1.

In vexillary aestivation:

1. The standard overlaps the wings
2. The standard overlaps the keel
3. The standard is overlapped by keel
4. The keel overlap the wings

2.

Match each item in Column I with one in Column II and select the correct answer from the codes given:

	Tissue		Location
A	Cuboidal brush bordered epithelium	P	Proximal convoluted tubule of nephron
B	Ciliated columnar epithelium	Q	Fallopian tubes
C	Dense regular connective tissue	R	Tendon
D	Dense irregular connective tissue	S	Skin

Codes:

	A	B	C	D
1.	P	Q	R	S
2.	Q	P	S	R
3.	Q	P	R	S
4.	P	Q	S	R

3.

The correct sequence of phases in cell cycle is:

1. $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$
2. $M \rightarrow G_1 \rightarrow G_2 \rightarrow S$
3. $G_1 \rightarrow G_2 \rightarrow S \rightarrow M$
4. $S \rightarrow G_1 \rightarrow G_2 \rightarrow M$

4.

Read the following statements w.r.t. pericycle and choose the suitable option
(a) It is the outermost portion of stele, that may be paranchymatous 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

5.

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

6.

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

7.

Select the incorrect match
1. Green photosynthetic petiole - Australian Acacia
2. Leaflets attached at tip of the petiole - Silk cotton
3. Papilionaceous corolla - Bean
4. Epiphyllous stamens - Brinjal

8.

Cymose inflorescence is dissimilar to racemose inflorescence in
1. Having limited growth of the main inflorenscence axis.
2. Having young flowers at top.
3. Showing centriperal manner of opening of flowers.
4. Having acropetal arrangement of flowers.

9.

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 2 SO 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

10.

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.

11.

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.

12.

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.

13.

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)

14.

Select the correct statement w.r.t. axoneme of eukaryotic flagella.
1. It is composed of 9 peripheral triplet microfibrils 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.

15.

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

16.

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

17.

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

18.

Drinking alcohol causes diuresis because it inhibits the secretion of _____.

1. ANH

2. ADH

3. angiotensin

4. aldosterone

19.

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

20.

The diaphragm and external intercostal muscles are _____ when expiration occurs.

1. contracted

2. relaxed

3. flexed

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

21.

When the heart beats, the familiar lub-dup sound occurs as the valves of the heart _____.

1. open

2. close

3. expand

4. contract

22.

The male and female cockroach can be distinguished by their:

1. size

2. wings

3. anal styles

4. color

23.

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

24.

Select the correct statement w.r.t given statements

1. Water transport is related with transpiration and guttation is related with stomata.

2. Transpiration is passive process but opening of stomata is active.

3. C_3 plants are twice efficient in photosynthesis as compared to C_4 plants whereas C_3 plants are less efficient w.r.t transpiration than C_4 plants.

4. Minerals uptake is passive whereas water absorption is active.

25.

Presence of oxygen is vital in aerobic respiration because

1. It drives the whole process by removing hydrogen from ETS.

2. Oxygen causes phosphorylation which is light stimulated.

3. Oxygen directly stimulates complex V to generate ATP.

4. Oxygen is initial electron acceptor.

26.

Select the correct option w.r.t activator of element

1. Mg – Carboxylase
   Zn – Rubisco
   Fe – Nitrogenase
   Mo – Catalase

2. Mg – Rubisco
   Zn – Carboxylase
   Fe – Catalase
   Mo – Nitrogenase

3. Mg – Carboxylase
   Zn – Rubisco
   Fe – Catalase
   Mo – Nitrogenase

4. Mg – Rubisco
   Zn – Carboxylase
   Fe – Nitrogenase
   Mo – Catalase

27.

Stroma lamella in plastid lacks

1. PS II and PS I.
2. PS II and NADP reductase.
3. PS I and NAD reductase.
4. PS II only.

28.

Which statement is incorrect w.r.t photoperiodism in plants?

1. The site of perception of light/dark duration is cotyledons or embryo.

2. It depends on duration of light/dark.

3. Critical exposure of light/dark is required.

4. When there is no correlation between exposure to light duration and induction of flowering response, plants are called day neutral plants.

29.

Bony endoskeleton is present in
(i) Pristis (ii) Hippocampus
(iii) Icthyophis (iv) Myxine

1. (i), (ii), (iii), (iv)

2. (ii), (iii) only

3. (ii) only

4. (ii), (iii), (iv) only

30.

To make pancreatic enzyme in action, which of the following is required?
(i) Enterokinase (ii) Bile
(iii) Intrinsic factor (iv) HCl

1. (i), (ii), (iii) (iv)

2. (i), (ii) only

3. (i) only

4. (i), (iii) only

31.

The hormones from heart, kidney and gastrointestinal tract respectively are

1. ANF, Rennin, Trypsin
2. ADH, Renin, GIP
3. ANF, Erythropoietin, CCK
4. GIP, CCK, Renin

32.

Haemolytic disease of the newborn (HDN) may occur in the featus of a second pregnancy if

1. The mother is Rh^+ and the baby is Rh^-

2. The mother is Rh^+ and the baby is Rh^+

3. The mother is Rh^- and the baby is Rh^-

4. The mother is Rh^- and the baby is Rh^+

33.

Three of the following pairs of the human skeletal parts are correctly matched with their respective inclusive skeletal category and one pair is not matched. Identify the non-matching pair

	Pairs of skeletal parts	Category
1.	Malleus and stapes	Ear ossicles
2.	Sternum and ribs	Axial skeleton
3.	Clavicle and glenoid cavity	Pelvic girdle
4.	Humerus and ulna	Appendicular skeleton

34.

Due to insufficient filtration in the Bowman's capsule, all are likely to happen except

1. Accumulation of fluid in the body

2. Increase in blood pressure

3. Increase in blood urea level

4. Increase in GFR

35.

Which one of the following sets of animals belong to a single taxonomic group?

1. Cuttlefish, jellyfish, silverfish, dogfish, starfish

2. Bat, pigeon, butterfly

3. Monkey, chimpanzee, man

4. Silkworm, tapeworm, earthworm

36.

Select the correct statement about class-Aves

1. They are warm blooded (homoiothermous) animals and are able to maintain a constant body temperature

2. Respiration occurs through lungs and air sacs connected to lungs for supplement respiration

3. They are oviparous with separate sexes, internal fertilisation and direct development

4. All of the above

37.

Which of the following structures or substances is incorectly paired with a tissue ?
1. Haversian system—bone
2. platelets—blood
3. fibroblasts—skeletal muscle
4. chondroitin sulfate—cartilage

38.

