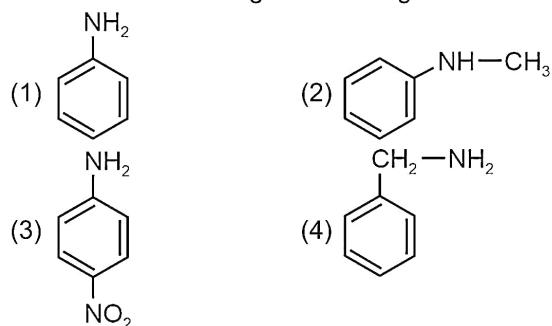
162. Which one of the following electrolytes has same value of Van't Hoff factor as that of  $\text{CaCl}_2$  (if all are 100% ionised)?

- (1)  $\text{K}_2\text{SO}_4$
- (2)  $\text{Al}(\text{NO}_3)_3$
- (3)  $\text{Al}_2(\text{SO}_4)_3$
- (4)  $\text{K}_4[\text{Fe}(\text{CN})_6]$

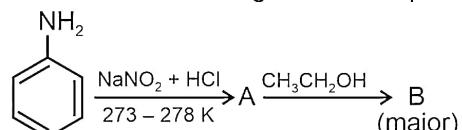
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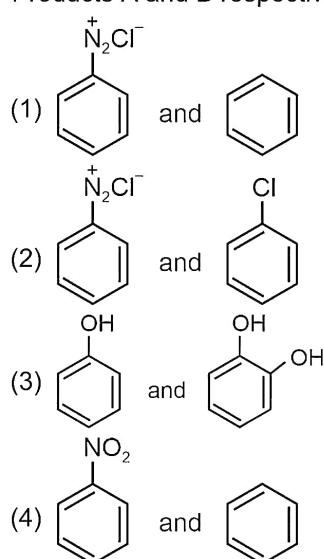
172. Which of the following is the strongest base?



173. Consider the following reaction sequence



Products A and B respectively are



174. The number of structural isomers for molecular formula  $C_4H_9Br$  is



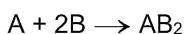
175. The **correct** order of increasing field strength is

- (1) SCN<sup>-</sup> < OH<sup>-</sup> < NCS<sup>-</sup> < CN<sup>-</sup>  
(2) OH<sup>-</sup> < SCN<sup>-</sup> < NCS<sup>-</sup> < CN<sup>-</sup>  
(3) SCN<sup>-</sup> < NCS<sup>-</sup> < CN<sup>-</sup> < OH<sup>-</sup>  
(4) NCS<sup>-</sup> < OH<sup>-</sup> < SCN<sup>-</sup> < CN<sup>-</sup>

176. A solution is prepared by adding 0.2 mol of a solute to 18 g of water. The mole fraction of the solute is

- (1)  $\frac{1}{6}$       (2)  $\frac{1}{9}$   
 (3)  $\frac{1}{12}$       (4)  $\frac{1}{4}$

177. In a reaction



2 moles of A reacts with 3 moles of B, then the limiting reagent and maximum amount of  $AB_2$  formed, respectively are

- (1) A and 2 moles
  - (2) B and 2 moles
  - (3) B and 1.5 moles
  - (4) A and 1.5 moles

178. According to Bohr's theory, which of the following transitions in the hydrogen atom will give rise to the least energetic photon?

- (1)  $n = 5$  to  $n = 4$
  - (2)  $n = 4$  to  $n = 2$
  - (3)  $n = 5$  to  $n = 1$
  - (4)  $n = 4$  to  $n = 3$

179. Given below are two statements

**Statement I :** Halogens have maximum negative electron gain enthalpy in the respective periods of the periodic table.

**Statement II :** Alkali metals have negative electron gain enthalpies.

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

180. The number of  $90^\circ$  bond angles in  $\text{XeF}_4$  is



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## **SECTION-B**

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

**Assertion (A) :** The SRP of three metal ions  $A^{2+}$ ,  $B^{2+}$  and  $C^{2+}$  are  $-0.25$ ,  $-0.44$  and  $-0.76$  V respectively. So oxidising power of ions is as  $C^{2+} > B^{2+} > A^{2+}$

**Reason (R) :** Higher the SRP of metal ion, lower is its oxidising power.

**Assertion (A)** : The SRP of three metal ions  $A^{2+}$ ,  $B^{2+}$  and  $C^{2+}$  are  $-0.25$ ,  $-0.44$  and  $-0.76$  V respectively. So oxidising power of ions is as  $C^{2+} > B^{2+} > A^{2+}$

