1.

The mucosal layer in the stomach form irregular folds known as:-
1. villi
2. lumen
3. rugae
4. crypts of Lieberkuhn

2.

The condition where urea accumulates in blood is:

1. Glycosuria

2. Uremia

3. Ketonuria

4. Acidosis

3.

Facilitated transport differs from active transport as the former

1. Transports saturates.

2. Response to protein inhibitors.

3. Requires special membrane proteins.

4. Shows downhill transport.

4.

Mark the incorrect match?

1.	Cerebral aqueduct	→	A canal passes through the midbrain, connecting 3rd ventricle to 4th ventricle of brain.
2.	Corpus callosum	→	Thick band of nerve fibres that divides the cerebral cortex lobes into left and right hemisphere.
3.	Limbic system	→	The inner part of forebrain involved in the regulation of sexual behaviour.
4.	Pons	→	Consist of fibre tracts that interconnect different regions of the brain.

5.

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)

6.

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

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

2. (d) and (e) only

3. (b) and (d) only

4. All except (a)

7.

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

8.

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

9.

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.

10.

Which area actually secretes renin into the blood?

2. macula densa
3. juxtaglomerular apparatus
4. juxtaglomerular cells
5. cortical nephron

11.

Morels and Agaricus have edible fruiting bodies and belong to their respective class as.

1. Ascomycetes and Basidiomycetes.
2. Basidiomycetes and Ascomycetes.
3. Ascomycetes and Phycomycetes.
4. Basidiomycetes only

12.

When a cell is viewed under the microscope, it does not show golgi complex, endoplasmic reticulum, nucleolus, nuclear envelope in which stage of cell division?

1. Early prophase
2. Late prophase
3. Interphase
4. Telophase

13.

Chemiosmosis (related with respiration, photosynthesis ETS) does not require

1. Membrane, a proton pump.
2. ATP.
3. A proton gradient.
4. ATPase.

14.

What conditions are required for vernalisation in plants?

1. Low temperature, CO_2.
2. Low temperature, O_2, leaf.
3. Optimum temperature, O_2.
4. Low temperature, O_2.

15.

Which of the following structure is associated with locomotion ?
(i) Parapodia.
(ii) Water vascular system.
(iii) Radula.
(iv) Proboscis.

1. (i), (ii), (iii), (iv)
2. (i) only
3. (i), (ii) only
4. (i), (iii) only

16.

Breathing is best described as

1. Utilisation of O_2 by the cells for catabolic reaction.
2. Transport of gases by the blood.
3. The movement of air into and out of the lungs.
4. Diffusion of gases across alveolar membrane

17.

Match column-I and column-II, choose the correct combination from the option given

	Column-I		Column-II
(A)	Adhering Junctions	1.	Help to stop substances from leaking across a tissue
(B)	Gap junctions	2.	Perform cementing to keep neighbouring cells together
(C)	Tight junctions	3.	Facilitate the cells to communicate with each other

1. (A)-3, (B)-2, (C)-1
2. (A)-2, (B)-3, (C)-1
3. (A)-2, (B)-1,(C)-3
4. (A)-1, (B)-3, (C)-2

18.

Select the correct statement regarding the specific disorder of muscular or skeletal system

1. Myasthenia gravis- Autoimmune disorder which inhbits sliding of myosin filaments
2. Gout-inflammation of joints due to extra deposition of calcium
3. Muscular dystrophy-Age related shortening of muscles
4. Osteoporosis-Decrease in bone mass and higher chances of fractures with advancing age

19.

The process of release of urine in called micturition and the neural mechanisms causing it is called the micturition reflex

(i) Urine formed by the nephron is ultimately carried to the urinary bladder

(ii) This signal is initiated by the stretching of the urinary bladder as it gets filled with urine

(iii) In response, the stretch receptors on the bladder send signals to the CNS

(iv) The CNS passes motor messages to initiated the contraction of smooth muscles of the bladder causing the release of urine

Choose correct option which contain correct order of phenomena of micturation

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

2. (ii),(i),(iii) and (iv)

3. (iii),(ii),(i) and (iv)

4. (iv),(ii),(iii) and (i)

20.

Thrombokinase performs a specific function in human body

Choose the correct option

1. Thrombin → Prothrombin

2. Fibrinogen → Fibrin

3. Fibrin → Fibrinogen

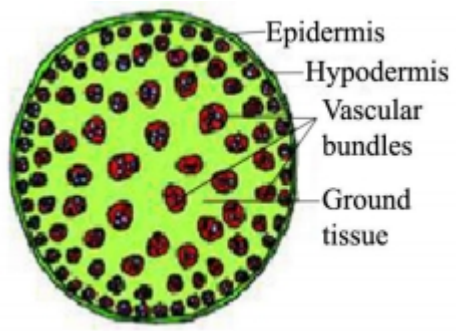
4. Prothrombin → Thrombin

21.