The majority of water and salt filtered into Bowman's capsule is reabsorbed by

1. the brush border of the transport epithelia of the proximal tubule

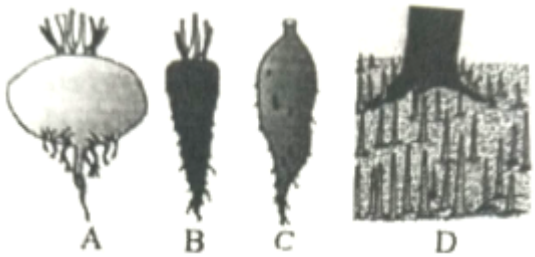
2. diffusion from the descending limb of the loop of Henle into the hypertonic interstitial fluid of the medulla

3. active transport across the transport epithelium of the thick upper segment of the ascending limb of the loop of Henle

4. selective secretion and diffusion across the distal tubule

39.

Which of the following incorrect about A, B, C and D?



1. Tap roots of carrot, turnip and adventitious root of sweet potato get swollen and store food.

2. Pneumatophores help of get oxygen for respiration

3. Pneumatophores are found in the plants that grow in sandy soil

4. A, B and C are underground roots but D grows vertically upwards

40.

Select the incorrect statement w.r.t. imbibition

1. It is diffusion process.

2. Affinity between the adsorbent and the liquid is not a pre-requisite.

3. It involves both capillary action and adsorption

4. Phycocolloids are best imbibants.

41.

Which if the following statement is not true regarding the C_4 plants?

1. They show Kranz anatomy.

2. Decarboxylation process in bundle sheath cells.

3. Granal chloroplast is present in bundle sheath cells

4. PEPcase enzyme activity occurs in mesophyll cells.

42.

Vernalisation stimulates flowering in

1. Zamikand

2. Turmeric

3. Carrot

4. Ginger

43.

The enzymes of Krebs cycle where $NADH + H^+$ are produced are

1. Isocitrate dehydrogenase succinate dehydrogenase and malic dehydrogenase.

2. Succinate thiokinase, succinate dehydrogenase and aconitase

3. Isocitrate dehydrogenase, α - ketoglutaric dehydrogenase, malic dehydrogenase

4. Isocitrate dehydrogenase, α - ketoglutaric dehydrogenase and succinate dehydrogenase.

44.

Which of the following set of animals belong the phylum hemichordate?

1. Balanoglossus, Saccoglossus

2. Salpa, Doliolum

3. Petromyzon, Myxine

4. Dentalium, Chaetopleura

45.

Match the Column I with Column II –

	Column-I		Column-II
1.	Terminalization of chiasmata	A.	Zygotene
2.	Synapsis	B.	Diplotene
3.	Crossing over	C.	Metaphase I
4.	Dissolution of synaptonemal complex	D.	Diakinesis
5.	Best stage for the study of chiasmata	E.	Pachytene
6.	Nuclear membrane and nucleolus disappear		
7.	Tetrads are arranged on equatorial line		

1. A – 2, B – 4,5, C – 7, D – 1,6, E – 3
2. A – 2, B – 3, C – 7, D – 1, 4, 6, E – 5
3. A – 2, B – 7, C – 3, D – 1, 4, 5, E – 6
4. A – 2, B – 1, C – 4, D – 5, 3, E – 6

46.

Nucleotide is made up of

1. Heterocyclic compound, Monosaccharide, Phosphoric acid.
2. Nitrogenous base, hexose sugar, phosphate.
3. Hetrocylic compound and pentose sugar only.
4. Hetrocyclic compound and nucleoside.

47.

Extra cellular receptors must be required for the action of
I. Oxytocin.
II. Thyroxine.
III. Epinephrine.
IV. Glucagon.

1. I, II, III & IV

2. I, IV only

3. I, III, IV

4. III & IV only

48.

Consider the following four statements (a-d) and select the option which includes all the correct :-

(a) Coronary Artery disease, (CAD) often referred to as Atherosclerosis

(b) Heart failure means when the heart muscle is suddenly damaged by an inadequate blood supply

(c) High blood pressure leads to heart diseases and also affects vital organs like brain and kidney

(d) Angina occurs due to conditions that affect the blood flow

Options :

1. Statements (b), (c) and (d).
2. Statements (a), (b).
3. Statements (b), (d).
4. Statement (a), (c) and (d).

49.

Restoration of resting potential of the membrane at the site of excitation is achieved by :-

1. Diffusion of K^+ outside the membrane.
2. Diffusion of Na^+ outside the membrane.
3. Diffusion of K^+ inside the membrane.
4. Diffusion of Na^+ inside the membrane.

50.

The water potential of pure water at standard temperatures, which is not under any pressure is taken to be equivalent to
1. Zero
2. $-\psi_S$
3. ψ_P
4. $+\psi_S$

51.

Five events in the transmission of nerve impulse across the synapse are given–

A. Opening of specific ion channels allows the entry of ions, a new action potential is generated in the post synaptic neuron.

B. Neurotransmitter binds to the receptor on post synaptic membrane

C. Synaptic vesicle fuses with pre-synaptic membrane,

neurotransmitter releases into synaptic cleft

D. Depolarization of pre-synaptic membrane

E. Arrival of action potential at axon terminal.

In which sequence do these events occur?

1. E → D → C → B → A2. A → B → C → D → E3. A → B → D → C → E4. E → D → C → A

52.

Which of the following enzyme is not operational in Rhizobium during free-living conditions?

1. Aldolase

2. Nitrogenase

3. Enolase

4. Mutase

53.

The neural system provides an organized network of ___A___ connections for a ___B___ coordination. Choose the correct option for A, B to complete the given statement.

1. A – point to point, B – slow

2. A – chemical, B – fast

3. A – point to point, B – fast

4. A – Chemical, B – slow

54.

See the following diagrams carefully and these animals are

1. Sycon, Leucosolenia

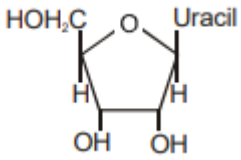
2. Hydra, Aurelia

3. Nereis, Hirudinaria

4. Fasciola, Taenia

55.

The molecule represented is :-



1. uridine and it is pyrimidine

2. urindylic acid and it is nucloside

3. uridylic acid and it is nuclotide

4. uridine and it is nucloside

56.

ER, Golgi complex, lysosomes and vacuoles are included in endomembrane system because :-

1. Their function are similar
2. Their structure are same
3. Their function are co-ordinated
4. Golgi complex, lysosomes and vacuoles are originated from the ER

57.

