

1. What is true about cork cambium?

- (1) It is extrastelar cambium in dicot stem.
- (2) In dicot stem it arises from the cells of cortex region.
- (3) It is also known as phellogen.
- (4) All the above

2. Read the following statements w.r.t.

pericycle and choose the suitable option

(a) It is the outermost portion of stele, that may be parenchymatous or sclerenchymatous.

(b) It is absent in monocot stems.

(c) It is always single layered.

- (1) Only (a) is correct
- (2) Only (b) is incorrect
- (3) Only (c) is incorrect
- (4) Both (a) & (b) are incorrect

3. State True (T) or False (F) to the given statements and select the correct option

(A) Annual rings are distinct in plants growing in temperate regions.

(B) Lenticels occur in most woody trees and permit the exchange of gases.

(C) Due to stellar secondary growth, central cylinder of wood surrounded by secondary phloem is formed.

(D) The cells of endodermis opposite to protoxylem divide to give rise vascular cambium in dicot roots.

(A) (B) (C) (D)

- (1) T T F F
- (2) T T T F
- (3) T F T F
- (4) F F T T

4. Read the following statements about dicot stem and

choose the correct option.

(a) Vascular bundles are arranged in a ring.

(b) Vascular bundles are conjoint, collateral and open type.

(c) Endarch type of arrangement of secondary xylem.

- (1) Only (b) is correct
- (2) Only (c) is incorrect
- (3) Both (a) and (b) are incorrect
- (4) All three statements are correct

5. What is incorrect for companion cell?

(1) It is specialized parenchymatous cell.

(2) It helps in maintaining the pressure gradient in the sieve tubes.

(3) It does not retain nucleus throughout the life.

(4) It is absent in gymnosperms

6. State True (T) or False (F) to the given statements and

select the correct option

(A) All tissue layers exterior to the vascular cambium constitute bark.

(B) Root hypodermis is sclerenchymatous.

(C) Ground tissue of leaves is called mesophyll.

(D) Due to presence of casparian strips, endodermis is impervious to water.

(A) (B) (C) (D)

- (1) T F F T
- (2) T F T T
- (3) F T T F
- (4) T F T F

7. Which of the following characters is/are related to

isobilateral leaf?

(a) Stomata are present on both surfaces.

(b) Mesophyll is differentiated into palisade and spongy parenchyma.

(c) Sub-stomatal cavity is present below the stoma of the abaxial epidermis.

(1) Only (a)

(2) Only (c)

(3) Only (a) and (c)

(4) (a), (b) and (c)

8. Which of the following floral features is not represented by symbols in a floral formula of a plant family?

(1) Relative positions of ovary w.r.t. other parts.

(2) Adhesion of stamens.

(3) Aestivation of calyx and corolla

(4) Symmetry of flower.

9. Select the incorrect match

(1) Green photosynthetic - Australian Acacia petiole

(2) Leaflets attached at - Silk cotton tip of petiole

(3) Papilionaceous corolla - Bean

(4) Epiphyllous stamens – Brinjal

10. Which of the given feature is not related to mustard?

(1) Superior ovary.

(2) Variable length of filaments of stamens.

(3) Parietal placentation.

(4) Opposite phyllotaxy.

11. Cymose inflorescence is dissimilar to racemose inflorescence in

(1) Having limited growth of the main inflorescence axis.

(2) Having young flowers at top.

(3) Showing centripetal manner of

opening of flowers.

(4) Having acropetal arrangement of flowers.

12. Read the following characters and mark the correct

ones for family Fabaceae.

(a) Flowers are arranged in acropetal manner on floral axis.

(b) Flowers with radial symmetry.

(c) Hypogynous flower.

(d) Albuminous seeds.

(e) Monocarpellary ovary.

(1) Only (a) and (c)

(2) Only (a), (c), (d) and (e)

(3) Only (a), (c) and (e)

(4) Only (a) and (b)

13. Which of the following statements is not true for runner?

(1) Internodes are longer.

(2) Helps plants to spread to new niches.

(3) Roots are present at nodes.

(4) Found in plants like grasses, strawberry and jasmine.

14. State True (T) or False (F) to the given statements and

select the correct option

(A) Abundance of lichens in any area indicates that the area is highly SO₂ polluted.

(B) Mycobiont partner of lichens is always heterotrophic.

(C) Body of lichens is made up of phycobionts only.

(A) (B) (C)

(1) T T F

(2) F T F

(3) F F F

(4) T F F

15. Which of the given statement is not true for viruses?

- (1) They are nucleoproteins where protein is infectious in nature.
- (2) They can be crystallized and crystals consist largely of proteins.
- (3) Virus means venom or poisonous fluid.
- (4) A virus can never have both DNA and RNA as its genetic material.

16. Mark the correct statement for Albugo.

- (1) Causes white rust in members of Brassicaceae.
- (2) Obligate saprophyte.
- (3) Cell wall is made up of fungal cellulose.
- (4) Mycelium is coenocytic and septate.

17. Organisms responsible for causing 'red tide' are also characterized by

- (1) Presence of stiff cellulosic plates.
- (2) Obligate saprophyte.
- (3) Presence of two longitudinal flagella.
- (4) Filamentous body made up of trichomes.

18. How many of the following organisms possess membrane bound cell organelles and autotrophic mode of nutrition?

[Nitrobacter, Chromatium, Methanococcus, Nostoc, Euglena, Gonyaulax, Paramoecium, Yeast,

Puccinia]

(1) 5 (2) 4

(3) 2 (4) 6

19. Group of organisms in which cell wall forms two thin overlapping shells are

- (1) Responsible for bioluminescence.
- (2) Chief producers of ocean.
- (3) Prokaryotes.
- (4) Heterotrophs.

20. According to mass flow hypothesis

- (a) Sucrose is moved into the companion cells and then into the sieve tube by passive transport.
 - (b) Inside the phloem, an osmotic pressure gradient is generated that facilitates the mass movement in the phloem.
 - (c) Water in the adjacent xylem moves into the phloem by active process.
- (1) (a) and (c) are correct.
 (2) (b) and (c) are incorrect.
 (3) (a) and (c) are incorrect.
 (4) (a) and (b) are correct.

21. Select the incorrect statements

- (a) Older dying leaves export most of their mineral content to younger leaves.
- (b) Sulphur and calcium are frequently remobilized from senescing parts.
- (c) Ions are absorbed from the soil by both passive and active transport.
- (d) A C₃ plant loses only half as much water as a C₄ plant for the same amount of CO₂ fixed

(1) (a), (b) and (c)

(2) Only (a) and (c)

(3) Only (b) and (d)

(3) (a), (b) and (c)

(4) All except (c)

(4) (a), (c) and (d)

22. Coralloid roots of gymnosperms are/have

- (1) Irregular and possess large number of roots hairs.
- (2) Symbiotic association with Rhizobium.
- (3) Symbiotic association with N_2 - fixing cyanobacteria.
- (4) VAM

25. Match the classes of pteridophyte given in column-I with their respective members given in column-II
Column-I Column-II

- (A) Psilopsida (i) Selaginella
- (B) Lycopsida (ii) Adiantum
- (C) Pteropsida (iii) Psilotum
- (D) Sphenopsida (iv) Equisetum

Select the correct answer from the following

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

23. In pteridophytes, gametophyte that develops in the homosporous species is usually

- (1) Monoecious and has events, precursor to the seed habit.
- (2) Dioecious and does not lead to seed habit.
- (3) Monoecious and does not lead to seed habit.
- (4) Dioecious and has events, precursor to the seed habit.

