

**Part - A**

1. Leaves become modified into spines in
 (1) silk cotton (2) Opuntia
 (3) Pea (4) Onion
2. Vertical distribution of different species occupying different levels in a biotic community is known as:
 (1) Pyramid (2) Divergence
 (3) Stratification (4) Zonation
3. Transpiration and root pressure cause water to rise in plants by
 (1) pushing and pulling it, respectively
 (2) pulling it upward
 (3) pulling and pushing it, respectively
 (4) pushing it upward
4. Gene regulation governing lactose operon of E.coli. that involves the lac I gene product is
 (1) Feedback inhibition because excess of β -galactosidase can switch off transcription
 (2) Positive and inducible because it can be induced by lactose
 (3) negative and inducible because repressor protein prevents transcription.
 (4) negative and repressible because repressor protein prevents transcription
5. High value of BOD (Biochemical Oxygen Demand) indicates that
 (1) consumption of organic matter in the water is higher by the microbes
 (2) water is pure
 (3) water is highly polluted
 (4) water is less polluted
6. Which one of the following matches is correct
- | | | | |
|-----|---------------------|------------------------------|----------------|
| (1) | Agaricus | Parasitic fungus | Basidiomycetes |
| (2) | <i>Phytophthora</i> | Aseptate mycelium | Basidiomycetes |
| (3) | <i>Alternaria</i> | Sexual reproduction absent | Deuteromycetes |
| (4) | <i>Mucor</i> | Re production by Conjugation | Ascomycetes |
7. Which of these is not an important component of initiation of parturition in humans?
 (1) Release of prolactin
 (2) Increase in estrogen and progesterone ratio
 (3) Synthesis of prostaglandins
 (4) Release of oxytocin
8. A chemical signal that has both endocrine and neural roles is
 (1) Cortisol (2) Melatonin
 (3) Calcitonin (4) Epinephrine
9. Match each disease with its correct type of vaccine
- | | |
|--------------------|------------------------|
| (a) tuberculosis | (i) Harmless virus |
| (b) whooping cough | (ii) inactivated toxin |
| (c) diphtheria | (iii) killed bacteria |
| (d) Polio | (iv) harmless bacteria |
- | | | | |
|-----------|-------|-------|-------|
| (a) | (b) | (c) | (d) |
| (1) (i) | (ii) | (iv) | (iii) |
| (2) (ii) | (i) | (iii) | (iv) |
| (3) (iii) | (ii) | (iv) | (i) |
| (4) (iv) | (iii) | (ii) | (i) |
10. Nuclear envelope is a derivative of
 (1) Rough endoplasmic reticulum
 (2) Smooth endoplasmic reticulum
 (3) Membrane of Golgi complex
 (4) Microtubules
11. The crops engineered for glyphosate are resistant/tolerant to
 (1) Herbicides (2) Fungi
 (3) Bacteria (4) Insects
12. Vascular bundles in monocotyledons are considered because
 (1) Xylem is surrounded all around by phloem
 (2) A bundle sheath surrounds each bundle
 (3) Cambium is absent
 (4) There are no vessels with perforations
13. Read the following five statements(A to E) and select the option with all correct statements:
 (A) Mosses and Lichens are the first organisms to colonise a bare rock
 (B) *Selaginella* is a homosporous pteridophyte
 (C) Coralloid roots in *Cycas* have VAM
 (D) Main plant body in bryophytes is gametophytic, whereas in pteridophytes it is sporophytic
 (E) In gymnosperms, male and female gametophytes are present within sporangia located on sporophyte
- | | |
|----------------------|----------------------|
| (1) (B), (C) and (E) | (2) (A), (C) and (D) |
| (3) (B), (C) and (D) | (4) (A), (D) and (E) |



14. True nucleus is absent in
(1) *Volvox* (2) *Anabaena*
(3) *Mucor* (4) *Vaucheria*
15. Which of the following statements is not true.
(1) Honey is made by bees by digesting pollen collected from flowres
(2) Pollen grains are rich in nutrients, and they are used in the form of tablets and syrups
(3) Pollen grains of some plants cause severe allergies and branchial affications in some people
(4) The flowers pollinated by flies and bats secrete foul odour to attract them.
16. Removal of proximal convoluted tubule from the nephron will result in
(1) No urine formation
(2) More diluted urine
(3) More concentrated urine
(4) No change in quality and quantity of urine
17. A guymnast is able to balance his body upside down even in the total darkness because of
(1) Organ of corti (2) Cochlea
(3) Vestibular apparatus (4) Tectorial membrane
18. The hlum is a scar on the
(1) Seed, where micropyle was present
(2) Seed, where funicle was attached
(3) Fruit, whre it was attached to pedicel
(4) Fruit, where style was present
19. Which one of the following is correct
(1) Blood = Plasma + RBC + WBC + Platelets
(2) Plasma = Blood - Lymphocytes
(3) Serum = Blood + Fibrinogen
(4) Lymph = Plasma + RBC + WBC
20. The guts of cow and buffalo possess
(1) Cyanobacteria (2) *Fucus* spp
(3) *Chlorella* spp (4) Methanogens
21. Which one of the following may require pollinators but is genetically similar to autogamy?
(1) Cleistogamy (2) Geitonogamy
(3) Xenogamy (4) Apogamy
22. In sea urchin DNA, which is double standed, 17% of the bases were shown to be cytosine. The percentage of the other three bases expected to the present in this DNA are
(1) G 8.5%, A 50%, T 24.5%
(2) G 34%, A 24.5%, T 32.5%
(3) G 17%, A 16.5%, T 32.5%
(4) G 17%, A 33%, T 33%
23. Capacitation refers to changes in the
(1) sperm after ferticlization
(2) sperm before fertilization
(3) ovum before fertilization
(4) ovum after fertilization
24. Which of the following had the smallest brain capacity
(1) *Homo habilis* (2) *Homo erectus*
(3) *Homo sapiens* (4) *Homo neanderthalensis*
25. Which of the following viruses is not transferred through semen of an infected male?
(1) Ebola virus
(2) Hepatitis B virus
(3) Human immunodeficiency virus
(4) Chikungunya virus
26. A major characteristic of the monocot root is the presence of
(1) Cambium sandwiched between phloem and xylem along the radius
(2) Open vascular bundles
(3) Scattered vascular bundles
(4) Vasculature without cambium
27. Blood pressure in the mammalian aorta is maximum during
(1) Diastole of the right atrium
(2) Systole of the left arium
(3) Diastole of the right ventricle
(4) Systole of the left ventricle
28. In Bt cotton, the Bt toxin present in the plant tissue as pro-toxin is converted into active toxin due to
(1) presence of conversion factors in insect gut
(2) alkaline pH of the insect gut
(3) acidic pH of the insect gut
(4) action of gut micro-organisms
29. In an ecosystem the rate of production of organic matter during the photosynthesis is termed as
(1) Net productivity
(2) Net primary productivity
(3) Gross primary productivity
(4) Secondary productivity
30. In a ring girdled plant
(1) Neither root nor shoot will die
(2) The shoot dies first