Oxidative phosphorylation is the formation of-

1. ATP in Anaerobic respiration

2. ATP in aerobic respiration

3. ATP in glycolysis

4. ATP in fermentation

58.

Plasmodesmata are :

1. Cemented layers between the cells

2. Locomotry structure

3. Membrane connecting the nucleus with plasmalemma

4. Connections between the adjacent plant cells

59.

Chromatin condensation and movement of duplicated centriole towards opposite pole can be observed during -

1. Prophase

2. Metaphase

3. Anaphase

4. Telophase

60.

Alimentary canal begins with :-

1. An vertical slit, the mouth

2. An anterior opening, buccal cavity

3. An ventral slit, the mouth

4. An opening, the mouth

61.

Fibrins are formed by the conversion of fibrinogens in plasma by which enzyme ?

1. Thromboplastin

2. Thrombin

3. Ca^{+2}

4. Thrombokinase

62.

The unbranched stem is character of which gymnosperm:-

1. Pinus

2. Cycas

3. Cedrus

4. Lycopodium

63.

Upon complete hydrolysis, one molecule of triglyceride will yield how many molecules of fatty acids?

1. 1

2. 2

3. 3

4. Any of these is possible

64.

Dwarfism, pot belly and deaf-mutism are seen in which disease ?

1. Myxoedema

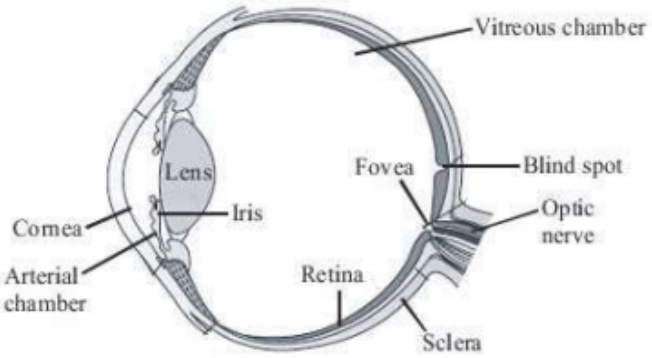
2. Cretinism

3. Grave's disease

4. Basedow's disease

65.

Following diagram showing parts of an eye. Choose the incorrect labelling in diagram :-



1. Sclera, Retina, Lens, Optics nerve

2. Lens, vitreous chamber, retina, Iris

3. Fovea, Blind spot, Arterial chamber

4. Retina, Sclera, Iris, Cornea

66.

White muscle fiber

1. Depend upon anaerobic process for energy

2. Have more mitochondria

3. Have more myoglobin

4. Have less sarcoplasmic reticulum

67.

Read the following statement :-

(a) The hypothalamus is the basal part of diencephalon

(b) Hypothalamus contains group of neurosecretory cells called ganglia which regulate the synthesis and secretion of pituitary hormone

(c) GnRH from hypothalamus stimulate the anterior pituitary to release gonadotrophins

(d) The posterior pituitary is under direct chemical regulation of the hypothalamus

How many of above statements are correct?

1. 4

2. 3

3. 1

4. 2

68.

In dicot stems the vascular cambium ring is derived from

1. Intrafascicular cambium
2. Interfascicular cambium
3. Intrafascicular cambium & Interfascicular cambium
4. Pericycle

69.

Disc-shaped proteinaceous structure associated with centromere is called

1. Kinetochore
2. Secondary constriction
3. Both Primary and Secondary constriction
4. Nucleolar organizer

70.

Structure present in the submucosa of GIT is

1. Gastric gland
2. Villi
3. Rugae
4. Brunner’s gland

71.

Complete the analogy with respect to joints Saddle joint: Between carpal and metacarpal of thumb: : Hinge joint:_____

1. Between femur and acetabulum
2. Between femur and tibia
3. Between atlas and axis
4. Between occipital condyle and atlas

72.

The partial pressure of carbon dioxide in the pulmonary artery is

1. More than that in tissues
2. Equal to that in systemic arteries
3. Less than that in alveoli
4. Equal to that in the systemic vein

73.

Which of the following statements is true for cockroaches?

1. The total number of ovarioles are five in both ovaries
2. The larval stage is called naiad
3. Anal styles are absent in females
4. They are ureotelic

74.

Which of the given plastids store fats and oils?

1. Amyloplast
2. Aleuroplast
3. Chloroplast
4. Elaioplast

75.

Select the incorrect match w.r.t. the given taxonomic categories of wheat.

1. Genus - Triticum
2. Family - aestivum
3. Order- Poales
4. Class - Monocotyledonae

76.

Select the incorrect match

1. Opposite phyllotaxy - Calotropis
2. Parallel venation - Banana
3. Whorled phylotaxy - Nerium
4. Alternate phyllotaxy - Guava

77.

Double fertilization is a unique event to

1. Alage
2. Gymnosperm
3. Angiosperm
4. Pteridophyte

78.

Glucagon and insulin hormone can be distinguished based on

1. Location of receptors i.e. intracellular or extracellular
2. Their source gland
3. Hepatocytes as target cells

4. Their role in the mechanism of maintaining glucose homeostasis

79.

The imperfect fungi such as Trichoderma

1. Reproduce sexually by spore formation
2. Have aseptate mycelium
3. Reproduce asexually by conidia formation
4. Have coenocytic mycelium

80.

Stele is constituted by all, except

1. Pith
2. Vascular bundles
3. Endodermis
4. Pericycle

81.

In cyclic photophosphorylation

1. There is production of ATP and $NADPH_2$
2. External source of electrons is required
3. The reaction center is P700
4. Splitting of water occurs

82.

Read the following statements and choose the correct option.

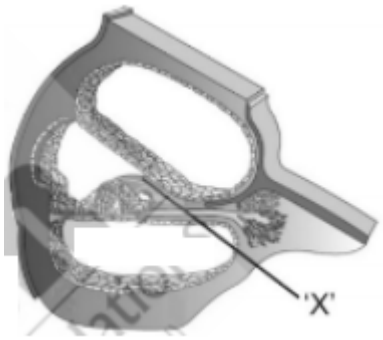
Statement-A : Auxin inhibits the growth of lateral or axillary buds.

Statement-B : Cytokinins are used to delay the senescence of intact leaves and other plant parts.

1. Only statement A is correct
2. Only statement B is correct
3. Both statements are correct
4. Both statements are incorrect

83.

Choose the incorrect statement w.r.t the structure marked 'X' in the following diagram



1. It is a thin elastic membrane
2. It makes up roof of organ of Corti
3. It is suspended in perilymph
4. It does not contain afferent neurons

84.