The incorrect match for chlorophyll type is
1. Chlorophyll ‘a’ .... Green algae
2. Chlorophyll ‘d’ ... Diatoms
3. Chlorophyll ‘c’ ... Dinoflagellates and Brown algae
4. Chlorophyll ‘d’ ...Red algae

22.

The diagram given below belongs to -



1. Dicot stem having conjoint and collateral vascular bundles

2. Monocot stem having conjoint and collateral vascular bundles

3. Dicot root with polyarch condition

4. Monocot root with radial vascular bundles

23.

Which of the following hormones is incorrectly paired with its action?

1. oxytocin–stimulates uterine contractions during childbirth

2. thyroxine–stimulates metabolic processes

3. insulin–stimulates glycogen breakdown in the liver

4. ACTH–stimulates the release of glucocorticoids by the adrenal cortex

24.

The role of calcium in muscle contraction is

1. to break the cross-bridges as a cofactor in the hydrolysis of ATP

2. to bind with troponin, changing its shape so that the actin filament is exposed

3. to transmit the action potential across the neuromuscular junction

4. to spread the action potential through the T tubules

25.

Which of these pairs is mismatched?

1. slightly movable joint–vertebrae
2. hinge joint–hip
3. immovable joint–sutures in cranium
4. ball and socket joint–hip

26.

Heterotrophic, eukaryotic, multicellular organisms lacking a cell wall are included in the kingdom.

1. Protista
2. Fungi
3. Plantae
4. Animalia

27.

The components of the vestibular apparatus are

1. Three semicircular canals and the otolith organs
2. Organ of corfi and eustachian tube
3. Malleus, incus and stapes
4. Saccule and cochlea

28.

What do A, B and C represent in the given scientific name respectively?

Mangifera Indica Linn

C B A

1. Generic name, specific name and author's name
2. Specific name, generic name and author's name
3. Author's name, specific name and generic name
4. Generic name, author's name and specific name

29.

Match Column - I with Column - II and choose the correct option

Column - I	Column - II
a.A vector of disease	(i) Bombyx
b.A gregarious pest	(ii) Limulus
c.A living fossil	(iii) Locusta
d.An economically important	(iv) Culex insect

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

30.

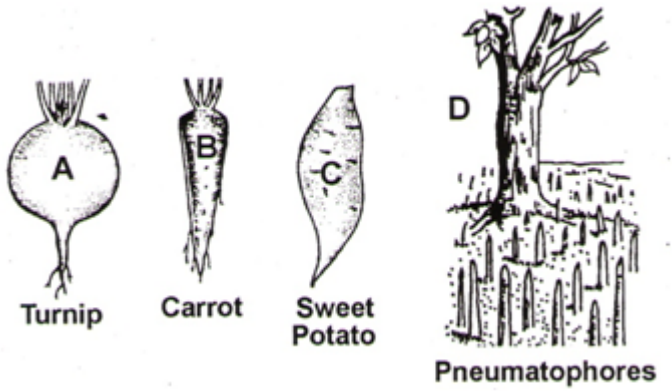
Column I	Column – II
A. Spring wood or early wood	I. Lighter in colour
B. Autumn wood or late wood	II. Density high
	III. Density low
	IV. Darker in colour
	V. Larger number of xylary elements
	VI. Vessels with wider cavity
	VII. Lesser number of xylary elements
	VIII. Vessels with small cavity

Which of the following matching is correct?

1. A – II, IV, VII, VIII; B – I, III, V, VI
2. A – I, II, VIII, VIII; B – III, IV, V, VI
3. A – I, III, V, VI; B – II, IV, VII, VIII
4. A – I, III, VII, VIII; B – II, IV, V, VI

31.

Which of the following is 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 to get oxygen for respiration.
3. Pneumatophore is found in the plants that grow in sandy soil.
4. A, B and C are underground roots but D grows vertically upwards.

32.

In 1971, T.O. Diener discovered a new infectious agent that was smaller than viruses –
I. It causes potato spindle tuber disease.
II. It is free RNA.
III. Molecular wt. of RNA is low.

The above statements are assigned to –
1. Viruses
2. Viroids
3. Virulent
4. Mycoplasma

33.

Which of the following is correct about class Deuteromycetes?
1. Some members are saprophytes or parasites.
2. A large number of members are decomposers of litter and help in mineral cycling.
3. Alternaria, Colletotrichum and Trichoderma are deuteromycetes.
4. All

34.

Similarity between protochordata and hemichordata is
1. Presence of notochord.
2. Exclusively marine.
3. Dorsal hollow and single central nervous system.
4. Exclusively parasitic.

35.

Identify the incorrect statement regarding the blood vascular system of cockroach:

1. Blood vessels are poorly developed and open into hemocoel
2. The hemolymph is composed of colorless plasma and hemocytes
3. Heart lies along the mid-ventral line of thorax and abdomen
4. Blood from sinuses enter heart through ostia

36.