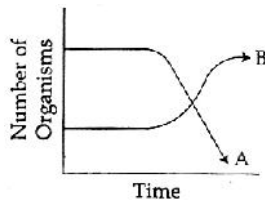


- (3) The root dies first
(4) The shoot and root die together
31. Erythropoiesis starts in
(1) Red bone marrow (2) Kidney
(3) Liver (4) Spleen
32. Keel is the characteristic feature of flower of
(1) Tomato (2) Tulip
(3) Indigofera (4) Aloe
33. In which of the following gametophyte is not independent free living
(1) *Pinus* (2) *Funaria*
(3) *Marchantia* (4) *Pteris*
34. The structures that are formed by stacking of organized flattened membranous sacs in the chloroplasts are
(1) Stroma (2) Crista
(3) Grana (4) Stroma lamellae
35. Which of the following does not favour the formation of large quantities of dilute urine?
(1) Atrial-natriuretic factor
(2) Alcohol
(3) Caffeine (4) Renin
36. DNA is not present in
(1) Mitochondria (2) Chloroplast
(3) Ribosomes (4) Nucleus
37. Which of the following are the important floral rewards to the animal pollinators
(1) Protein pellicle and stigmatic exudates
(2) Colour and large size of flower
(3) Nectar and pollen grains
(4) Floral fragrance and calcium crystals
38. Which of the following represents the correct combination without any exception?

	Characteristics	Class
(1)	Body covered with feathers; skin moist and glandular; fore-limbs form wings; lungs with air sacs	Aves
(2)	Mammary gland; hair on body; pinnae; two pairs of limbs	Mammalia
(3)	Mouth ventral; gills without operculum; skin with placoid scales; persistent notochord	Chondrichthyes
(4)	Sucking and circular mouth; jaws absent, integument without scales; paired appendages	Cyclostomata

39. Alleles are
(1) heterozygotes
(2) different phenotype
(3) true breeding homozygotes
(4) different molecular forms of a gene
40. Hysterectomy is surgical removal of
(1) Mammary glands (2) Uterus
(3) Prostate gland (4) Vas-deference
41. The UN Conference of Parties on climate change in the year 2011 was held in
(1) Qatar (2) Poland
(3) South Africa (4) Peru
42. HIV that causes AIDS, first starts destroying
(1) Thrombocytes (2) B-Lymphocytes
(3) Leucocytes (4) Helper T-Lymphocytes
43. Which one of the following statements is wrong
(1) Mannitol is stored food in Rhodophyceae
(2) Algin and Carragen are products of algae
(3) Agar-agar is obtained from *Gelidium* and *Gracilaria*
(4) *Chlorella* and *Spirulina* are used as space food
44. Cryopreservation of gametes of threatened species in viable and fertile condition can be referred to as:
(1) In situ cryo-conservation of biodiversity
(2) In situ conservation of biodiversity
(3) Advanced ex-situ conservation of biodiversity
(4) In situ conservation by sacred groves
45. Select the correct matching in the following pairs
(1) Rough ER - Oxidation of fatty acids
(2) Smooth ER - Oxidation of phospholipids
(3) Smooth ER - Synthesis of lipids
(4) Rough ER - Synthesis of glycogen
46. Secondary succession takes place on/in
(1) Newly cooled lava (2) Bare rock
(3) Degraded forest (4) Newly created pond
47. Which of the following is not a sexually transmitted disease?
(1) Encephalitis (2) Syphilis
(3) Acquired Immuno Deficiency Syndrome (AIDS)
(4) Trichomoniasis
48. The movement of a gene from one linkage group to another is called
(1) Crossing over (2) Inversion
(3) Duplication (4) Translocation

49. The following graph depicts changes in two populations (A and B) of herbivores in a grassy field. A possible reason for these changes is that



- (1) Population A consumed the members of population B
 (2) Both plant populations in this habitat decreased
 (3) Population B competed more successfully for food than population A
 (4) Population A produced more offspring than population B
50. Typical growth curve in plants is
 (1) Parabolic (2) Sigmoid
 (3) Linear (4) Stair-steps shaped
51. Which one gives the most valid and recent explanation for stomatal movements
 (1) Guard cell photosynthesis
 (2) Transpiration
 (3) Potassium influx and efflux
 (4) Starch hydrolysis
52. Cytochromes are found in
 (1) Lysosomes
 (2) Matrix of mitochondria
 (3) Outer wall of mitochondria
 (4) Cristae of mitochondria
53. Rachel Carson's famous book "Silent Spring" is related to
 (1) Ecosystem management
 (2) Pesticide pollution
 (3) Noise pollution
 (4) Population explosion
54. Which of the following regions of the brain is paired with its function
 (1) Cerebrum-calculation and contemplation
 (2) Medulla oblongata-homeostatic control
 (3) Cerebellum-language comprehension
 (4) Corpus callosum-communication between the left and right cerebral cortices

55. Which of the following characteristics is mainly responsible for diversification of insects on land?
 (1) Eyes (2) Segmentation
 (3) Bilateral symmetry (4) Exoskeleton
56. Sliding filament theory can be best explained as
 (1) When myofilaments slide past each other, Myosin filaments shorten while Actin filaments do not shorten
 (2) When myofilaments slide past each other Actin filaments shorten while Myosin filaments do not shorten
 (3) Actin and Myosin filaments shorten and slide past each other
 (4) Actin and Myosin filaments do not shorten but rather slide past each other
57. Which one of the following is not an inclusion body found in prokaryotes?
 (1) Polysome
 (2) Phosphate granule
 (3) Cyanophyccean granule
 (4) Glycogen granule
58. The mass of living material at a trophic level at a particular time is called
 (1) Standing crop
 (2) Gross primary productivity
 (3) Standing state
 (4) Net primary productivity
59. Select the correct option

	I		II
(a)	Synapsis aligns homologous chromosomes	(i)	Anaphase-II
(b)	Synthesis of RNA and protein	(ii)	Zygotene
(c)	Action of enzyme recombinase	(iii)	G ₂ -phase
(d)	Centromeres do not separate but chromatids move towards opposite poles	(iv)	Anaphase-I
		(v)	Pachytene