26. Read the following statements and select the incorrect ones

- (a) Mosses have an elaborate mechanism of spore dispersal.
- (b) In liverworts, the haploid free living sporophyte is formed by spore germination.
- (c) Vegetative reproduction in Polytrichum occurs by budding in the secondary protenema.
- (d) Marchantia is a heterosporous bryophyte.
- (e) Growth of bog moss ultimately fills ponds and lakes with soil

24. Read the following statements and select the option with correct statements

- (a) In Wolfia, the highly reduced female gametophyte present within ovule, is embryo sac.
- (b) The ploidy level of endosperm in Cycas and Eucalyptus is triploid.
- (c) Azolla is a water fern.
- (d) Majority of the red algae are marine with greater abundance in the warmer areas.

(1) (a) and (b) only

(1) (a), (b) and (c)

(2) (b) and (c) only

(2) (d) and (e) only

(3) (b) and (d) only

(4) All except (a)

27. The members of phaeophyceae are characterized by all, except

- (1) Presence of chlorophyll a,c and fucoxanthin pigments.
- (2) Production of pear-shaped and biflagellated asexual spores.
- (3) Production of pyriform gametes that bear laterally attached flagella.
- (4) Their occurrence, mostly in fresh water habitats.

28. Which of the following characters, are defining features of all living organisms?

- (A) Growth from inside
- (B) Sexual reproduction
- (C) Metabolism
- (D) Response to stimuli
- (E) Cellular organisation
- (1) Only (C), (D) and (E)
- (2) Only (A) and (B)
- (3) Only (B), (C) and (D)
- (4) All except (B)

29. A taxonomic aid which gives actual account of habitat and distribution of various plants of given area, is

- (1) Manual (2) Flora
- (3) Monograph (4) Catalogue

30. "The synaptonemal complex is formed during _A_ stage and dissolves during _B_ stage". Complete the above statement by choosing the correct option for A and B

- | | |
|---------------|------------|
| A | B |
| (1) Diplotene | Diakinesis |

(2) Leptotene Zygotene

(3) Zygotene Diplotene

(4) Pachytene Diplotene

31. Chromosomes appear like a 'ball of wool' in

- (1) Prophase (2) Telophase
- (3) Anaphase (4) Metaphase

32. Which one of the following features differentiates G₂ phase from G₁ phase?

- (1) Synthesis of proteins.
- (2) C₄ content of DNA.
- (3) C₂ content of DNA.
- (4) Synthesis of RNA.

33. Endoplasmic reticulum which is free of ribosomes is involved in all the given functions, except

- (1) Synthesis of enzyme precursor for lysosomes.
- (2) Detoxification of drugs.
- (3) Uptake and release of Ca²⁺ ions during muscle contraction.
- (4) Glycogen synthesis.

34. A membraneless cell organelle which is not found in higher plants is/has

- (1) 9+2 arrangement of microtubules.
- (2) A role in formation of flagella in prokaryotes.
- (3) composed of rRNA and proteins.
- (4) Involved in the formation of spindle fibres during cell division in animals.

35. Enzymes and electron carriers for the formation of cellular energy are present in the mitochondria at

- (1) Outer membrane only.
- (2) Inner membrane only.

- (3) Both outer and inner membrane.
(4) Mitochondrial matrix only.

36. Endoplasmic reticulum plays a role in origin of A which is lined by B and contains a fine tubule called C. Select the option that correctly fills the blanks:

	A	B	C
(1)	Lysosome	Plasma Membrane	Golgi body
(2)	Cytoskeleton	Vacuole	Desmotubule
(3)	Plasmodesmata	Plasma Membrane	Desmotubule
(4)	Plasmodesmata	Cell Wall	Vacuole

37. Select the correct statement w.r.t. axoneme of eukaryotic flagella.

- (1) It is composed of 9 peripheral triplet microfilaments of tubulin proteins.
(2) It does not have covering of plasma membrane.
(3) Central tubules are enclosed by a central sheath.
(4) It gives rise to spindle apparatus during cell division.

38. Nucleolus is

- (1) Bounded by a single membrane.
(2) Always one per cell.
(3) Present inside mitochondria.
(4) The site for rRNA synthesis.

39. Select the features which are common for both ER and Golgi apparatus.

- (A) Both are sites for synthesis of lipids and steroidal hormones.
(B) Both are composed of cisternae, tubules and vesicles.
(C) Both are parts of endomembrane system.
(D) Both help in formation of plasma membrane during cytokinesis.

- (1) Only (B)
(2) Only (B) and (C)
(3) Only (A) and (D)
(4) All except (D)

40. What is the main arena of all cellular activities of a cell?

- (1) Cell wall (2) Cell membrane
(3) Nucleus (4) Cytoplasm

41. Which of the following is correct for the function of calcium?

- (1) Helps in the synthesis of middle lamella.
(2) It is required during the formation of spindle fibres.
(3) It is required by meristematic as well as differentiating tissues.
(4) All of the above.

42. The symptoms due to toxicity of elements are difficult to identify as

- (1) Toxicity of micronutrients lead to the deficiency of macronutrients express the symptoms.
(2) Deficiency of macronutrient leads to the toxicity micronutrients.
(3) Toxicity of macronutrient leads to the

deficiency of micronutrient.

(4) More than one option is correct.

43. In plant cells, synthesis of ATP by the chemiosmotic

mechanism occurs during

(1) Photosynthesis only.

(2) Respiration only.

(3) Both photosynthesis and respiration.

(4) Photorespiration only.

44. In a plant system, the rate of photosynthesis may become equal to the rate of respiration at

(1) CO₂ compensation point.

(2) Light compensation point.

(3) Light saturation point.

(4) More than one option is correct.

45. Which of the following plant hormones would most likely be found in high concentrations in a mature, slightly over-ripe fruit

(1) Cytokinin and ethylene.

(2) ABA and ethylene.

(3) GA and ABA.

(4) Auxin and cytokinin

46. The "sodium-potassium pump" pumps ____.

1. sodium ions out and potassium ions in

2. sodium ions in and potassium ions out

3. sodium and potassium ions in

4. sodium and potassium ions out

47. Which of the following is not a characteristic of the sympathetic system?

1. inhibits the digestive tract

2. dilates the bronchi

3. accelerates the heartbeat

4. constricts the pupil

48. The iris ____.

1. regulates light entrance through the pupil

2. refracts light rays

3. absorbs stray light rays

4. contains receptors for sight

49. The most versatile joints that permit the most movement are the ____.

1. hinge joints

2. ball-and-socket joints

3. fibrous and cartilaginous joints

4. vertebral joints

50. Creatine phosphate ____.

1. can be used in the reaction: actin + myosin = actomyosin

2. is used to regenerate ADP to ATP

3. is the molecule that triggers contraction

4. forms the core strand of myosin

51. The sliding filament theory of muscle contraction involves

1. calcium ions releasing ATP for energy

2. calcium ions binding with troponin, which shifts tropomyosin and allows the myosin-binding sites on actin to be exposed

3. neuromuscular junctions directly producing the movement of actin and myosin

4. actin filaments moving the myosin filaments in each sarcomere

52. The receptors for non-steroid peptide hormones are on the ____.

1. plasma membrane
2. nuclear envelope
3. DNA receptor complex
4. peptide chain

53. Perhaps the biggest reason for the enormous success of Arthropods is?

1. Chitinous exoskeleton
2. Diverse appendages
3. Respiration by tracheoles
4. Internal fertilization

54. If insufficient PTH is produced, the blood calcium level drops, resulting in ____.

1. reduced growth in childhood or parathyroid dwarfism
2. tetany, where the body shakes from continuous muscle contraction
3. osteoporosis
4. blood clotting