Match column I and column II w.r.t animal and its common name

Column-I	Column-II
(i) Ancylostoma	(a) Sea-hare
(ii) Aplysia	(b) Sea anemone
(iii) Echinus	(c) Sea urchin
(iv) Adamsia	(d) Hookworm

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

85.

A poikilotherm having four-chambered heart is

1. Columba
2. Chameleon
3. Crocodilus
4. Canis

86.

Select the **correct** match

1. Imperfect fungi – *Ustilago*
2. *Agaricus* – Club fungus
3. Toadstool – Edible mushroom
4. Smut of wheat – *Puccinia graminis*

87.

Select the mobile electron carrier in inner mitochondrial membrane

1. NADH dehydrogenase
2. Cytochrome C
3. Cytochrome C oxidase complex
4. ATP synthase

88.

Select **incorrect** match

1. Polyadelphous stamens – Lemon
2. Diadephous stamens – Pea
3. Imbricate aestivation – *Cassia*
4. Basal placentation – Tomato

89.

Vomiting is an emetic reflex which is regulated by

1. Hypothalamus
2. Superior colliculi of midbrain
3. Medulla oblongata
4. Pons

90.

The terminal electron acceptor in ETS during oxidative phosphorylation receives electron from

1. Cytochrome bc1 complex
2. Cytochrome c oxidase complex
3. Succinate dehydrogenase
4. Ubiquinone

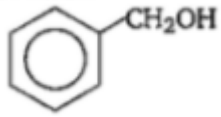
91.

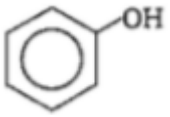
Which method cannot be used to remove hardness of water ?

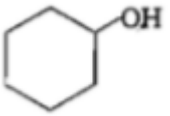
1. Clark's method
2. By adding washing soda
3. Calgon process
4. Filtration

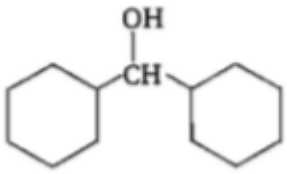
92.

Which one of the following has the most acidic nature?

1. 

2. 

3. 

4. 

93.

The pair of elements which on combination are most likely to form an ionic compound is :

1. Na and Ca
2. K and O_2
3. O_2 and Cl_2
4. *Al and* I_2

94.

Which factor makes Li metal the strongest reducing agent in an aqueous solution :

1. Sublimation enthalpy
2. Ionisation enthalpy
3. Hydration enthalpy
4. Electron-gain enthalpy

95.

Greater the dipole moment:

1. greater is the ionic nature
2. lesser the polarity
3. smaller is the ionic nature
4. none of these

96.

On partial hydrolysis of one mole of peroxodisulphuric acid produces

1. two moles of sulphuric acid

2. two moles of peroxomonosulphuric acid

3. one mole of sulphuric acid and one mole of peroxomonosulphuric acid

4. one mole of sulphuric acid, one mole of peroxomonosulphuric acid and one mole of hydrogen peroxide.

97.

Two flasks of equal volume connected by a narrow tube (of negligible volume) at 27ºC and contain 0.70 mole of H_2 at 0.5 atm. One of the flasks is then immersed into a hot bath, kept at 127ºC, while the other remains at 27ºC. Calculate the final pressure.

1. 5.714 atm

2. 0.5714 atm

3. 2.5214 atm

4. 5.5114 atm

98.

For the reaction, $2N_2(g) + O_2(g) \rightarrow 2N_2O$, at 298K ΔH is 164 KJ mol^{-1}. The ΔE of the reaction is

1. 166.5 kJ mol^{-1}

2. 161.5 kJ mol^{-1}

3. 164.0 kJ mol^{-1}

4. 169 kJ mol^{-1}

99.

Find the work done if 1 g H_2 gas at S.T.P is expanded to twice of its initial volume?

1. 22.4 L atm

2. 5.6 L atm

3. 11.2 L atm

4. 44.8 L atm

100.

Which of the following is most covalent-

1. AlF_3

2. $AlCl_3$

3. $AlBr_3$

4. AlI_3

101.

Borax bead test is responded by:

1. divalent metals

2. heavy metals

3. light metals

4. metal which forms coloured metaborates

102.

R_3SiCl on complete hydrolysis forms:

1. R_3SiOH

2. $R_3Si—O—SiR_3$

3. $R_3Si = O$

4. none of these

103.

From the following bond energies :

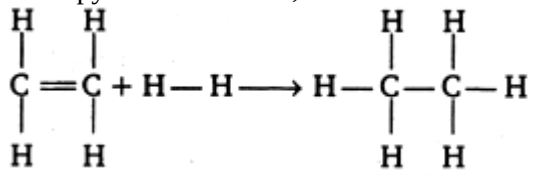
H—H bond energy: 431.37 kJ mol^{-1}

C =C bond energy: 606.10 kJ mol^{-1}

C—C bond energy: 336.49 kJ mol^{-1}

C—H bond energy: 410.50 kJ mol^{-1}

Enthalpy for the reaction,



will be

1. 1523.6 kJ mol^{-1}

2. -243.6 kJ mol^{-1}

3. -120.0 kJ mol^{-1}

4. 553.0 kJ mor^{-1}

104.

What is the empirical formula of vanadium oxide, if 2.74 g of the metal oxide contains 1.53 g of metal?

1. V_2O_3

2. VO

3. V_2O_5

4. V_2O_7

105.

The vapour density of a volume chloride of a metal is 95 and the specific heat of the metal is 0.13 cal/g. The equivalent mass of the metal will be:

1. 6
2. 12
3. 18
4. 24

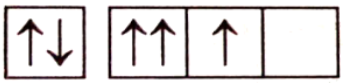
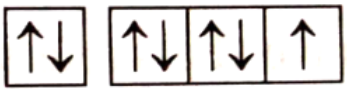
106.

Which mixture is lighter than humid air?

1. $N_2 + O_2 + SO_2$
2. $N_2 + O_2 + CO_2$
3. $N_2 + O_2 + C_2H_6$
4. $N_2 + O_2 + He$

107.

The orbital diagram in which both the Pauli's exclusion principle and Hund's rule are violated is:

1. 
2. 
3. 
4. 

108.

Which of the following statement is correct?

1. Number of angular nodes = n-l-1
2. Number of radial nodes = l
3. Total number of nodes = n-1
4. All

109.

The excluded volume of a gas will be larger, if $\frac{T_C}{P_C}$ is:

1. small
2. large
3. equal to 1
4. less than unity

110.