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



60. Multiple alleles are present
- (1) On non-sister chromatids
 - (2) On different chromosomes
 - (3) At different loci on the same chromosome
 - (4) At the same locus of the chromosome
61. Which of the following is **not** one of the prime health risks associated with greater UV radiation through the atmosphere due to depletion of stratospheric ozone?
- (1) Increased liver cancer
 - (2) Increased skin cancer
 - (3) Reduced Immune System
 - (4) Damage to eyes
62. Which is the most common mechanism of genetic variation in the population of a sexually reproducing organism?
- (1) Recombination
 - (2) Transduction
 - (3) Chromosomal aberrations
 - (4) Genetic drift
63. Minerals known to be required in large amounts for plant growth include
- (1) magnesium, sulphur, iron, zinc
 - (2) phosphorus, potassium, sulphur, calcium
 - (3) calcium, magnesium, manganese, copper
 - (4) potassium, phosphorus, selenium, boron
64. Transmission tissue is characteristic feature of
- (1) Wet stigma
 - (2) Hollow style
 - (3) Solid style
 - (4) Dry stigma
65. A man with blood group 'A' married a woman with blood group 'B'. What are all the possible blood groups of their offsprings?
- (1) O only
 - (2) A and B only
 - (3) A, B and AB only
 - (4) A, B, AB and O
66. Which of the following statements is **not correct**?
- (1) Acini are present in the pancreas and secrete carboxypepti
 - (2) Brunner's glands are present in the submucosa of stomach and secrete pepsinogen
 - (3) Goblet cells are present in the mucosa of intestine and secrete mucus
 - (4) Oxyntic cells are present in the mucosa of stomach and secrete HCl
67. Perigynous flowers are found in
- (1) Rose
 - (2) Guava
 - (3) Cucumber
 - (4) China rose
68. An abnormal human baby with 'XXX' sex chromosomes are born due to
- (1) fusion of two sperms and one ovum
 - (2) formation of abnormal sperms in the father
 - (3) formation of abnormal ova in the mother
 - (4) fusion of two ova and one sperm
69. What causes a green plant exposed to the light on only one side, to bend toward the source of light as it grows?
- (1) Auxin accumulates on the shaded side, stimulating greater cell elongation there
 - (2) Green plants need light to perform photosynthesis
 - (3) Green plants seek light because they are phototropic
 - (4) Light stimulates plant cells on the lighted side to grow faster
70. The chromosomes in which centromere is situated close to one end are
- (1) Sub-metacentric
 - (2) Metacentric
 - (3) Acrocentric
 - (4) Telocentric
71. A technique of micropropagation is
- (1) Embryo rescue
 - (2) Somatic hybridization
 - (3) Somatic embryogenesis
 - (4) Protoplast fusion
72. A somatic cell that has just completed the S phase of its cell cycle, as compared to gamete of the same species, has
- (1) four times the number of chromosomes and twice the amount of DNA
 - (2) twice the number of chromosomes and twice the amount of DNA
 - (3) same number of chromosomes but twice the amount of DNA
 - (4) twice the number of chromosomes and four times the amount of DNA
73. Gastric juice of infants contains
- (1) amylase, rennin, pepsinogen
 - (2) maltase, pepsinogen, rennin
 - (3) nuclease, pepsinogen, lipase
 - (4) pepsinogen, lipase, rennin
74. Which of the following animals is **not** viviparous?
- (1) Whale
 - (2) Flying fox (Bat)
 - (3) Elephant
 - (4) Platypus
75. $\oplus \otimes K_{(5)} C_{(5)} A_5 G_{(2)}$ is the floral formula of
- (1) *Brassica*
 - (2) *Allium*
 - (3) *Sesbania*
 - (4) *Petunia*



76. In which of the following both pairs have **correct** combination?
- (1) In-situ conservation : Tissue culture
Ex situ conservation : Sacred groves
- (2) In situ conservation : National Park
Ex situ conservation : Botanical Garden
- (3) In situ conservation : Cryopreservation
Ex situ conservation : Wildlife Sanctuary
- (4) In situ conservation : Seed Bank
Ex situ conservation : National Park
77. Which body of the Government of India regulates GM research and safety of introducing GM organisms for public services?
- (1) Reserach committee on Genetic Manipulation
- (2) Bio-safety committee
- (3) Indian Council of Agricultural Reserach
- (4) Genetic Engineering Approval Committee
78. Which of the following endoparasites of humans does show viviparity?
- (1) *Ascaris lumbricoides*
- (2) *Ancylostoma duodenale*
- (3) *Enterobius vermicularis*
- (4) *Trichinella spiralis*
79. The terga, sterna and pleura of cockroach body are joined by
- (1) Cartilage (2) Cementing glue
- (3) Muscular tissue (4) Arthrodiol membrane
80. Mosst animals are tree dwellers in a
- (1) tropical rain forest
- (2) coniferous forest
- (3) thorn woodland
- (4) temperate deciduous forest
81. Which of the following enhances or induces fusion of protoplasts?
- (1) IAA and gibbrellins
- (2) Sodium chloride and potassium chloride
- (3) Polyethylene glycol and sodium nitrate
- (4) IAA and kinetin
82. Glenoid cavity articulates
- (1) humerus with scapula
- (2) clavicle with acromion
- (3) scapula with acromion
- (4) clavicle with scapula
83. A population will **not** exist in Hardy-Weinberg equilibrium if
- (1) the population is large
- (2) individuals mate selectivity
- (3) there are no mutations
- (4) there is no migration
84. Male gametes are flagellated in
- (1) *Spirogyra* (2) *Polysiphonia*
- (3) *Anabaena* (4) *Ectocarpus*
85. When you hold your breath, which of the following gas changes in blood would first lead to the urge to breathe?
- (1) rising CO₂ and falling O₂ concentration
- (2) falling O₂ concentration
- (3) rising CO₂ concentration
- (4) falling CO₂ concentration
86. Which of the following cells during gametogenesis is normally diploid?
- (1) Secondary polar body
- (2) Primary polar body
- (3) Spermatid
- (4) Spermatogonia
87. In ginger vegetative propagation occurs through
- (1) Runners (2) Rhizome
- (3) Offsets (4) Bulbils
88. Which one of the following statements is **incorrect**?
- (1) The presence of the competitive inhibitor decreases the Km of the enzyme for the substrate
- (2) A competitive inhibitor reacts reversibly with the enzyme to form an enzyme inhibitor complex
- (3) In competitive inhibition, the inhibitor molecule is not chemically changed by the enzyme
- (4) The competitive inhibitor does not affect the rate of breakdown of the enzyme substrate complex
89. The active form of *Entamoeba histolytica* feeds upon?
- (1) blood only
- (2) erythrocytes; mucosa and submucosa of colon
- (3) mucosa and submucosa of colon only
- (4) food in intestine
90. How many pairs of contrasting characters in pea plants were studied by Mendel in his experiments?
- (1) Seven (2) Five
- (3) Six (4) Eight

91. A radiation of energy E falls normally on a perfectly reflecting surface. The momentum transferred to the surface is (C = Velocity of light)

- (1) $\frac{E}{c^2}$ (2) $\frac{E}{c}$
 (3) $\frac{2E}{c}$ (4) $\frac{2E}{c^2}$

92. A ship A is moving Westwards with a speed of 10 km h^{-1} and a ship B 100 km South of A, is moving Northwards with a speed of 10 km h^{-1} . The time after which the distance between them becomes shortest is

- (1) $10\sqrt{2}h$ (2) $0h$
 (3) $5h$ (4) $5\sqrt{2}h$

93. Three blocks A, B and C, of masses 4 kg , 2 kg and 1 kg , respectively, are in contact on a frictionless surface, as shown. If a force of 14 N is applied on the 4 kg block, then the contact force between A and B is

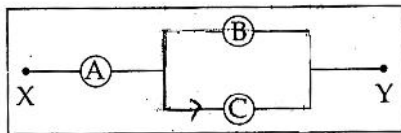


- (1) 18 N (2) 2 N
 (3) 6 N (4) 8 N

94. The electric field in a certain region is acting radially outward and is given by $E = Ar$. A charge contained in a sphere of radius a centred at the origin of the field, will be given by

- (1) $v_0 Aa^3$ (2) $4fv_0 Aa^2$
 (3) $Av_0 a^2$ (4) $4fv_0 Aa^3$

95. A, B and C are voltmeters of resistance R , $1.5R$ and $3R$ respectively as shown in the figure. When some potential difference is applied between X and Y, the voltmeter readings are V_A , V_B and V_C respectively.