55. A person with Addison disease ____.

1. is unable to replenish blood glucose levels under stressful conditions
2. develops dramatically more male features
3. develops a rounded face and edema
4. has overgrowth of hands and face

56. The filterable components of the blood that move across from the glomerulus are ____.

1. water, nitrogenous wastes, nutrients, and salts
2. blood cells and platelets and proteins
3. albumin, fats and other proteins
4. mainly blood cells

57. Drinking alcohol causes diuresis because it inhibits the secretion of ____.

1. ANH
2. ADH
3. angiotensin
4. aldosterone

58. The maximum volume of air that can be moved in and out during a single breath is called the ____.

1. vital capacity
2. tidal volume
3. residual volume
4. dead space

59. The diaphragm and external intercostals muscles are ____ when expiration occurs.

1. contracted
2. relaxed
3. flexed

4. both relaxed (diaphragm) and flexed (intercostals muscles)

60. When blood levels of carbon dioxide rise, the rate and depth of breathing _____.

1. decreases
2. increases
3. stays the same
4. stops

61. Which of the following is not a character of deuterostomes?

1. Radial cleavage
2. Schizocoelous coelom
3. Indeterminate cleavage
4. Blastopore forms anus

62. Which of the following statements is NOT correct?

1. Microvilli increase the surface area of the small intestine for absorption of nutrients.
2. Enzymes located on the brush-border finish the digestion of chyme.
3. Absorption is an active process in the small intestine.
4. Sugars and amino acids cross columnar epithelial cells to enter the lacteal.

63. Which of the following comparisons is NOT correct?

1. jaundice--abnormally large amount of bilirubin in the skin and the whites of the eyes

2. ulcer--open sore in the wall of the stomach

3. peritonitis--inflammation of the cecum

4. cirrhosis--liver first becomes fatty and then replaced by fibrous scar tissue

64. When the heart beats, the familiar lub-dub sound occurs as the valves of the heart ____.

1. open
2. close
3. expand
4. contract

65. The greater the number of blood vessels dilated, the _____.

1. higher the blood pressure
2. lower the blood pressure
3. faster the heartbeat
4. slower the heartbeat

66. If blood is transferred to a test tube and is prevented from clotting, it separates into ____.

1. formed elements and plasma
2. granular leukocytes and agranular leukocytes

3. red blood cells and white blood cells
4. inorganic and organic substances

67. The male and female cockroach can be distinguished by their:

1. size
2. wings
3. anal styles
4. color

68. Without the presence of enzymes, the reactions necessary to sustain life would require _____ in order to occur.

1. larger cells
2. higher temperatures
3. larger proteins
4. smaller atoms

69. Cofactors

1. break hydrogen bonds in proteins
2. help facilitate enzyme activity
3. increase activation energy
4. are very rare in living organisms

70. In the formation of a macromolecule, what type of reaction would join two subunits together?

1. hydrophobic reaction
2. hydrolysis reaction
3. dehydration reaction
4. denaturation reaction

71. How much of the cardiac output passes through the kidneys?

1. 10%
2. 20%
3. 50%
4. 65%

72. Which of the following statements is not correct with respect to the epithelial tissue?

1. It covers the external surface of the body and internal surface of many organs.
2. The neighbouring cells are held together by cell junctions and there is very little extracellular material.
3. The epithelial cells rest on a cellular basement membrane that separates it from underlying connective tissue.
4. There is no blood vessel supplying the nutrients to the epithelial cells.

73. When secretory granules leave cell by exocytosis with no loss of other cellular material, the glands are called

- | | |
|--------------|--------------|
| 1. Holocrine | 2. Merocrine |
| 3. Apocrine | 4. Autocrine |

74. The mucosa of the bladder is comprised of ____.

1. smooth muscle
2. squamous epithelium
3. transitional epithelium
4. simple columnar epithelium

75. Which of these could appear in the urine from dieting or the utilization of excess lipids?

1. urea
2. uric acid

3. glycine
 4. Ketone
76. Which area actually secretes renin into the blood?
1. macula densa
 2. juxtaglomerular apparatus
 3. juxtaglomerular cells
 4. cortical nephron
77. Intercalated discs are associated with what type of cells?
1. dense regular connective tissue
 2. dense irregular connective tissue
 3. cardiac muscle
 4. skeletal muscle
78. Which of the following is mismatched?
1. matrix - extracellular material in connective tissue
 2. cardiac muscle cells - have multiple nuclei
 3. chondrocytes - cartilage cells
 4. ligaments - bind muscles to bone
79. Endocrine and exocrine glands are formed from what type of tissue?
1. connective
 2. blood
 3. muscle
 4. epithelial
80. Goblet cells are specialized cells of the
1. stratified squamous epithelium
 2. cuboidal epithelium
 3. columnar epithelium
 4. simple squamous epithelium
81. Which cells are the first to phagocytize foreign particles in the tissues such as bacteria in a wound?
1. fibroblasts
 2. white blood cells
 3. macrophages
 4. mast cells
82. The air sacs in the lungs are comprised of ____ cells.
1. simple squamous
 2. simple columnar
 3. simple cuboidal
 4. transitional
83. The sebaceous glands of the skin produce secretions by the ____ method of secretion.
1. merocrine
 2. eccrine
 3. holocrine
 4. apocrine
84. Neuroglial cells help neurons in each of these ways, with the exception of _____.
1. supporting and binding nervous tissue
 2. carrying on phagocytosis
 3. playing a role in cell-to-cell

communications

4. transmitting nervous impulses

85. Mark the correct statement

1. Electrical synapses are more common in our neural system than chemical synapses

2. The new potential in post synaptic neuron may be either excitatory or inhibitory

3. Hypothalamus is the major coordination centre for sensory and motor signaling

4. The tracts of nerve fibres that connect two cerebral hemispheres are called corpora bigemina

86. Go through the following characterization of Sympathetic and Parasympathetic Nervous System.

I. Dilates pupil,

II. ↑ Heart rate, BP

(Vasoconstriction) ↑ Glycogenolysis, dilates bronchi.

III. Constricts pupil.

IV. Induces ejaculation.

V. ↑↑ Gastric secretion, ↑↑ salivary secretion, ↑↑ peristalsis.

VI. Erection and urination.

1. Sympathetic - III, V, VI;

Parasympathetic - I, II, IV

2. Sympathetic - I, II, IV; Parasympathetic - III, V, VI

3. Sympathetic M II, IV, VI;

Parasympathetic - I, III, V

4. Sympathetic - I, III, V; Parasympathetic - II, IV, VI

87. One example of animals having a single opening

to the outside that serves both as mouth and as anus is

1. Octopus

2. Asterias

3. Ascidia

4. Fasciola

88. Which of the following groups of animals is correctly matched with its one characteristic feature without even a single exception?