When 10 ml of 0.1 M acetic acid (pK_a=5.0) is titrated against 10 ml of 0.1 M ammonia solution (pK_b=5.0), the equivalence point occurs at pH

1. 9.0
2. 6.0
3. 5.0
4. 7.0

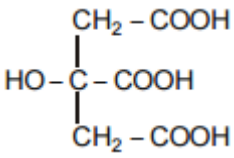
111.

Which of the following oxide is mixed oxide?

1. PbO_2
2. SnO_2
3. Pb_2O_3
4. Pb_3O_4

112.

The IUPAC name of the following compound is :-



1. Citric acid
2. 3-Hydroxy pentane-1,5-dioic acid
3. 2-Hydroxy propane-1,2,3-tricarboxylic acid
4. 2-Carboxy-2-hydroxy propane-1,3-dicarboxylic acid

113.

At 27° C, the ratio of root mean square speeds of ozone to oxygen is:

1. $\sqrt{(3/5)}$
2. $\sqrt{(4/3)}$
3. $\sqrt{(2/3)}$
4. 0.25

114.

The density of a gas is 1.964 g dm^{-3} at 273 K and 76 cm Hg. The gas is

1. CH_4
2. C_2H_6
3. CO_2
4. Xe

115.

The maximum number of molecules is present in

1. 15 L of H_2 gas at STP
2. 5 L of N_2 gas at STP
3. 0.5 g of H_2 gas
4. 10 g of O_2 gas

116.

Equal weights of ethane and hydrogen are mixed in an empty container at 25°C. The fraction to total pressure exerted by hydrogen is

1. 1: 2
2. 1: 1
3. 1: 16
4. 15: 16

117.

An aqueous solution of 6.3 g oxalic acid dehydrate is made up to 250 mL. The volume of 0.1 N NaOH required to completely neutralize 10 mL of this solution is

1. 4 mL
2. 20 mL
3. 40 mL
4. 60 mL

118.

$KMnO_4$ (mol. wt=158) oxidizes oxalic acid in acidic medium to CO_2 and water as follows.

$5C_2O_4^{2-} + 2MnO_4^- + 16H^+ \rightarrow 10CO_2 + 2Mn^{2+} + 8H_2O$

What is the equivalent weight of $KMnO_4$?

1. 158
2. 31.6
3. 39.5
4. 79

119.

The total number of isomers for C_4H_8 are

1. 8
2. 7
3. 6
4. 5

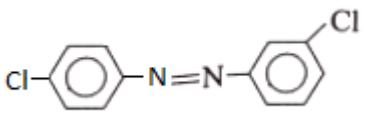
120.

Number of stereoisomers of the compound, 2-chloro-4-methylhex-2-ene is

1. 2
2. 4
3. 6
4. 7

121.

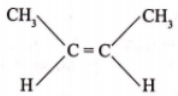
Assign the IUPAC name for the following compound.



1. 3, 4-dichlorobenzene
2. (4-chlorophenyl)(3-chlorophenyl) diazene
3. 3,4-bis (chlorophenyl) diazene
4. (3-chlorophenyl)(4-chlorophenyl)diazene

122.

Which of the following hydrocarbons has the lowest dipole moment?

1. 

2. $CH_3 - C \equiv C - CH_3$
3. $CH_3CH_2CH = CH_2$
4. $CH_2 = CH - C \equiv CH$

123.

Which will have the smallest heat of hydrogenation per mole?

1. cis-2-butene
2. trans-2-butene
3. propene
4. 1-butene

124.

Which hydrocarbon has the highest octane number?

1. methane
2. ethane
3. iso-octane
4. triptane

125.

The pH of a solution made by mixing 50 mL of 0.01 M barium hydroxide solution with 50 mL of H_2O is

1. 3.0
2. 6.0
3. 12.0
4. 15.0

126.

Which one of these is not an acid salt?

1. NaH_2PO_2
2. NaH_2PO_3
3. $Na_2H_2S_2O_7$
4. NaH_2PO_4

127.

When 0.1 mol of CH_3NH_2 $\left(K_b = 5 \times 10^{-4}\right)$ is mixed with 0.08 mol of HCl and diluted to 1L, the H^+ ion concentration in the solution is

1. 8×10^{-11} M
2. 6×10^{-5} M
3. 1. 6×10^{-11} M
4. 8×10^{-2} M

128.

Assume each reaction is carried out in an open container, For which reaction $\Delta H = \Delta U$?

1. $PCl_3(g) \rightarrow PCl_3(g) + Cl_2(g)$
2. $2CO(g) + O_2(g) \rightarrow 2CO_2(g)$
3. $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$
4. $C(s) + 2H_2O(g) \rightarrow 2H_2(g) + CO_2(g)$

129.

Which one of the following species is diamagnetic in nature?

1. H_2^-
2. H_2
3. H_2^+
4. He_2^+

130.

ln which of the following molecules/ions all the bonds are unequal?

1. SF_4
2. SiF_4
3. XeF_4
4. BF_4^-

131.

Electrons are emitted with zero velocity from a metal surface when it is exposed to radiation of wavelength 6800 Å.The work function (W_0) of the metal is

1. 3.109 x 10^{-20} J
2. 2.922 x 10^{-19} J
3. 4.031 x 10^{19} J
4. 2.319 x 10^{-18} J

132.

The element Z = 114 has been discovered recently.
It will belong to which of the following family/group and electronic configuration?

1. *Carbon family*[*Rn*]5 f^{14} 6$d^{10}7s^2 7p^2$

2. *Oxygen family*[*Rn*]5 f^{14} 6$d^{10}7s^2 7p^4$

3. *Nitrogen family*[*Rn*]5 f^{14} 6$d^{10}7s^2 7p^6$

4. *Halogen family*[*Rn*]5 f^{14} 6$d^{10}7s^2 7p^5$

133.
Solubility of the alkaline earth's metal sulphates in water decreases in the sequence
1. Mg>Ca>Sr>Ba
2. Ca>Sr>Ba>Mg
3. Sr>Ca>Mg>Ba
4. Ba>Mg>Sr>Cr

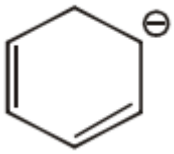
134.

Al_2O_3 reacts with

1. Only water
2. Only acids
3. Only alkalis
4. Both acids and alkalis

135.

Among the following, the aromatic compound is:-

1. 

2. 

3. 

4. 

136.

The distance of a planet from the sun is 5 times the distance between the earth and the sun. The time period of the planet is -

1. $5^{3/2}$ *years*

2. $5^{2/3}$ *years*

3. $5^{1/3}$ *years*

4. $5^{1/2}$ *years*

137.