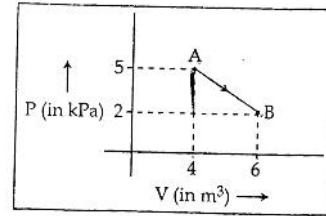


- (1) $V_A \neq V_B \neq V_C$ (2) $V_A = V_B = V_C$
 (3) $V_A \neq V_B = V_C$ (4) $V_A = V_B \neq V_C$

96. In a double slit experiment, the two slits are 1 mm apart and the screen is placed 1 m away. A monochromatic light of wavelength 500 nm is used. What will be the width of each slit for obtaining ten maxima of double slit within the central maxima of single slit pattern?

- (1) 0.02 mm (2) 0.2 mm
 (3) 0.1 mm (4) 0.5 mm

97. One mole of an ideal diatomic gas undergoes a transition from A to B along a path AB as shown in the figure



The change in internal energy of the gas during the transition is

- (1) -12 kJ (2) 20 kJ
 (3) -20 kJ (4) 20 kJ

98. A rod weight W is supported by two parallel knife edges. A and B is in equilibrium in a horizontal position. The knives are at a distance d from each other. The centre of mass of the rod is at distance x from A. The normal reaction on A is

- (1) $\frac{W(d-x)}{d}$ (2) $\frac{Wx}{d}$
 (3) $\frac{Wd}{x}$ (4) $\frac{W(d-x)}{x}$

99. Kepler's third law states that square of period of revolution (T) of a planet around the sun, is proportional to third power of average distance r between sun and planet.

i.e. $T^2 = Kr^3$

here K is constant

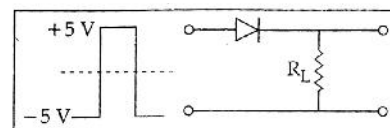
If the masses of sun and planet are M and m respectively then as per Newton's law of gravitation force of attraction between them is

$F = \frac{GMm}{r^2}$, here G is gravitational constant

The relation between G and K is described as

- (1) $K = \frac{1}{G}$ (2) $GK = 4f^2$
 (3) $GK = 4f^2$ (4) $K = G$

100. If in a p-n junction, a square input signal of 10 V applied as shown.



Then the output across R_L will be

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

101. Two particles of masses m_1, m_2 move with initial velocities u_1 and u_2 . On collision, one of the particles get excited to higher level, after absorbing energy v . If final velocities of particles be v_1 and v_2 then we must have

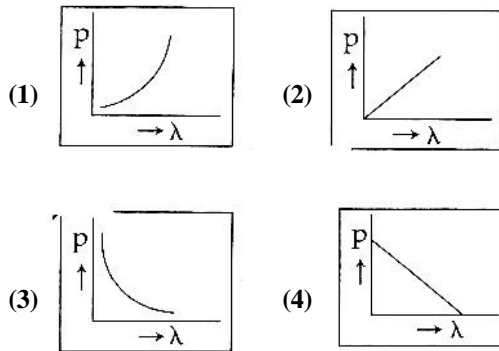
(1) $\frac{1}{2}m_1^2u_1^2 + \frac{1}{2}m_2^2u_2^2 + v = \frac{1}{2}m_1^2v_1^2 + \frac{1}{2}m_2^2v_2^2$

(2) $m_1^2u_1 + m_2^2u_2 - v = m_1^2v_1 + m_2^2v_2$

(3) $\frac{1}{2}m_1u_1^2 + \frac{1}{2}m_2u_2^2 = \frac{1}{2}m_1v_1^2 + \frac{1}{2}m_2v_2^2 - v$

(4) $\frac{1}{2}m_1u_1^2 + \frac{1}{2}m_2u_2^2 - v = \frac{1}{2}m_1v_1^2 + \frac{1}{2}m_2v_2^2$

102. Which of the following figures represent the variation of particles momentum and the associated de-Broglie wavelength?



103. The approximate depth of an ocean is 2700 m. The compressibility of water is $45.4 \times 10^{-11} \text{ Pa}^{-1}$ and density of water is 10^3 kg/m^3 . What fractional compression of water will be obtained at the bottom of the ocean?

(1) 1.4×10^{-2} (2) 0.8×10^{-2}

(3) 1.0×10^{-2} (4) 1.2×10^{-2}

104. The two ends of a metal rod are maintained at temperatures 100°C and 110°C . The rate of heat flow in the rod is found to be 4.0 J/s . If the ends are maintained at temperatures 200°C and 210°C , the rate of heat flow will be

(1) 4.0 J/s (2) 44.0 J/s

(3) 16.8 J/s (4) 8.0 J/s

105. A particle of unit mass undergoes one-dimensional motion such that its velocity varies according to

$v(x) = Sx^{-2n}$

where S and n are constants and x is the position of the particle. The acceleration of the particle as a function of x , is given by

(1) $-2nS^2e^{-4n+1}$ (2) $-2nS^2x^{-2n-1}$

(3) $-2nS^2x^{-4n-1}$ (4) $-2S^2x^{-2n+1}$

106. The refracting angle of a prism is A , and refractive index of the material of the prism is $\cot(A/2)$. The angle of minimum deviation is

(1) $180^\circ + 2A$ (2) $180^\circ - 3A$

(3) $180^\circ - 2A$ (4) $90^\circ - 2A$

107. A particle is executing SHM along a straight line. Its velocities at distances x_1 and x_2 from the mean position are V_1 and V_2 respectively. Its time period is

(1) $2f \sqrt{\frac{V_1^2 - V_2^2}{x_1^2 - x_2^2}}$ (2) $2f \sqrt{\frac{x_1^2 + x_2^2}{V_1^2 + V_2^2}}$

(3) $2f \sqrt{\frac{x_2^2 - x_1^2}{V_1^2 - V_2^2}}$ (4) $2f \sqrt{\frac{V_1^2 + V_2^2}{x_1^2 + x_2^2}}$

108. Two similar springs P and Q have spring constants K_P and K_Q , such that $K_P > K_Q$. They are stretched, first by the same amount (case a), then by the same force (case b). The work done by the springs W_P and W_Q are related as, in case (a) and case (b), respectively.