**Reason (R) :** Higher the SRP of metal ion, lower is its oxidising power.

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





189. Given below are the two statements

**Statement I :** The carbohydrates are stored in animal body as glycogen.

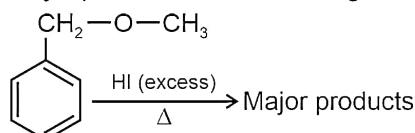
**Statement II :** Cellulose occurs exclusively in plants and consists of only  $\beta$ -D-glucose units

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

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

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190. Major products formed in the given reaction is



- (1) and  $\text{CH}_3-\text{OH}$
- (2) and  $\text{CH}_3\text{I}$
- (3) and  $\text{CH}_3-\text{I}$
- (4) and  $\text{CH}_3\text{I}$

191. **Correct** order of boiling point of the given compounds is

- (1) 2,2-Dimethylpropane > Pentane > 2-Methylbutane
- (2) 2,2-Dimethylpropane > 2-Methylbutane > Pentane
- (3) Pentane > 2-Methylbutane > 2, 2-Dimethylpropane
- (4) 2-Methylbutane > Pentane > 2,2-Dimethyl propane

192. 1.6 kg oxygen gas expands at STP isobarically to occupy 4 times of its original volume. The work done by the system is nearly

- (1) 40.6 kcal
- (2) 81.1 kcal
- (3) 27.3 kcal
- (4) 97.5 kcal

193. Which of the following has highest melting point?

- (1) W
- (2) Os
- (3) Cr
- (4) Ru

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

**Assertion (A)** : +R effect of  $-\text{NHCOCH}_3$  group is less than that of  $-\text{NH}_2$  when both the groups are attached to benzene ring.

**Reason (R)** : The lone pair of electrons on nitrogen in case of  $-\text{NHCOCH}_3$  group is less available for delocalisation as compared to  $-\text{NH}_2$  group when attached to benzene ring.

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) Both (A) and (R) are correct and (R) is the correct explanation of (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

195. Given below are the two statements

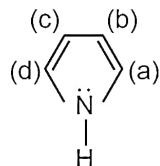
**Statement I** : Hybridisation of cobalt in  $[\text{Co}(\text{NH}_3)_6]^{3+}$  is  $d^2\text{sp}^3$ .

**Statement II** :  $[\text{Co}(\text{NH}_3)_6]^{3+}$  is diamagnetic complex ion.

In the light of above statements, select the **correct** option.

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

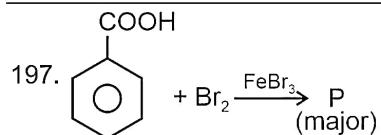
196. Consider the given compound in which carbon atoms are marked as a, b, c and d



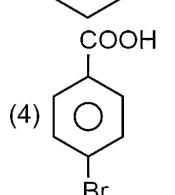
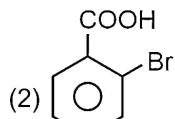
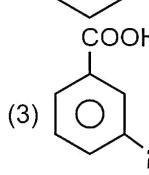
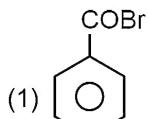
The probability of attack of an electrophile is maximum at

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

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Product P is



198. Mass of product B formed from zero order decomposition of A that has rate constant  $10^{-4}$  mol L $^{-1}$  s $^{-1}$  in 10 min will be (molar mass of B = 40 g mol $^{-1}$ )

- (1) 2.4 g (2) 0.04 g  
 (3)  $10^{-3}$  g (4) 0.06 g

199. The measurement of the electron position is associated with an uncertainty in momentum, which is equal to  $18 \times 10^{-25}$  g cm s $^{-1}$ . The uncertainty in electron velocity is,

- (Mass of an electron is  $9 \times 10^{-31}$  kg)  
 (1)  $2 \times 10^6$  cm s $^{-1}$   
 (2)  $4 \times 10^5$  cm s $^{-1}$   
 (3)  $3 \times 10^4$  cm s $^{-1}$   
 (4)  $2 \times 10^3$  cm s $^{-1}$

200. Catalyst used to oxidise SO<sub>2</sub> to SO<sub>3</sub> in contact process is

- (1) Fe (2) V<sub>2</sub>O<sub>5</sub>  
 (3) MnO<sub>2</sub> (4) O<sub>3</sub>

□ □ □

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