Water is flowing through a tube of non-uniform cross-section. Ratio of the radius at entry and exit end of the pipe is 3 : 2. Then the ratio of velocities at entry and exit of liquid is -

1. 4 : 9
2. 9 : 4
3. 8 : 27
4. 1 : 1

138.

Water rises to a height h in a capillary at the surface of earth. On the surface of the moon, the height of water column in the same capillary will be-
1. 6h
2. $\frac{1}{6}$h
3. h
4. Zero

139.

A black metal foil is warmed by radiation from a small sphere at temperature T and at a distance d where surrounding temperature is T_o. It is found that the power received by the foil is P. If both the temperature and the distance are doubled, the power received by the foil will be - [Assume $T > > T_o$]

1. 16P
2. 4P

3. 2P

4. P

140.

In a Carnot engine, when $T_2 = 0°C$ and $T_1 = 200°C$, its efficiency is η_1 and when $T_1 = 0°C$ and $T_2 = -200°C$, its efficiency is η_2, then what is η_1 / η_2 **?**

1. 0.577

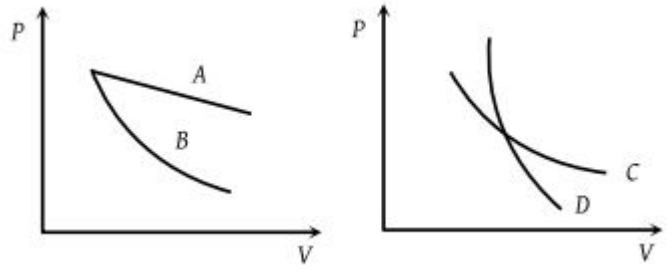
2. 0.733

3. 0.638

4. Can not be calculated

141.

In the following figures, four curves *A*, *B*, *C* and *D* are shown. The curves are



1. Isothermal for *A* and *D* while adiabatic for *B* and *C*

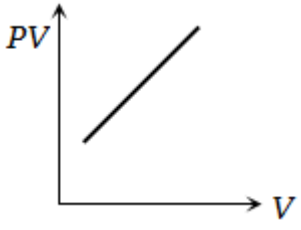
2. Adiabatic for *A* and *C* while isothermal for *B* and *D*

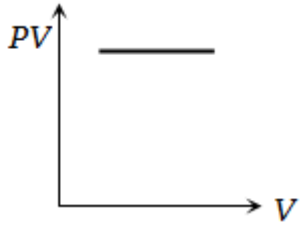
3. Isothermal for *A* and *B* while adiabatic for *C* and *D*

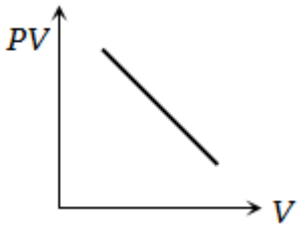
4. Isothermal for *A* and *C* while adiabatic for *B* and *D*

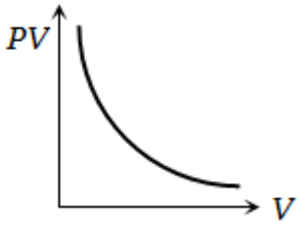
142.

Which one of the following graphs represents the behaviour of an ideal gas at constant temperature?

1.


2.


3.


4.


143.

The speed of sound in a medium is v. If the density of the medium is doubled at constant pressure, what will be new speed of sound?

1. $\sqrt{2}$v

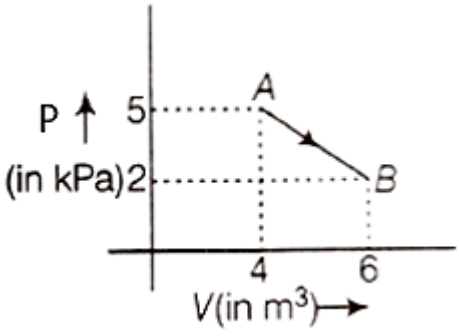
2. v

3. $\frac{v}{\sqrt{2}}$

4. 2 v

144.

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

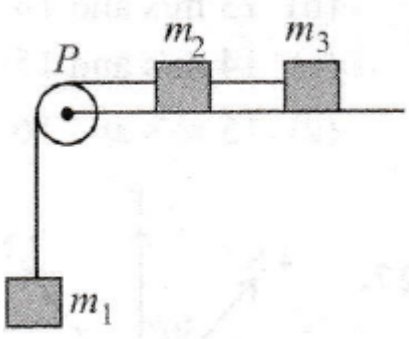


The change in internal energy of the gas during the transition is:

1. 20 kJ
2. - 20 kJ
3. 20 J
4. -12 kJ

145.

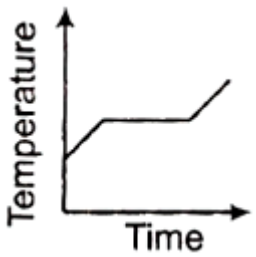
A system consists of three masses m_1, m_2, and m_3 connected by a string passing over a pulley P. The mass m_1 hangs freely and m_2 and m_3 are on a rough horizontal table (the coefficient of friction = μ). The pulley is frictionless and of negligible mass. The downward acceleration of mass m_1 is : (Assume $m_1 = m_2 = m_3 = m$)

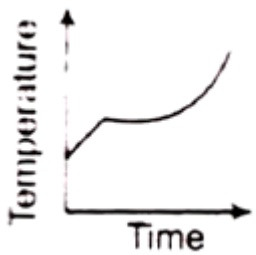


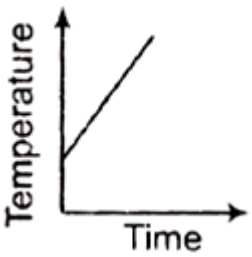
1. $\frac{g(1-g\mu)}{9}$
2. $\frac{2g\mu}{3}$
3. $\frac{g(1-2\mu)}{3}$
4. $\frac{g(1-2\mu)}{2}$

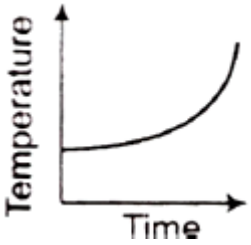
146.

Liquid oxygen at 50 K is heated up to 300 K at a constant pressure of 1 atm. The rate of heating is constant. Which one of the following graphs represents the variation of temperature with time?

1. 

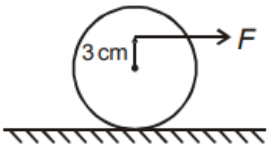
2. 

3. 

4. 

147.

A solid sphere of radius 5 cm is resting on a rough horizontal surface. A force F is applied at a height 3 cm from centre of mass in horizontal direction as shown. Frictional force acting on the sphere is-



1. In forward direction
2. In backward direction
3. Initially in backward direction and after some time in forward direction
4. Zero

148.