(1) $W_P < W_Q; W_Q < W_P$ (2) $W_P = W_Q; W_P > W_Q$

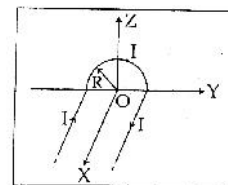
(3) $W_P = W_Q; W_P = W_Q$ (4) $W_P > W_Q; W_Q > W_P$

109. Consider 3rd orbit of He^+ (Helium), using non-relativistic approach, the speed of electron in this orbit will be [Given $K = 9 \times 10^9$ constant, $Z=2$ and h (Planck's Constant) = $6.6 \times 10^{-34} \text{ J s}$]

(1) $3.0 \times 10^8 \text{ m/s}$ (2) $2.92 \times 10^6 \text{ m/s}$

(3) $1.46 \times 10^6 \text{ m/s}$ (4) $0.73 \times 10^6 \text{ m/s}$

110. A wire carrying current I has the shape as shown in adjoining figure. Linear parts of the wire are very long and parallel to X-axis while semicircular portion of radius R is lying in Y-Z plane. Magnetic field at point O is



(1) $\vec{B} = \frac{\mu_0 I}{4f R} (f\hat{i} - 2\hat{k})$ (2) $\vec{B} = \frac{\mu_0 I}{4f R} (f\hat{i} + 2\hat{k})$

(3) $\vec{B} = -\frac{\mu_0 I}{4f R} (f\hat{i} - 2\hat{k})$ (4) $\vec{B} = -\frac{\mu_0 I}{4f R} (f\hat{i} + 2\hat{k})$

111. A particle of mass m is driven by a machine that delivers a constant power k watts. If the particles starts from rest the force on the particle at time t is

(1) $\frac{1}{2} \sqrt{mk} t^{-1/2}$ (2) $\sqrt{\frac{mk}{2}} t^{-1/2}$

(3) $\sqrt{mk} t^{-1/2}$ (4) $\sqrt{2mk} t^{-1/2}$



112. The fundamental frequency of a closed organ pipe of length 20 cm is equal to the second overtone of an organ pipe open at both the ends. The length of organ pipe open at both the ends is

- (1) 140 cm (2) 80 cm
(3) 100 cm (4) 120 cm

113. An electron moving in a circular orbit of radius r makes n rotations per second. The magnetic field produced at the centre has magnitude.

- (1) $\frac{\sim_0 ne}{2r}$ (2) $\frac{\sim_0 ne}{2fr}$
(3) Zero (4) $\frac{\sim_0 n^2 e}{r}$

114. Two identical thin-plano-convex glass lenses (refractive index 1.5) each having radius of curvatures of 20 cm are placed with their convex surfaces in contact at the centre. The intervening space is filled with oil of refractive index 1.7. The focal length of the combination is

- (1) 50 cm (2) -20 cm
(3) -25 cm (4) -50 cm

115. On observing light from three different stars P, Q and R, it was found that intensity of violet colour is maximum in the spectrum of P, the intensity of green colour is maximum in the spectrum of R and the intensity of red colour is maximum in the spectrum of Q. If T_P , T_Q and T_R are the respective absolute temperatures of P, Q and R, then it can be concluded from the above observations that

- (1) $T_P < T_Q < T_R$ (2) $T_P > T_Q > T_R$
(3) $T_P > T_R > T_Q$ (4) $T_P < T_R < T_Q$

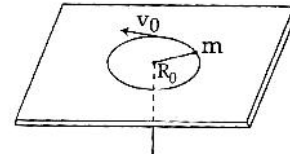
116. If energy (E), velocity (V) and time (T) are chosen as the fundamental quantities, the dimensional formula of surface tension will be

- (1) $[E^{-2}V^{-1}T^{-3}]$ (2) $[EV^{-2}T^{-1}]$
(3) $[EV^{-1}T^{-2}]$ (4) $[EV^{-2}T^{-2}]$

117. A Carnot engine, having an efficiency of $\eta = \frac{1}{10}$ as a heat engine, is used as a refrigerator. If the work done on the system is 10 J, the amount of energy absorbed from the reservoir at lower temperature is

- (1) 1 J (2) 100 J
(3) 99 J (4) 90 J

118. A mass m moves in a circle on a smooth horizontal plane with velocity v_0 at a radius R_0 . The mass is attached to a string which passes through a smooth hole in the plane as shown.



The tension in the string is increased gradually and finally m moves in a circle of radius $\frac{R_0}{2}$. The final value of the kinetic energy is

- (1) $\frac{1}{2}mv_0^2$ (2) mv_0^2
(3) $\frac{1}{4}mv_0^2$ (4) $2mv_0^2$

119. For a parallel beam of monochromatic light of wavelength λ diffraction is produced by a single slit whose width a is of the order of the wavelength of the light. If D is the distance of the screen from the slit, the width of the central maxima will be

- (1) $\frac{2Da}{\lambda}$ (2) $\frac{2D\lambda}{a}$
(3) $\frac{D\lambda}{a}$ (4) $\frac{Da}{\lambda}$

120. A wind with speed 40 m/s blows parallel to the roof of a house. The area of the roof is 1250 m². Assuming that the pressure inside the house is atmospheric pressure, the force exerted by the wind on the roof and the direction of the force will be

- ($\rho_{\text{air}} = 1.2 \text{ kg/m}^3$)
(1) $2.4 \times 10^5 \text{ N}$, downwards
(2) $4.8 \times 10^5 \text{ N}$, downwards
(3) $4.8 \times 10^5 \text{ N}$, upwards (4) $2.4 \times 10^5 \text{ N}$, upwards

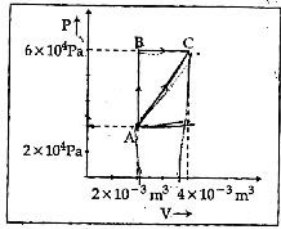
121. The ratio of the specific heats $\frac{C_P}{C_V} = \gamma$ in terms of degrees of freedom (n) is given by

- (1) $\left(1 + \frac{n}{2}\right)$ (2) $\left(1 + \frac{1}{n}\right)$
(3) $\left(1 + \frac{n}{3}\right)$ (4) $\left(1 + \frac{2}{n}\right)$

122. If radius of the ${}^{27}_{13}\text{Al}$ nucleus is taken to be R_{Al} , then the radius of ${}^{125}_{53}\text{Te}$ nucleus is nearly

- (1) $\left(\frac{13}{53}\right)^{1/3} R_{\text{Al}}$ (2) $\left(\frac{53}{13}\right)^{1/3} R_{\text{Al}}$
(3) $\frac{5}{3} R_{\text{Al}}$ (4) $\frac{3}{5} R_{\text{Al}}$

123. Figure below shows two paths that may be taken by a gas to go from a state A to a state C.



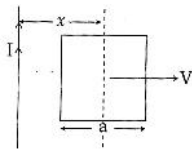
In process AB, 400 J of heat is added to the system and in process BC, 100 J of heat is added to the system. The heat absorbed by the system in the process AC will be

- (1) 300 J (2) 380 J
(3) 500 J (4) 460 J

124. A block of mass 10 kg, moving in x direction with a constant speed of 10 m s⁻¹, is subjected to a retarding force $F = 0.1 \text{ x J/m}$ during its travel from $x = 20 \text{ m}$ to 30 m . Its final KE will be

- (1) 250 J (2) 475 J
(3) 450 J (4) 275 J

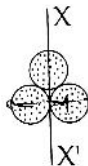
125. A conducting square frame of side a and a long straight wire carrying current I are located in the same plane as shown in the figure. The frame moves to the right with a constant velocity V . The emf induced in the frame will be proportional to



- (1) $\frac{1}{(2x-a)(2x+a)}$ (2) $\frac{1}{x^2}$
(3) $\frac{1}{(2x-a)^2}$ (4) $\frac{1}{(2x+a)^2}$

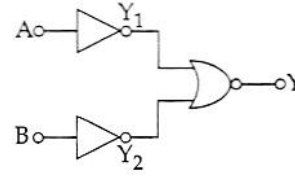
126. Three identical spherical shells, each of mass m and radius r are placed as shown in figure. Consider an axis XX' which is touching to two shells and passing through diameter of third shell.