1. Mammalia: give birth to young ones.

2. Reptilia: possess 3-chambered heart with one incompletely divided ventricle

3. Chordata: possess a mouth provided with an upper and a lower jaw

4. Chondrichthyes: possess cartilaginous endoskeleton

89. *Planaria* possess high capacity of

1. metamorphosis

2. regeneration

3. alternation of generation

4. Bioluminescence

90. Some hormones can act on their target cells through second messengers. Identify the one that does not:

1. cortisol

2. adrenaline

3. FSH

4. Calcitonin

91. The quantum number not obtained from the Schrodinger's wave equation is -

1. n
2. l
3. m
4. s

92. Which of the following statements about nodal planes is/are not true -

1. A plane on which there is zero probability of finding an electron
2. A plane on which there is maximum probability that the electron will be found
3. ψ^2 is non zero at nodal plane
4. None of these

93. Which is not the correct order of electronegativity

1. $\text{Cl} > \text{S} > \text{P} > \text{Si}$
2. $\text{Si} > \text{Al} > \text{Mg} > \text{Na}$
3. $\text{F} > \text{Cl} > \text{Br} > \text{I}$
4. None of these

94. Lattice energy of BeCO_3 (I), MgCO_3 (II) and CaCO_3 (III) are in the order -

1. $\text{I} > \text{II} > \text{III}$

2. $\text{I} < \text{II} < \text{III}$

3. $\text{I} < \text{III} < \text{II}$

4. $\text{II} < \text{I} < \text{III}$

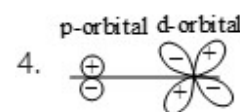
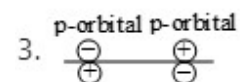
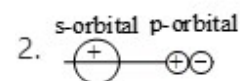
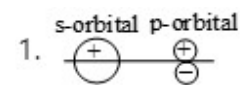
95. NH_3 and BF_3 combine readily because of the formation of -

1. a covalent bond
2. a hydrogen bond
3. a co-ordinate bond
4. an ionic bond

96. Which cannot be explained by VBT -

1. Overlapping
2. Bond formation
3. Paramagnetic nature of oxygen
4. Shapes of molecules

97. Which of the following leads to bonding?



98. The pair of species with similar shape is

1. $\text{PCl}_3, \text{NH}_3$
2. CF_4, SF_4
3. $\text{PbCl}_2, \text{CO}_2$
4. PF_5, IF_5

99. $\text{CH}\equiv\text{CH} \xrightarrow[\text{Cu}_2\text{Cl}_2]{\text{NH}_4\text{Cl}}$ Product

Product is -

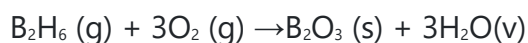
1. $\text{Cu}-\text{C}\equiv\text{C}-\text{Cu}$
2. $\text{CH}_2=\text{CH}-\text{C}\equiv\text{CH}$
3. $\text{CH}=\text{C}-\text{Cu}$
4. $\text{Cu}-\text{C}\equiv\text{C}-\text{NH}_4$

100. $\text{B} \xleftarrow[\text{H}_2\text{O}_2/\text{OH}^-]{\text{BH}_3/\text{THF}} \text{CH}_3-\text{C}\equiv\text{CH} \xrightarrow{\text{HgSO}_4/\text{H}_2\text{SO}_4} \text{A}$

A and B are -

1. $\text{CH}_3\text{CH}_2\text{CHO}, \text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$
2. $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3, \text{CH}_3\text{CH}_2\text{CHO}$
3. $\text{CH}_3\text{CH}_2\text{CHO}$ (both)
4. $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$ (both)

101. For the reaction

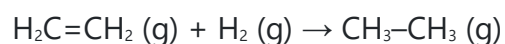


$$\Delta E = -2143.2 \text{ kJ}$$

Calculate ΔH for the reaction at 25°C –

1. $-2145 \text{ kJ mole}^{-1}$
2. $-2138.6 \text{ kJ mole}^{-1}$
3. $-2133.2 \text{ kJ mole}^{-1}$
4. $-2143.2 \text{ kJ mole}^{-1}$

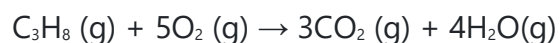
102. Using bond enthalpies (symbolized by e) an estimated value of ΔH° for the reaction



would be–

1. $\epsilon\text{C}=\text{C} + \epsilon\text{H}-\text{H} - 2\epsilon\text{C}-\text{H} - \epsilon\text{C}-\text{C}$
2. $\epsilon\text{C}=\text{C} + \epsilon\text{H}-\text{H} - 6\epsilon\text{C}-\text{H} - \epsilon\text{C}-\text{C}$
3. $\epsilon\text{C}=\text{C} - \epsilon\text{H}-\text{H} + 4\epsilon\text{C}-\text{H} - \epsilon\text{C}-\text{C}$
4. $\epsilon\text{C}=\text{C} + \epsilon\text{H}-\text{H} - 4\epsilon\text{C}-\text{H} - \epsilon\text{C}-\text{C}$

103. The standard heat of combustion of propane is $-2220.1 \text{ kJ mol}^{-1}$. The standard heat of vaporisation of liquid water is 44.0 kJ mol^{-1} . What is ΔH° of–



1. -2220.1 kJ
2. -2044.1 kJ
3. -2396.1 kJ
4. -2176.1 kJ

104. The standard heat of combustion of solid boron is equal to—

1. $\Delta H^\circ_f (B_2O_3)$
2. $1/2 \Delta H^\circ_f (B_2O_3)$
3. $2\Delta H^\circ_f (B_2O_3)$
4. $-1/2\Delta H^\circ_f (B_2O_3)$

105. Pure ammonia is placed in a vessel at a temperature where its dissociation constant (K_p) is appreciable. At equilibrium:

1. K_p does not change significantly with pressure
2. K_p does not change with pressure
3. concentration of NH_3 does not change with pressure
4. concentration of hydrogen is less than that of nitrogen

106. One mole of $N_2O_4(g)$ at 300 K is kept in a closed container under one atmosphere. It is heated to 600 K when 20% by mass of $N_2O_4(g)$ decomposes to $NO_2(g)$. The resultant pressure is

1. 1.2 atm
2. 2.4 atm
3. 2.0 atm
4. 1.0 atm

107. The correct order of acidic strength is -

1. $Cl_2O_7 > SO_2 > P_4O_{10}$
2. $CO_2 > N_2O_5 < SO_3$
3. $Na_2O > MgO > Al_2O_3$
4. $K_2O > CaO > MgO$

108. Match the items under list (1) with items under list (2) select the correct answers from the sets (A), (B), (C) and (D) -

List (1) molecule

- | | |
|-------------|------------|
| (a) PCl_5 | (b) F_2O |
| (c) BCl_3 | (d) NH_3 |

List (2) shape

- (i) V-shaped
- (ii) Triangular planar
- (iii) Trigonal bipyramidal
- (iv) Trigonal pyramidal
- (v) Tetrahedral

1. a - i, b - v, c - iv, d - iii
2. a - ii, b - iii, c - i, d - ii
3. a - iv, b - iii, c - ii, d - v
4. a - iii, b - i, c - ii, d - iv

109. The equilibrium constant of the reaction $A_2(g) + B_2(g) \rightleftharpoons 2AB(g)$ at $100^\circ C$ is 50. If a one litre flask containing one mole of A_2 is connected to a two litre flask containing two moles of B_2 , how many moles of AB will be formed at 373 K?

1. 1.8
2. 1.9

3. 2.1

4. 3.6

110. In the preparation of quick lime from lime stone, the reaction is:
 $\text{CaCO}_3(\text{s}) \rightleftharpoons \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$ led to set of K_p values fitting an empirical equation
 $\log K_p = 7.282 - \frac{8500}{T}$

If the reaction is carried out in quite an air, what temperature would be predicted from this equation for complete decomposition of the lime stone?