The position of a particle at time t is given by the relation $x(t) = \left(\frac{v_0}{\alpha}\right)\left(1 - e^{-\alpha t}\right)$, where v_0 is a constant and $\alpha>0$. The dimensions of v_0 and α are respectively

1. $M^0L^1T^{-1}$ and T^{-1}
2. $M^0L^1T^0$ and T^{-1}
3. $M^0L^1T^{-1}$ and LT^{-2}
4. $M^0L^1T^{-1}$ and T

149.

A point starts moving in a straight line with a certain acceleration. At a time 't' after beginning

of motion the acceleration suddenly becomes retardation of the same value. The time in which the point returns to the initial point is-

1. $\sqrt{2t}$

2. $\left(2+\sqrt{2}\right)t$

3. $\frac{t}{\sqrt{2}}$

4. Cannot be predicted unless acceleration is given

150.

A 5 kg stationary bomb is exploded in three parts having mass in the ratio 1 : 1 : 3 respectively. If parts having same mass move in perpendicular directions with velocity 30 m/s, then the speed of the bigger part will be -

1. $10\sqrt{2}\ m/s$

2. $\frac{10}{\sqrt{2}}\ m/s$

3. $13\sqrt{2}\ m/s$

4. $\frac{15}{\sqrt{2}}\ m/s$

151.

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.

152.

The shape of a wave propagating in the positive x or negative x direction is given by $y = \frac{1}{\sqrt{1+x^2}}$ 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. $\frac{1}{2}$ m/s in positive x direction

4. $\frac{1}{2}$ m/s in negative x direction

153.

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

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

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

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

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

154.

A thin circular ring of mass *M* and radius *R* is rotating about its axis with a constant angular velocity ω. Four objects each of mass *m* are kept gently to the opposite ends of two perpendicular diameters of the ring. The angular velocity of the ring will be

1. $\frac{M\omega}{M+4m}$

2. $\frac{(M+4m)\omega}{M}$

3. $\frac{(M-4m)\omega}{M+4m}$

4. $\frac{M\omega}{4m}$

155.

The amplitude and the time period in a S.H.M. is 0.5 cm and 0.4 sec respectively. If the initial phase is $\pi/2$ radian, then the equation of S.H.M. will be

1. $y = 0.5 \sin 5\pi t$

2. $y = 0.5 \sin 4\pi t$

3. $y = 0.5 \sin 2.5\pi t$

4. $y = 0.5 \cos 5\pi t$

156.

The degree of freedom per molecule for a gas at an average is 8. If the gas performs 100 J of work when it expands under constant pressure, then amount of heat absorbed by gas is-

1. 500 J
2. 600 J
3. 20 J
4. 400 J

157.

A man is walking on the road with speed 3 m/s. Rain is falling vertically at speed 3 m/s. At what angle from vertical , man has to hold his umbrella to avoid the rain drops ?

1. 45^o
2. 30^o
3. 60^o
4. 90^o

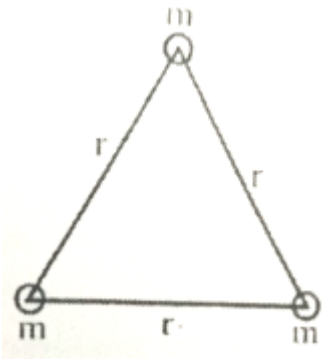
158.

In a horizontal pipe line the pressure falls by 16 Nm^{-2} between two points separated by a distance of 2 km. Density of oil is 800 kg m^{-3}. Change in kinetic energy per kg of the oil flowing in the tube is:

1. 2×10^3 J/kg
2. 2×10^2 J/kg
3. 2×10^{-2} J/kg
4. 2×10^{-3} J/kg

159.

Three equal mass (m) are placed at vertex of an equilateral triangle of side r . Work required to double the separation between masses will be :-



1. $\frac{Gm^2}{r}$
2. $\frac{3Gm^2}{r}$
3. $\frac{3}{2}\frac{Gm^2}{r}$
4. None

160.

Three rods made of the same material and having the same cross-section have been joined as shown in figure. Each rod is of the same length. The left and right ends are kept at $0°C$ *and* $90°C$, respectively. The temperature of the junction of the three rods will be

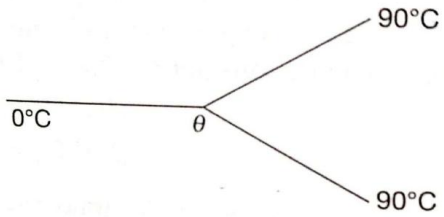


Fig. 11.2

1. $45°C$
2. $60°C$
3. $30°C$
4. $20°C$

161.

A fixed mass of an ideal gas undergoes a change in which it is supplied with 3500 J of thermal energy. At the same time this gas does 3500 J of work on its surroundings. Which type of change does the gas undergo during this time?

1. adiabatic
2. isothermal
3. isochoric
4. isomeric

162.

A man grows into a giant such that his linear dimensions increase by a factor of 9. Assuming that his density remains the same, the stress in the leg will change by a factor of:

1. $\frac{1}{81}$
2. 9
3. $\frac{1}{9}$
4. 81

163.

A standing wave is represented by

$Y = A\sin(100t)\cos(0\ .01\ x)$

where Y and A are in millimetre, t is in seconds and x is in *metre*. The velocity of the wave is :

1. 10^4 *m/s*
2. 1 *m/s*
3. 10^{-4} *m/s*
4. Not derivable from the above data

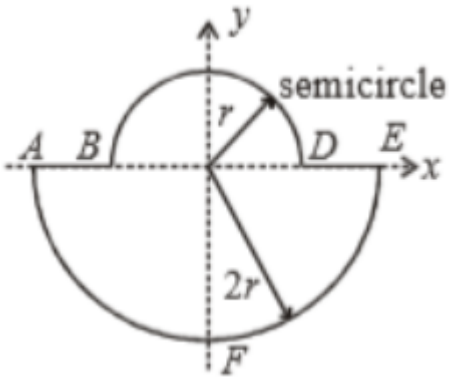
164.

A man sitting in a moving train hears the whistle of the engine. The frequency of the whistle is 600 *Hz*

1. The apparent frequency as heard by him is smaller than 600 *Hz*
2. The apparent frequency is larger than 600 *Hz*
3. The frequency as heard by him is 600 *Hz*
4. None of the above

165.

A uniform thin rod is bent in the form of closed loop ABCDEFA as shown in the figure. The ratio of inertia of the loop about x-axis to that about y-axis is:



1. >1
2. <1
3. =1
4. =1/2

166.