Moment of inertia of the system consisting of these three spherical shells about XX' axis is



- (1) $4mr^2$ (2) $\frac{11}{5}mr^2$
(3) $3mr^2$ (4) $\frac{16}{5}mr^2$

127. Which logic gate is represented by the following combination of logic gates?



- (1) NOR (2) OR
(3) NAND (4) AND

128. A block A of mass m_1 rests on a horizontal table. A light string connected to it passes over a frictionless pulley at the edge of table and from its other end another block B of mass m_2 is suspended. The coefficient of kinetic friction between the block and table is μ_k . When the block A is sliding on the table, the tension in the string is

- (1) $\frac{m_1 m_2 (1 - \mu_k) g}{(m_1 + m_2)}$ (2) $\frac{(m_2 + \mu_k m_1) g}{(m_1 + m_2)}$
(3) $\frac{(m_2 - \mu_k m_1) g}{(m_1 + m_2)}$ (4) $\frac{m_1 m_2 (1 + \mu_k) g}{(m_1 + m_2)}$

129. A certain metallic surface is illuminated with monochromatic light of wavelength λ . The stopping potential for photo-electric current for this light is $3V_0$. If the same surface is illuminated with light of wavelength 2λ , the stopping potential is V_0 . The threshold wavelength for this surface for photo-electric effect is

- (1) $\frac{\lambda}{6}$ (2) 6λ
(3) 4λ (4) $\frac{\lambda}{4}$

130. When two displacement represented by $y_1 = a \sin(\omega t)$ and $y_2 = b \cos(\omega t)$ are superimposed the motion is

- (1) simple harmonic with amplitude $\frac{(a+b)}{2}$
(2) not a simple harmonic
(3) simple harmonic with amplitude $\frac{a}{2}$
(4) simple harmonic with amplitude $\sqrt{a^2 + b^2}$

131. A potentiometer wire has length 4 m and resistance 8Ω . The resistance that must be connected in series with the wire and an accumulator of e.m.f. 2V, so as to get a potential gradient 1 mV per cm on the wire is

- (1) 48Ω (2) 32Ω
(3) 40Ω (4) 44Ω

132. Two spherical bodies of mass M and $5M$ and radii R and $2R$ are released in free space with initial separation between their centres equal to $12R$. If they attract each other due to gravitation force only, then the distance covered by the smaller body before collision is

- (1) $1.5R$ (2) $2.5R$
 (3) $4.5R$ (4) $7.5R$

133. A resistance R draws power P when connected to an AC source. If an inductance is now placed in series with the resistance, such that the impedance of the circuit becomes ' Z ' the power drawn will be

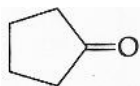
- (1) P (2) $P\left(\frac{R}{Z}\right)^2$
 (3) $P\sqrt{\frac{R}{Z}}$ (4) $P\left(\frac{R}{Z}\right)$

134. Across a metallic conductor of non-uniform cross section a constant potential difference is applied. The quantity which remains constant along the conductor is

- (1) Electric field (2) current density
 (3) current (4) drift velocity

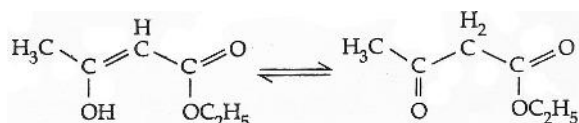
135. A parallel plate air capacitor of capacitance C is connected to a cell of emf V and then disconnected from it. A dielectric slab of dielectric constant K , which can just fill the air gap of the capacitor, is now inserted in it. Which of the following is incorrect?

- (1) The charge on the capacitor is not conserved
 (2) The potential difference between the plates decreases K times
 (3) The energy stored in the capacitor decreases K times
 (4) The change in energy stored is $\frac{1}{2}CV^2\left(\frac{1}{K}-1\right)$

136. Treatment of cyclopentanone  with methyl lithium gives which of the following species?

- (1) Cyclopentanonyl biradical
 (2) Cyclopentanonyl anion
 (3) Cyclopentanonyl cation
 (4) Cyclopentanonyl radical

137. The enolic form of ethyl acetoacetate as below has



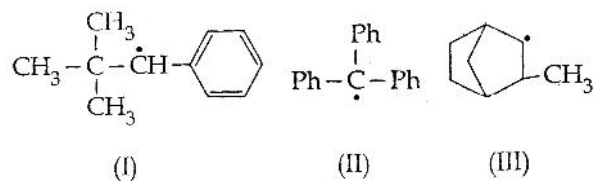
- (1) 9 sigma bonds and 1 pi - bond
 (2) 18 sigma bonds and 2 pi - bond

- (3) 16 sigma bonds and 1 pi - bond
 (4) 9 sigma bonds and 2 pi - bond

138. Biodegradable polymer which can be produced from glycine and aminoacaproic acid is

- (1) Nylon 6, 6 (2) Nylon 2 - nylon 6
 (3) PHBV (4) Buna - N

139. Consider the following compounds



Hyperconjugation occurs in

- (1) I and II (2) I only
 (3) II only (4) III only

140. Which of the following species contains equal number of π and π bonds?

- (1) $\text{CH}_2(\text{CN})_2$ (2) HCO_3^-
 (3) XeO_4 (4) $(\text{CN})_2$

141. The correct bond order in the following species is

- (1) $\text{O}_2^- < \text{O}_2^+ < \text{O}_2^{2+}$ (2) $\text{O}_2^{2+} < \text{O}_2^+ < \text{O}_2^-$
 (3) $\text{O}_2^{2+} < \text{O}_2^- < \text{O}_2^+$ (4) $\text{O}_2^+ < \text{O}_2^- < \text{O}_2^{2+}$

142. The function of "Sodium pump" is a biological process operating in each and every cell of all animals. Which of the following biologically important ions is also a constituent of this pump?

- (1) Fe^{2+} (2) Ca^{2+}
 (3) Mg^{2+} (4) K^+

143. Which of these statement about $[\text{Co}(\text{CN})_6]^{3-}$ is true?

- (1) $[\text{Co}(\text{CN})_6]^{3-}$ has no unpaired electrons and will be in a high-spin configuration
 (2) $[\text{Co}(\text{CN})_6]^{3-}$ has no unpaired electrons and will be in a low-spin configuration
 (3) $[\text{Co}(\text{CN})_6]^{3-}$ has four unpaired electrons and will be in a low-spin configuration
 (4) $[\text{Co}(\text{CN})_6]^{3-}$ has four unpaired electrons and will be in a high-spin configuration

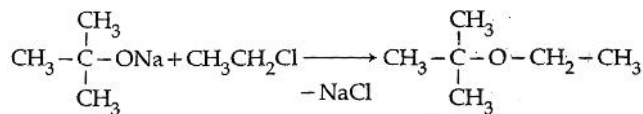


144. The activation energy of a reaction can be determined from the slope of which of the following graphs?

(1) $\frac{T}{\ln K}$ vs. $\frac{1}{T}$ (2) $\ln K$ vs. T

(3) $\frac{\ln K}{T}$ vs. T (4) $\ln K$ vs. $\frac{1}{T}$

145. The reaction



is called :

- (1) Gatterman-Koch reaction
 (2) Williamson Synthesis
 (3) Williamson continuous etherification process
 (4) Etard reaction

146. Which one is **not** equal to zero for an ideal solution?

(1) $\Delta P = P_{\text{observed}} - P_{\text{Raoult}}$ (2) ΔH_{mix}

(3) ΔS_{mix} (4) ΔV_{mix}

147. "Metals are usually not found as nitrates in their ores".