1. $T = 1167.26 \text{ K}$

2. $T = 1670.55 \text{ K}$

3. $T = 1650.80 \text{ K}$

4. None of these

111. For the equilibrium



$K_p = 9 \text{ atm}^2$, at 40°C . A 5 litre contains 0.1 mole of $\text{LiCl} \cdot \text{NH}_3$. How many moles of NH_3 should be added to the flask at this temperature to drive the backward reaction for completion

1. 0.78

2. 0.80

3. 0.90

4. None of these

112. A sample of $\text{CaCO}_3(\text{s})$ is introduced into a sealed container of volume 0.821 litre and heated to 1000 K until equilibrium is reached. The equilibrium constant for the reaction $\text{CaCO}_3(\text{s}) \rightleftharpoons \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$ is $4 \times 10^{-2} \text{ atm}$ at this temperature. Calculate the mass of CaO present at equilibrium.

1. 22.4 mg

2. 25 mg

3. 27.2 mg

4. None of these

113. At 100°C and 1 atm, if the density of liquid water is 1.0 g cm^{-3} and that of water vapor is 0.0006 g cm^{-3} , then the volume occupied by water molecules in 1 litre of steam at that temperature is -

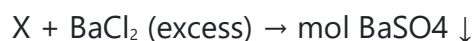
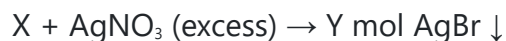
1. 6 cm^3

2. 60 cm^3

3. 0.6 cm^3

4. 0.06 cm^3

114. A 2L solution (X) contain 0.02 mole of $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Br}$ and 0.02 mol $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$. 2 L of this solution is - taken:



Values of Y and Z are -

1. 0.01, 0.02 2. 0.02, 0.02
3. 0.02, 0.01 4. 0.01, 0.01

115. What volume (in ml) at STP of SO_2 gas is oxidized by 100 ml of 0.1 (M) H_2CrO_7 in acid solution?

1. 672 ml 2. 224 ml
3. 448 ml 4. 112 ml

116. 25 ml of a 0.1 (M) solution of a stable cation of transition metal z reacts exactly with 25 ml of 0.04 (M) acidified KMnO_4 solution. Which of the following is most likely to represent the change in oxidation state of z correctly?

1. $\text{Z}^+ \rightarrow \text{Z}^{2+}$
2. $\text{Z}^{2+} \rightarrow \text{Z}^{3+}$
3. $\text{Z}^{3+} \rightarrow \text{Z}^{4+}$
4. $\text{Z}^{2+} \rightarrow \text{Z}^{4+}$

117. In context with beryllium, which one of the following statements is incorrect?

1. It is rendered passive by nitric acid
2. It forms Be_2C
3. Its salts rarely hydrolyse
4. Its hydride is electron-deficient and polymeric

118. The function of "Sodium pump" is a biological process operating in each and every cell of all animals. Which of the

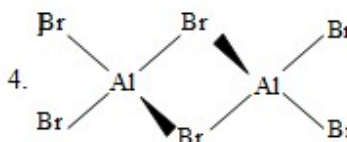
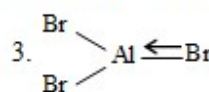
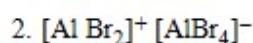
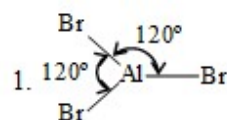
following biologically important ions is also a constituent of this pump?

1. Ca^{2+}
2. Mg^{2+}
3. K^+
4. Fe^{2+}

119. Alumina is insoluble in water because -

1. It is a covalent compound
2. It has high lattice energy and low heat of hydration
3. It has low lattice energy and high heat of hydration
4. Al^{3+} and O^{2-} ions are not excessively hydrated.

120. The structure of aluminium bromide is best represented as -



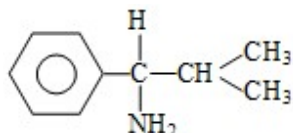
121. The compound which has one isopropyl group is -

1. 2,2,3,3-tetramethyl pentane
2. 2,2-dimethyl pentane

3. 2,2,3-trimethyl pentane

4. 2-methyl pentane

122. The IUPAC name of the compound is:



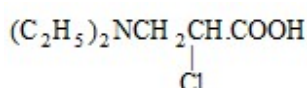
1. 1-amino-1-phenyl-2-methyl propane

2. 2-methyl-1-phenyl propanamine

3. 2-methyl-1-amino-1-phenyl propane

4. 1-isopropyl-1-phenyl methyl amine

123. The IUPAC name of is?



1. 2-chloro-4-N-ethylpentanoic acid

2. 2-chloro-3-(N, N-diethyl amino)-propanoic acid

3. 2-chloro-2-oxo diethylamine

4. 2-chloro-2-carboxy-N-ethyl ethane

124. When temperature is increased -

1. % of eclipsed form increases

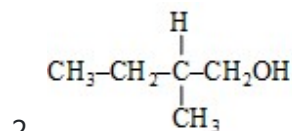
2. % of skew form increases

3. % of staggered form increases

4. No effect on any form

125. Which of the following compounds cannot exist as enantiomers -

1. $\text{CH}_3\text{CH}(\text{OH})\text{COOH}$



2.

3. $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_3$

4. $\text{C}_6\text{H}_5\text{CHClCH}_3$

126. Pair of groups exerting (-I) effect is

-

1. $-\text{NO}_2$ & $-\text{CH}_3$

2. $-\text{NO}_2$ & $-\text{Cl}$

3. $-\text{Cl}$ & $-\text{CH}_3$

4. $-\text{CH}_3$ & $-\text{C}_2\text{H}_5$

127. 'M' effect is the resonance of -

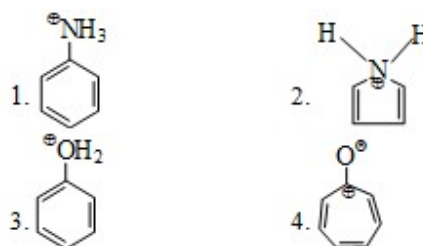
1. π electrons only

2. σ electrons only

3. π and σ both

4. (+) ve and (-) charge.

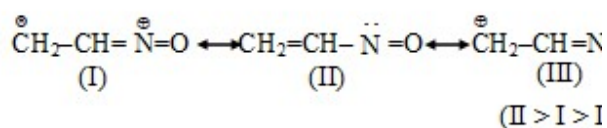
128. In which delocalization of positive charge is possible



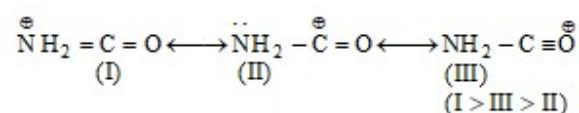
129. Which of the following is/are not correctly ordered for resonance stability

-

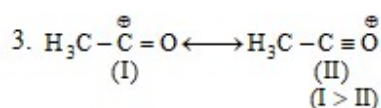
1.



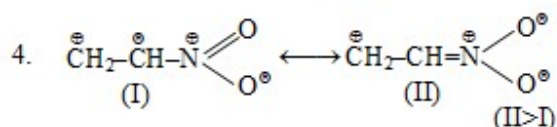
2.



3.



4.