The instantaneous angular position of a point on

a rotating wheel is given by the equation

$\theta\left(t\right) = 2t^3 - 6t^2$

The torque on the wheel becomes zero at-

1. t = 0.5 s
2. t = 0.25 s
3. t = 2 s
4. t = 1 s

167.

In forced oscillation when system oscillates under the action of the driving force $F = F_0 \sin \omega t$ in addition to its internal restoring force, then the particle oscillates with a frequency equal to

1. The natural frequency of the body
2. Frequency of driving force
3. The difference in frequency of driving force and natural frequency
4. Mean of the frequency of driving frequency and natural frequency

168.

A body executes oscillations under the effect of a small damping force. If the amplitude of the body reduces by 50% in 6 minutes, then amplitude after the next 12 minutes will be[initial amplitude is A_0] -

1. $\frac{A_0}{4}$
2. $\frac{A_0}{8}$
3. $\frac{A_0}{16}$
4. $\frac{A_0}{6}$

169.

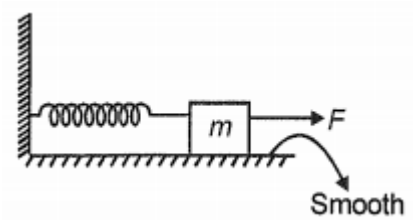
A body of mass 2 kg moving with a velocity of 3 m/s collides with a body of mass 1 kg approaching with velocity 6 m/s. If the collision is one dimensional

and perfect inelastic, then the velocity of combined mass after a collision is

1. 4 m/s
2. 3 m/s
3. 12 m/s
4. Zero

170.

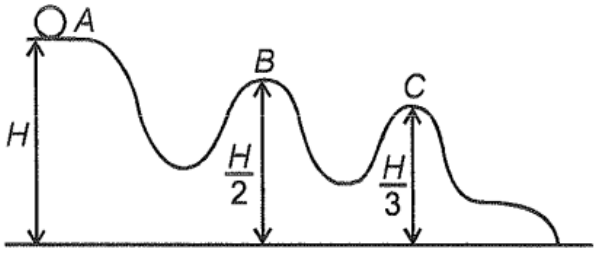
A block of mass m is connected to a spring of force constant K. Initially, the block is at rest and the spring is relaxed. A constant force F is applied horizontally towards the right. The maximum speed of the block will be



1. $\frac{F}{\sqrt{2mK}}$
2. $\frac{\sqrt{2}F}{\sqrt{mK}}$
3. $\frac{F}{\sqrt{mK}}$
4. $\frac{2F}{\sqrt{2mK}}$

171.

A ball of mass m at rest starts moving from point A. The irregular surface is frictionless. The speed of the ball at the point C on the track is



1. $\sqrt{\frac{4gH}{3}}$
2. $\sqrt{\frac{2gH}{3}}$
3. $\sqrt{gH}$
4. Zero

172.

A solid is suspended from independent support in a liquid placed on a weighing machine, due to which the weight of the liquid

1. Increases
2. Decreases
3. Remain unchanged
4. May increase or decrease

173.

The Young's modulus of a wire is numerically equal to the stress at which:

1. strain produced in the wire is equal to unity.
2. length of wire gets doubled.
3. length increases by 100%.
4. All of these

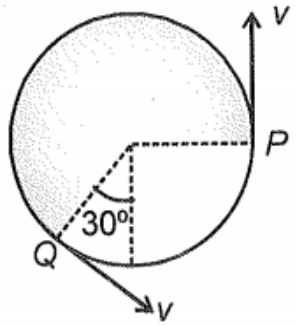
174.

Two bullets are fired simultaneously horizontally and at different speeds from the same place. Which bullet will hit the ground first? (Air resistance is neglected)

1. The faster one
2. The slower one
3. Depends on masses
4. Both will reach simultaneously

175.

A particle of mass 2 kg is moving in a circular path with a constant speed of 10 m/s. The change in the magnitude of velocity when a particle travels from P to Q will be (assume the radius of the circle is $10/\pi^2$]



1. $10\sqrt{3}$

2. $20\sqrt{3}$

3. 10

4. 0

176.

A body of mass m is situated at a distance $4R_e$ above the earth's surface, where R_e is the radius of the earth. How much minimum energy be given to the body so that it may escape?

1. mgR_e

2. $2mgR_e$

3. $mgR_e/5$

4. $mgR_e/16$

177.

In an experiment the height of an object measured by vernier calipers having least count 0.01 cm is found to be 5.72 cm. When no object is there between jaws of vernier calipers, the reading of the main scale is 0.1 cm and reading of the vernier scale is 0.3 mm. Find the correct height of the object:-

1. 5.72 cm

2. 5.59 cm

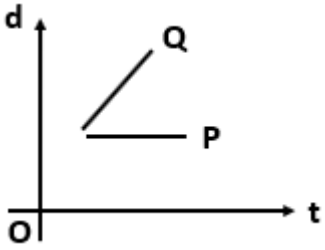
3. 5.85 cm

4. 5.69 cm

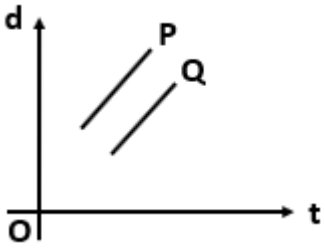
178.

Which one of the following displacement-time graph represents two moving objects P and Q with zero relative velocity?

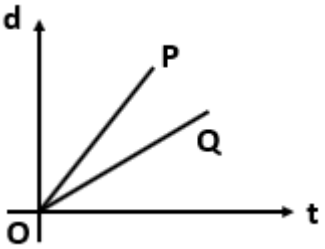
1.



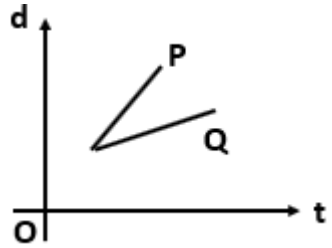
2.



3.



4.



179.

Choose the incorrect statement-

1. The centre of mass of a two-particle system lies on the line joining the two particles, being closer to the heavier particle

2. In rolling, the point of contact of the rolling body remains at rest relative to the surface on which it is rolling

3. Parallel axis theorem is applicable only for laminar bodies

4. A particle moving on a straight line may have non-zero angular momentum about a point

180.

A mass m is attached to a thin wire and whirled in a vertical circle. The wire is most likely to break when:

1. inclined at an angle of 60^0 from vertical

2. the mass is at the highest point

3. the wire is horizontal

4. the mass is at the lowest point.

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