Out of the following two (a and b) reasons which is / are **true** for the above observation?

- a. Metal nitrates are highly unstable.
 b. Metal nitrates are highly soluble in water.

- (1) a is true but b is false
 (2) a and b are true
 (3) a and b are false
 (4) a is false but b is true

148. An organic compound 'X' having molecular formula $\text{C}_5\text{H}_{10}\text{O}$ yields phenyl hydrazone and gives negative response to the Iodoform test and Tollen's test. It produces n-pentane on reduction. 'X' could be

- (1) n-amyl alcohol (2) pentanal
 (3) 2-pentanone (4) 3-pentanone

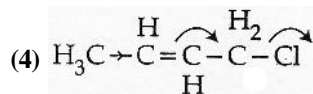
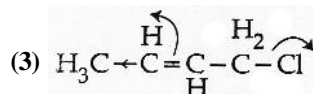
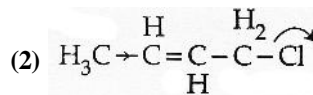
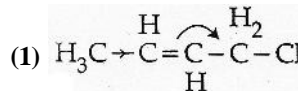
149. Cobalt(III) chloride forms several octahedral complexes with ammonia. Which of the following will not give test for chloride ions with silver nitrate at 25°C ?

- (1) $\text{CoCl}_3 \cdot 6\text{NH}_3$ (2) $\text{CoCl}_3 \cdot 3\text{NH}_3$
 (3) $\text{CoCl}_3 \cdot 4\text{NH}_3$ (4) $\text{CoCl}_3 \cdot 5\text{NH}_3$

150. A mixture of gases contains H_2 and O_2 gases in the ratio of 1 : 4 (w / w). What is the molar ratio of the two gases in the mixture?

- (1) 2 : 1 (2) 1 : 4
 (3) 4 : 1 (4) 16 : 1

151. Which of the following is the most correct electron displacement for a nucleophilic reaction to take place?



152. The electrolytic reduction of nitrobenzene in strongly acidic medium produces

- (1) Aniline (2) p-Aminophenol
 (3) Azoxybenzene (4) Azobenzene

153. Nitrogen dioxide and sulphur dioxide have some properties in common. Which property is shown by one of these compounds, but not by the other?

- (1) is used as a food-preservative
 (2) forms 'acid rain'
 (3) is a reducing agent
 (4) is soluble in water

154. Which of the following statement is correct for a reversible process in a state of equilibrium?

- (1) $\Delta G^\circ = 2.30 RT \log K$
 (2) $\Delta G = -2.30 RT \log K$
 (3) $\Delta G = 2.30 RT \log K$
 (4) $\Delta G^\circ = -2.30 RT \log K$

155. Which of the following pairs of ions are isoelectronic and isostructural?

- (1) ClO_3^- , SO_3^{2-} (2) CO_3^{2-} , SO_3^{2-}
 (3) ClO_3^- , CO_3^{2-} (4) SO_3^{2-} , NO_3^-

156. The angular momentum of electron in 'd' orbital is equal to

- (1) $0\hbar$ (2) $\sqrt{6}\hbar$
 (3) $\sqrt{2}\hbar$ (4) $2\sqrt{3}\hbar$

157. Which of the following options represents the correct bond order?

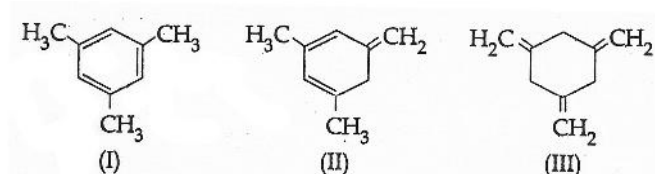
- (1) $\text{O}_2^- < \text{O}_2 > \text{O}_2^+$ (2) $\text{O}_2^- > \text{O}_2 > \text{O}_2^+$
 (3) $\text{O}_2^- < \text{O}_2 < \text{O}_2^+$ (4) $\text{O}_2^- > \text{O}_2 < \text{O}_2^+$

158. Magnetic moment 2.84 B.M. is given by :

(At. nos, Ni = 28, Ti = 22, Cr = 24, Co = 27)

- (1) Co^{2+} (2) Ni^{2+}
 (3) Ti^{3+} (4) Cr^{2+}

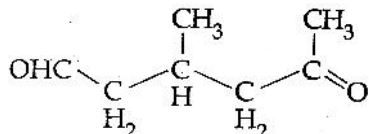
159. Given



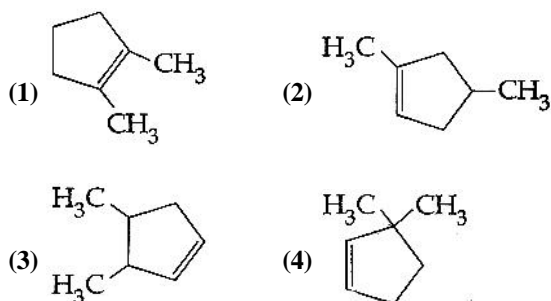
The enthalpy of hydrogenation of these compounds will be in the order as

- (1) $\text{II} > \text{I} > \text{III}$ (2) $\text{I} > \text{II} > \text{III}$
 (3) $\text{III} > \text{II} > \text{I}$ (4) $\text{II} > \text{III} > \text{I}$

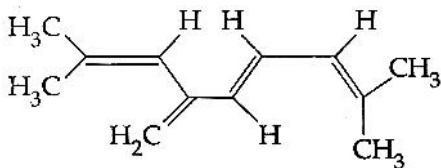
160. A single compound of the structure



is obtainable from ozonolysis of which of the following cyclic compounds ?



161. The total number of p-bond electrons in the following structure is



- (1) 16 (2) 4
 (3) 8 (4) 12

162. The K_{sp} of Ag_2CrO_4 , AgCl , AgBr and AgI are respectively, 1.1×10^{-12} , 1.8×10^{-10} , 5.0×10^{-13} , 8.3×10^{-17} . Which one of the following salts will precipitate last if AgNO_3 solution is added to the solution containing equal moles of NaCl , NaBr , NaI and Na_2CrO_4 ?

- (1) Ag_2CrO_4 (2) AgI
 (3) AgCl (4) AgBr

163. When initial concentration of a reactant is doubled in a reaction, its half-life period is not affected. The order of the reaction is

- (1) More than zero but less than first
 (2) Zero
 (3) First (4) Second

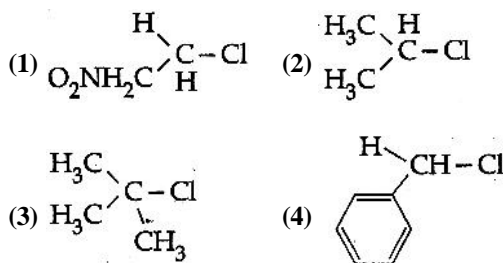
164. Which of the following processes does not involve oxidation of iron?