4. 1/8

132. $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$. 1 mol N_2 and 4 mol H_2 are taken in 15 L flask at 27 °C. After complete conversion of N_2 into NH_3 , 5 L of H_2O is added. Pressure set up in the flask is –

1. $\frac{3 \times 0.0821 \times 300}{15} \text{ atm}$

2. $\frac{2 \times 0.0821 \times 300}{10} \text{ atm}$

3. $\frac{1 \times 0.0821 \times 300}{15} \text{ atm}$

4. $\frac{3 \times 0.0821 \times 300}{10} \text{ atm}$

130. A gas at a pressure of 5.0 atm is heated from 0° to 546 °C and simultaneously compressed to one-third of its original volume. Hence final pressure is –

1. 10.0 atm

2. 30.0 atm

3. 45.0 atm

4. 5.0 atm

131. An open vessel containing air is heated from 300 K to 400 K. The fraction of air originally present which goes out of it is at 400 K –

1. 3/4

2. 1/3

3. 2/3

133. A sample of air contains only N_2 , O_2 and H_2O . It is saturated with water vapours and total pressure is 640 torr. The vapour pressure of water is 40 torr and the molar ratio of $\text{N}_2 : \text{O}_2$ is 3 : 1. The partial pressure of N_2 in the sample is –

1. 540 torr

2. 900 torr

3. 1080 torr

4. 450 torr

134. The phenomenon in which atmospheric gases trap the heat radiations from sun, near the earth's surface and keep it warm is known as:

1. Natural greenhouse effect

2. Tyndall effect

3. Heating effect

4. Joule's effect

135. Among the following gases which one is damaging the ozone layer?

1. CFCs

2. CO₂

3. CH₄

4. SO₂

136. A physical quantity X is expressed as

$$v = \sqrt{\frac{X}{\text{Density}}}$$

The dimensions of X are

1. ML⁻¹T⁻²

2. MLT⁻²

3. MLT⁻¹

4. ML⁻¹T⁻³

137. The ratio of maximum and minimum magnitudes of the resultant of two vectors \vec{A} and \vec{B} is 3:2. The relation between A and B is

1. A = 5B

2. 5A = B

3. A = 3B

4. A = 4B

138. In head on collision of two point particles, loss in kinetic energy is given by

$$\Delta K = \frac{m_1 m_2}{2(m_1 + m_2)} \left| \vec{u}_1 - \vec{u}_2 \right|^2 (1 - k^2)$$

With usual notations (except k), the dimensional formula of quantity k is

1. [M⁰L⁰T⁻¹]

2. [M⁰L⁰T⁰]

3. [M⁰LT⁻¹]

4. [M⁰L²T⁻²]

139. A particle starting from the point (1, 2) moves in a straight line in XY plane. Its coordinates at a later time are (2,3). The path of the particle makes with x-axis an angle of

1. 30°

2. 45°

3. 60°

4. data insufficient

140. A ball is thrown vertically upwards with a velocity 'u' from the balloon descending with velocity v. The ball will pass by the balloon after time.

1. $\frac{u-v}{2g}$

2. $\frac{u+v}{2g}$

3. $\frac{2(u-v)}{g}$

4. $\frac{2(u+v)}{g}$

141. A projectile is fired horizontally from an inclined plane (of inclination 45° with horizontal) with speed $=50$ m/s. If $g=10\text{m/s}^2$, the range measured along the incline is

1. 500 m
2. $500\sqrt{2}$ m
3. $200\sqrt{2}$ m
4. none of these

142. Two particles are projected from a point at the same instant with velocities whose horizontal and vertical components are u_1, v_1 and u_2, v_2 respectively. The interval between their passing through the other common point of their path is

1. $\frac{2(v_1 u_1 - v_2 u_2)}{g(u_1 + u_2)}$

2. $\frac{2(v_1 u_1 + v_2 u_2)}{g(u_1 + u_2)}$

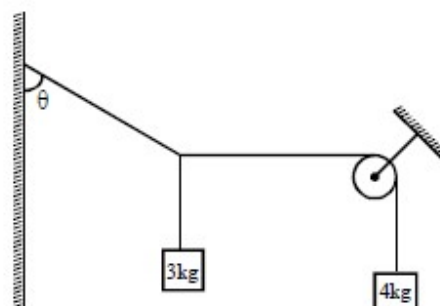
3. $\frac{2(v_2 u_1 - v_1 u_2)}{g(u_1 + u_2)}$

4. $\frac{2(v_2 v_1 - u_1 u_2)}{g(u_1 + u_2)}$

143. A ball is thrown vertically upwards from the ground. It crosses a point at the height of 25 m twice at an interval of 4 secs. The ball was thrown with the velocity of

1. 20m/sec.
2. 25 m/sec.
3. 30m/sec.
4. 35 m/sec

144. In shown system, each of the block is at rest. The value of θ is



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

145. A force F acting on a body depends on its displacement x as $F \propto x^n$. The power delivered by F will be independent of x if n is—

1. $\frac{1}{3}$

2. $-\frac{1}{3}$

3. $\frac{1}{2}$

4. $-\frac{1}{2}$

146. Forces acting on a particle have magnitudes of 14, 7, and 7 N and act in the direction of vectors $6\hat{i} + 2\hat{j} + 3\hat{k}$, $3\hat{i} - 2\hat{j} + 6\hat{k}$, $2\hat{i} - 3\hat{j} - 6\hat{k}$ respectively. The forces remain constant while the particle is displaced from point A: (2, -1, -3) to B: (5, -1, 1). Find the work done. The coordinates are specified in meters.

1. 75 J

2. 55 J

3. 85 J

4. 65 J

147. A block of mass 1 kg lying on the floor is subjected to a horizontal force given by $F = 2\sin\omega t$ newtons. The coefficient of friction between the block and the floor is 0.25. The acceleration of the block will be

1. positive and uniform

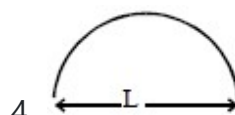
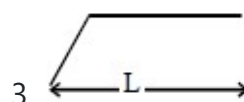
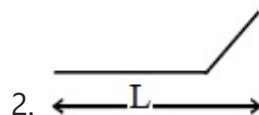
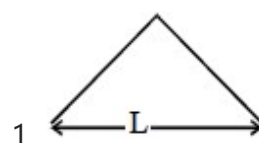
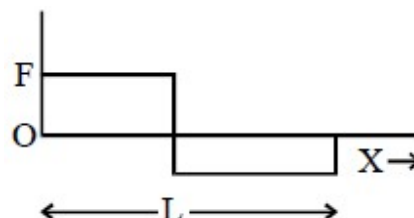
2. positive and non-uniform

3. zero

4. depending on the value of ω

148. A person used force (F), shown in figure to move a load with constant

velocity on given surface. Identify the correct surface profile: -



149. A body of mass m dropped from a height h reaches the ground with a speed of $1.4\sqrt{gh}$. The work done by air drag is-

1. $-0.2 mgh$

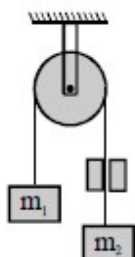
2. $-0.02 mgh$

3. $-0.04 mgh$

4. mgh

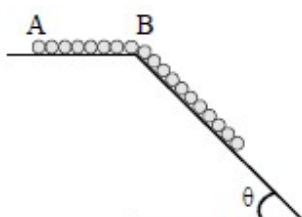
150. A weightless string passes through a slit over a pulley. The slit offers frictional force f to the string. The string

carries two weights having masses m_1 and m_2 where $m_2 > m_1$, then acceleration of the weights is



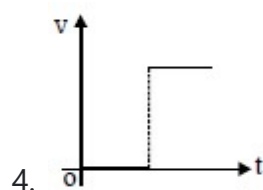
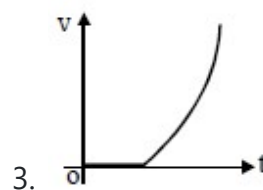
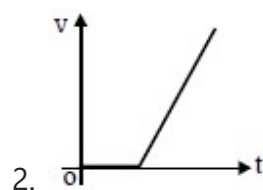
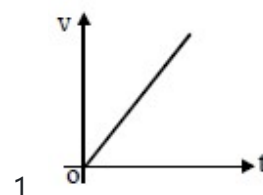
1. $\frac{(m_2 - m_1)g - f}{m_1 + m_2}$
2. $\frac{f - (m_2 - m_1)g}{m_1 + m_2}$
3. $\frac{(m_1 + m_2)g - f}{(m_1 - m_2)}$
4. $\frac{m_2 g - f}{(m_1 + m_2)}$

151. A chain of length L and mass m is placed upon a smooth surface. The length of BA is $(L - b)$. Calculate the velocity of the chain when its end reaches B .