- (1) Liberation of H_2 from steam by iron at high temperature
 (2) Rusting of iron sheets
 (3) Decolourization of blue CuSO_4 solution by iron
 (4) Formation of $\text{Fe}(\text{CO})_5$ from Fe

165. Bithional is generally added to the soaps as an additive to function as a / an

- (1) Antiseptic (2) Softener
 (3) Dryer (4) Buffering agent

166. In which of the following compounds, the C - Cl bond ionisation shall give most stable carbonium ion?



167. A given metal crystallizes out with a cubic structure having edge length of 361 pm. If there are four metal atoms in one unit cell, what is the radius of one atom?

- (1) 108 pm (2) 40 pm
 (3) 127 pm (4) 80 pm

168. The boiling point of 0.2 mol kg^{-1} solution of X in water is greater than equimolar solution of Y in water. Which one of the following statements is true in this case?

- (1) Y is undergoing dissociation in water while X undergoes no change
 (2) X is undergoing dissociation in water.
 (3) Molecular mass of X is greater than the molecular mass of Y.
 (4) Molecular mass of X is less than the molecular mass of Y.

169. In Duma's method for estimation of nitrogen, 0.25 g of an organic compound gave 40 mL of nitrogen collected at 300 K temperature and 725 mm pressure. If the aqueous tension at 300 K is 25 mm, the percentage of nitrogen in the compound is

- (1) 15.76 (2) 17.36
 (3) 18.20 (4) 16.76

170. The species A, K^+ and Ca^{2+} contain the same number of electron. In which order do their radii increase?

- (1) $K^+ < Ar < Ca^{2+}$ (2) $Ar < K^+ < Ca^{2+}$
 (3) $Ca^{2+} < Ar < K^+$ (4) $Ca^{2+} < K^+ < Ar$

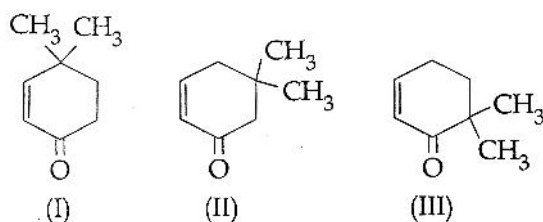
171. Because of lanthanoid contraction, which of the following pairs of elements have nearly same atomic radii? (Numbers in the parenthesis are atomic numbers)>

- (1) Zr (40) and Ta (73) (2) Ti (22) and Zr (40)
 (3) Zr (40) and Nb (41) (4) Zr (40) and Hf (72)

172. The number of d-electrons in Fe^{2+} ($Z = 26$) is not equal to the number of electrons in which one of the following?

- (1) p - electrons in Ne ($Z = 10$)
 (2) s - electrons in Mg ($Z = 12$)
 (3) p - electrons in Cl ($Z = 17$)
 (4) d - electrons in Fe ($Z = 26$)

173. Given :



Which of the given compounds can exhibit tautomerism?

- (1) I, II and III (2) I and II
 (3) I and III (4) II and III

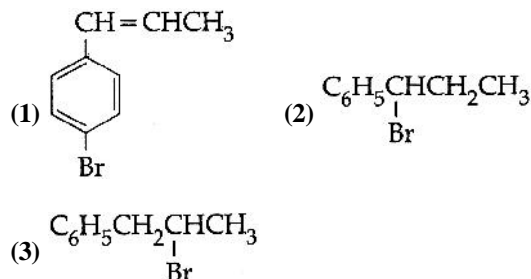
174. Which one of the following electrolytes has the same value of van't Hoff's factor (i) as that of $Al_2(SO_4)_3$ (if all are 100% ionised)?

- (1) $K_4[Fe(CN)_6]$ (2) K_2SO_4
 (3) $K_3[Fe(CN)_6]$ (4) $Al(NO_3)_3$

175. Maximum bond angle at nitrogen is present in which of the following?

- (1) NO_3^- (2) NO_2
 (3) NO_2^- (4) NO_2^+

176. The reaction of $C_6H_5CH=CHCH_3$ with HBr produces :



- (3) $C_6H_5CH_2CH(Br)CH_3$
 (4) $C_6H_5CH_2CH_2CH_2Br$

177. Which property of colloidal solution is independent of charge on the colloidal particles?

- (1) Tyndall effect (2) Coagulation
 (3) Electrophoresis (4) Electro-osmosis

178. Solubility of the alkaline earth's metal sulphates in water decreases in the sequence

- (1) $Ba > Mg > Sr > Ca$
 (2) $Mg > Ca > Sr > Ba$
 (3) $Ca > Sr > Ba > Mg$
 (4) $Sr > Ca > Mg > Ba$

179. A device that converts energy of combustion of fuels like hydrogen and methane, directly into electrical energy is known as

- (1) Ni-Cd cell (2) Fuel Cell
 (3) Electrolytic Cell (4) Dynamo

180. If the value of an equilibrium constant for a particular reaction is 1.6×10^{12} , then at equilibrium the system will contain :

- (1) similar amounts of reactants and products
 (2) all reactants
 (3) mostly reactants
 (4) mostly products



Answer Key										
Q	1	2	3	4	5	6	7	8	9	10
A	2	3	3	3	3	3	1	4	4	1
Q	11	12	13	14	15	16	17	18	19	20
A	1	3	4	2	1	2	3	2	1	4
Q	21	22	23	24	25	26	27	28	29	30
A	2	4	2	1	4	4	4	2	3	3
Q	31	32	33	34	35	36	37	38	39	40
A	1	3	1	3	4	3	3	3	4	2
Q	41	42	43	44	45	46	47	48	49	50
A	3	4	1	3	3	3	1	4	3	2
Q	51	52	53	54	55	56	57	58	59	60
A	3	4	2	3	4	4	1	1	3	4
Q	61	62	63	64	65	66	67	68	69	70
A	1	1	2	3	4	2	1	3	1	3
Q	71	72	73	74	75	76	77	78	79	80
A	3	4	4	4	4	2	4	4	4	1
Q	81	82	83	84	85	86	87	88	89	90
A	3	1	2	4	3	4	2	1	2	1
Q	91	92	93	94	95	96	97	98	99	100
A	3	3	3	4	2	2	3	1	3	1
Q	101	102	103	104	105	106	107	108	109	110
A	4	3	4	1	3	3	3	4	3	4
Q	111	112	113	114	115	116	117	118	119	120
A	2	4	1	4	3	4	4	4	2	4
Q	121	122	123	124	125	126	127	128	129	130
A	4	3	4	2	1	1	4	4	3	4
Q	131	132	133	134	135	136	137	138	139	140
A	2	4	2	3	1	2	2	2	4	3
Q	141	142	143	144	145	146	147	148	149	150
A	1	4	2	4	2	3	4	4	3	3
Q	151	152	153	154	155	156	157	158	159	160
A	4	1	1	4	1	2	3	2	3	2
Q	161	162	163	164	165	166	167	168	169	170
A	3	1	3	4	1	3	3	2	4	4
Q	171	172	173	174	175	176	177	178	179	180
A	4	3	2	1	4	2	1	2	2	4