1. $\sqrt{\frac{2g \sin \theta}{L} (L^2 - b^2)}$
2. $\sqrt{\frac{g \sin \theta}{2L} (L^2 - b^2)}$
3. $\sqrt{\frac{g \sin \theta}{L} (L^2 - b^2)}$
4. None of these

152. A metal block is resting on a rough wooden surface. A horizontal force applied to the block is increased uniformly. Which of the following curves correctly represents velocity of the block ?



153. Choose the correct option-

1. If only conservative forces act on a particle, the kinetic energy remains constant.
2. If the net force acting on an object is zero, then the object is at rest.
3. If net mechanical work is done on a body, the body must accelerate.

4. If net mechanical work is done on a body, the speed of body remains unchanged.

154. A particle A of mass 1kg moves along the line $3x - 4y = 0$ with a speed of 10 ms^{-1} and another particle B of mass 2kg moves along the line $12y + 5x = 0$ with a speed of $v \text{ ms}^{-1}$. Both of them start simultaneously from the origin, with A and B moving in first and fourth quadrants respectively, such that their centre of mass is always on x-axis. The value of v is:-

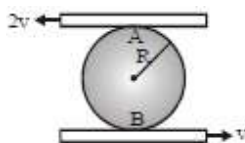
1. $\frac{39}{5}$

2. $\frac{13}{4}$

3. $\frac{78}{5}$

4. None

155. A disc of the radius R is confined to roll without slipping at A and B. If the plates have the velocities v and $2v$ as shown, the angular velocity of the disc is



1. $\frac{3v}{2R}$ Anticlockwise
2. $\frac{3v}{2R}$ Clockwise
3. $\frac{v}{2R}$ Anticlockwise
4. $\frac{v}{2R}$ Clockwise

156. A uniform rod of mass $2M$ is bent into four adjacent semicircles each of

radius r , all lying in the same plane. The moment of inertia of the bent rod about an axis through one end A and perpendicular to plane of rod is :-



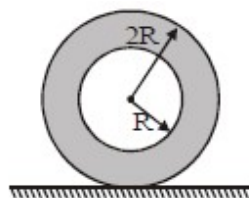
1. $22 Mr^2$

2. $88 Mr^2$

3. $44 Mr^2$

4. $66 Mr^2$

157. A hollow cylinder with inner radius R , outer radius $2R$ and mass M is rolling without slipping with speed of its centre v . Its kinetic energy is:



1. $\frac{11}{16} Mv^2$

2. $\frac{7}{4} Mv^2$

3. $\frac{13}{16} Mv^2$

4. None of these

158. A particle of mass M is at a distance 'a' from surface of a thin spherical shell of equal mass and having radius 'a'. Select correct alternative.

1. Gravitational field and potential both are zero at centre of the shell.

2. Gravitational field is zero not only inside the shell but at a point outside the shell also.

3. Inside the shell, gravitational field alone is zero.

4. Neither gravitational field nor gravitational potential is zero inside the shell.

159. A particle is projected vertically upwards the surface of the earth (radius R_e) with a speed equal to one fourth of escape velocity. What is the maximum height attained by it from the surface of the earth ?

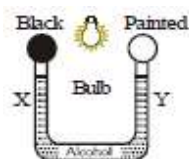
1. $16/15 R_e$

2. $R_e/15$

3. $4/15 R_e$

4. None

160. The following figure shows two air-filled bulbs connected by a U-tube partly filled with alcohol. What happens to the levels of alcohol in the limbs X and Y when an electric bulb placed midway between the bulbs is lighted-



1. The level of alcohol in limb X falls while that in limb Y rises

2. The level of alcohol in limb X rises while that in limb Y falls

3. The level of alcohol falls in both limbs

4. There is no change in the levels of alcohol in the two limbs

161. A rubber cord has a cross-sectional area 1mm^2 and total unstretched length 10 cm . It is stretched to 12 cm and then released to project a mass of 80 g . The Young's modulus for rubber is $5 \times 10^8\text{ N-m}^2$. Find the velocity of mass (in m/s)

1. 5

2. 3

3. 7

4. 2

162. A liquid drop at temperature T , isolated from its surroundings, breaks into a number of droplets. The temperature of the droplets will be—

1. equal to T

2. greater than T

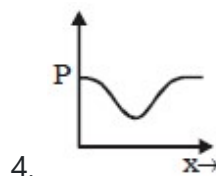
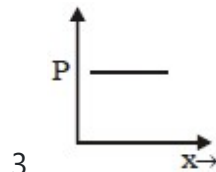
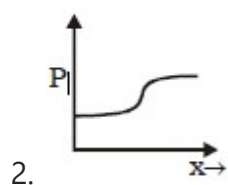
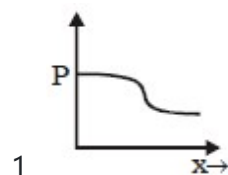
3. less than T

4. either (1), (2) or (3) depending on the surface tension of the liquid.

163. Find the rate of flow of glycerine of density $1.25 \times 10^3 \text{ kg/m}^3$ through the conical section of a pipe, if the radii of its ends are 0.1m and 0.04 m and the pressure drop across its length is 10 N/m^2 .

1. $3.14 \times 10^{-4} \text{ m}^3/\text{s}$
2. $6.28 \times 10^{-4} \text{ m}^3/\text{s}$
3. $12.56 \times 10^{-4} \text{ m}^3/\text{s}$
4. $1.57 \times 10^{-4} \text{ m}^3/\text{s}$

164. Water flows through a frictionless duct with a cross section varying as shown in figure. Pressure P at points along the axis is represented by-



165. Statement 1: When a large soap bubble and a small soap bubble are connected by a capillary tube, the large bubble expands while the small bubble shrinks.

and

Statement 2 : The excess pressure inside a bubble is inversely proportional to radius and air flows from small bubble to large bubble.

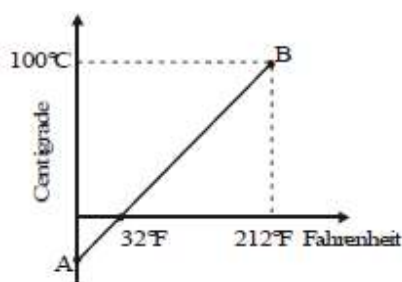
1. Statement-1 is true, statement-2 true; statement-2 is the correct explanation of statement-1

2. Statement-1 is false, statement-2 is true

3. Statement-1 is true, statement-2 is false

4. Statement-1 is true, statement-2 is true; statement -2 is not correct explanation of statement-1

166. The graph AB shown in figure is a plot of temperature of a body in degree Celsius and degree Fahrenheit. Then



1. slope of line AB is 9/5
2. slope of line AB is 5/9
3. slope of line AB is 1/9
4. slope of line AB is 3/9

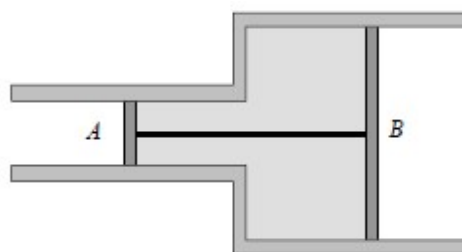
167. At ordinary temperatures, the molecules of a diatomic gas have only translational and rotational kinetic energies. At high temperatures, they may also have vibrational energy. As a result of this compared to lower temperatures, a diatomic gas at higher temperatures will have—

1. lower molar heat capacity.
2. higher molar heat capacity.
3. lower isothermal compressibility.
4. higher isothermal compressibility.

168. At a pressure of 24×10^5 dyne/cm², the volume of O₂ is 10 litre and mass is 20g. The r.m.s velocity will be—

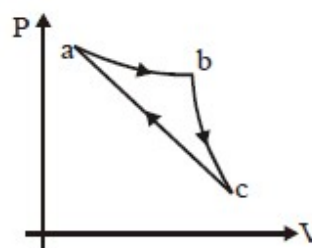
1. 800 m/s
2. 400 m/s
3. 600 m/s
4. Data is incomplete

169. A horizontal cylinder has two sections of unequal cross-sections in which two pistons A and B can move freely. The pistons are joined by a string. Some gas is trapped between the pistons. If this gas is heated, the pistons will



1. move to the left
2. move to the right
3. remain stationary
4. move either to the left or to the right depending on the initial pressure of the gas

170. In the P-V diagram shown, the gas does 5 J of work in isothermal process ab and 4 J in adiabatic process bc. What will be the change in internal energy of the gas in straight path c to a?



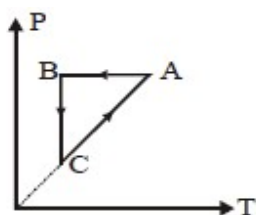
1. 9J

2. 1 J

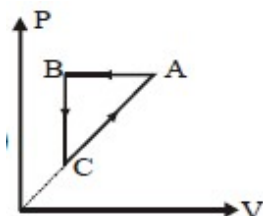
3. 4 J

4. 5 J

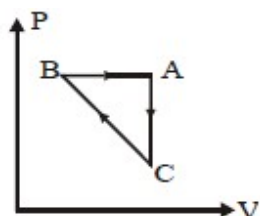
171. ABCA is cyclic process. its P-V graph would be



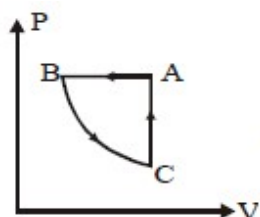
1.



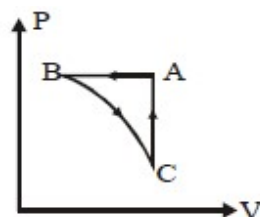
2.



3.



4.



172. When x amount of heat is given to a gas at constant pressure, it performs $x/3$ amount of work. The average number of degrees of freedom per molecule of the gas is—

1. 3

2. 4

3. 5

4. 6

173. A block is given a initial push along rough horizontal fixed table surface and after some time it stops due to friction. For the system of block and table,

1. temperature increase

2. heat supplied is positive

3. heat supplied is negative

4. total energy decreases

174. The shape of a wave propagating in the positive x or negative x - direction is given $y = \frac{1}{\sqrt{1+x^2}}$ at $t = 0$ and $y = \frac{1}{\sqrt{2-2x+x^2}}$ at $t = 1$ s where x and y are in meters. The shape of the wave disturbance does not change during propagation, then the velocity of the wave is

1. 1 m/s in positive x direction

2. 1 m/s in negative x direction

3. 1/2 m/s in positive x direction

4. 1/2 m/s in negative x direction

2. 47/23f

175. Kinetic energy of a particle executing simple harmonic motion in straight line is pv^2 and potential energy is qx^2 , where v is speed at distance x from the mean position. Its time period is given by the expression

3. $31/32f$

4. f

1. $2\pi\sqrt{\frac{q}{p}}$

2. $2\pi\sqrt{\frac{p}{q}}$

3. $2\pi\sqrt{\frac{q}{p+q}}$

4. $2\pi\sqrt{\frac{p}{p+q}}$

176. Two pendulums of time periods 3 s and 7s respectively start oscillating simultaneously from two opposite extreme positions. After how much time they will be in phase

178. Two particles A and B are performing SHM along x and y-axis respectively with equal amplitude and frequency of 2 cm & 1Hz respectively. Equilibrium positions of the particles A and B are at the coordinates (3 cm, 0) and (0, 4 cm) respectively. At $t = 0$, B is at its equilibrium position and moving towards the origin, while A is nearest to the origin and moving away from the origin.

Equation of motion of particle A can be written as-

1. 21/8s

1. $x = (2 \text{ cm}) \cos 2\pi\pi t$

2. 21/4s

2. $x = (3 \text{ cm}) - (2 \text{ cm}) \cos 2\pi\pi t$

3. 21/2s

3. $x = (2 \text{ cm}) \sin 2\pi\pi t$

4. 21/10 s

4. $x = (3 \text{ cm}) - (2 \text{ cm}) \sin 2\pi\pi t$

177. An observer moving with velocity 20 m/s is moving away from a source moving with speed 10 m/s towards the observer. If frequency of source is 'f', then find the frequency observed by the observer. ($v_{\text{sound}} = 330 \text{ m/s}$)

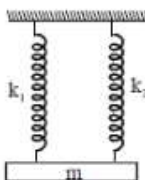
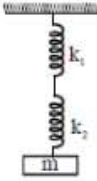

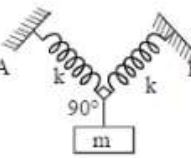
179. Two particles A and B are performing SHM along x and y-axis respectively with equal amplitude and frequency of 2 cm & 1Hz respectively. Equilibrium positions of the particles A and B are at the coordinates (3 cm, 0) and (0, 4 cm) respectively. At $t = 0$, B is at its equilibrium position and moving towards the origin, while A is nearest to the origin and moving away from the origin.

1. 32/31 f

Minimum and maximum distance between A and B during the motion is-

1. $\sqrt{5}$ cm and $\sqrt{61}$ cm
2. 3 cm and 7 cm
3. 1 cm and 5 cm
4. 9 cm and 16 cm

180 In each of the following questions, Match column I and column II and select the correct match out of the four given choices

Column I	Column II
<p>(1) </p>	<p>(P) $T = 2\pi\sqrt{\frac{m(k_1 + k_2)}{k_1 k_2}}$</p>
<p>(2) </p>	<p>(Q) $T = 2\pi\sqrt{\frac{m}{k_1 + k_2}}$</p>
<p>(3) </p>	<p>(R) $T = 2\pi\sqrt{\frac{m}{k}}$</p>
<p>(4) </p>	<p>(S) $T = 2\pi\sqrt{\frac{m}{2k}}$</p>



Test # 7 (NEETprep Test Series)

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