Adipose tissue and areolar tissue are consider as

1. Loose connective tissue and dense connective tissue respectively.
2. Dense regular and dense irregular tissue respectively.
3. Both are specialised connective tissue.
4. Both are loose connective tissue

37.

Which of the following is mis-matched pair?
1. Belladonna - Medicine - Solanaceae
2. Asparagus- Vegetable - Liliaceae
3. Trifolium- Ornamental plant - Fabaceae
4. Tobacco - Fumigatory - Potato family

38.

Which of the following complex of mitochondrial ETS having two copper centers?
1. Cytochorme b c_1 complex
2. NADH dehydrogenase complex
3. Succinate dehydrogenase complex
4. Cytochrome oxidase complex

39.

The placentation having only single ovule is
1. Marginal
2. Axile
3. Basal
4. Parietal

40.

The blood from a person with an AB blood type
1. Would agglutinate with anti-A antibodies only.
2. Would agglutinate with anti-B antibodies only.
3. Would agglutinate with both anti-A and anti-B antibodies.
4. Would not agglutinate with either anti-A of anti-B antibodies.

41.

How is the digestion and absorption of fats different fron that of proteins and carbohydrates ?

1. Fat digestion occurs in the small intensine, and the digestion of proteins and carbohydrates occurs in stomach.

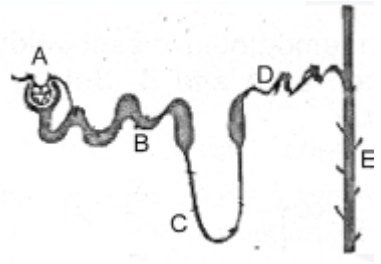
2. Fats are absorbed into the cells as fatty acids and monoglycerides but are then modified for absorption into the blood through lacteals; amino acids and glucose are not modified further.

3. Fats enter hepatic portal circulation, but proteins and carbohydrates enter lymphatic system.

4. Fats are absorbed in large intestine, and protein and carbohydrates are abosrbed in small intestine.

42.

In the accompanying diagram of a human nephron the functional parts are labelled as A,B,C,D,E



Study the diagram to answer the questions given
P : Active secretion of H+ and K+ into the filtrate occurs in which parts ?
Q : Conditional reabsorption of Na+ and water is a function of
R : Reabsorption of water is minimum in which segment ?
Choose the correct option.

S.No.	P	Q	R
1.	B,D	C	E

2. A,B,C C E
3. D,E D C
4. A,D,E E C

43.

Intercalated disc are a type of
1. Adherent junction.
2. Desmosomes.
3. Communicating junction.
4. Tight juction

44.

The plasma calcium levels is very effectively maintained by a balance between the activities of
1. Thyroxine and parathormone.
2. Parathormone and calcitonin.
3. Aldosterone and vasopressin.
4. Insulin and glucagon.

45.

All the following are present in sponges, except
1. Spicules
2. Choanocytes
3. A digestive tract
4. Sexual and / or asexual reproduction

46.

It begins with the simultaneous splitting of the centromere of each chromosome, is true for which stage of Cell division.
1. Anaphase-I
2. Anaphase-II
3. Anaphase
4. More than one

47.

Archaebacteria differ from other bacteria on the basis of
1. Cell membrane structure.
2. Cell wall structure.
3. Presence of vacuole.
4. flagella structure.

48.

Plant prefers to absorb nitrogen in form of nitrate from soil, then it is reduced to ammonia. This reduction to ammonia takes place in which part of plant
1. Root.
2. Leaf.
3. Stem.
4. Any

49.

The following processes occur during photosynthesis

(i) Reduction of carbon dioxide

(ii) The splitting of water

(iii) The synthesis of glucose

(iv) Release of oxygen

(v) Formation of ATP

Which one of the following combinations is correct for the light phase ?

1. i, ii and iii

2. iii, iv and v

3. i, iii and iv

4. ii, iv and v

50.

Anisogamy is observed in
1. Eudorina
2. Volvox
3. Fucus
4. Kelps

51.

Excretory system is absent, sexes are separate, fertilization is usually external this is correct for :

1. 

2. 

3. 

4. 

52.

Select the correct option in respect of characteristics of each group :-

	Cyclostomes	Chondrichthyes	Osteichthyes
(i)	Marine	Marine, Fresh water	Marine
(ii)	Sucking mouth	Ventral mouth	Terminal mouth
(iii)	6-15 Pairs of Gills	5-7 Pairs of Gills	4 Pairs of Gills
(iv)	Placoid scales	Cycloid Scales	Ctenoid/ Ganoid

1. (i), (ii) are correct.
2. (i), (iii), (iv) are correct.
3. (ii), (iii) are correct.
4. (ii), (iii), (iv) are correct.

53.

Match the column I with column II :-

Column-I	Column-II
(i) Vomiting	(a) Inadequate enzyme secretion
(ii) Diarrhoea	(b) Irregular bowel movement
(iii) Constipation	(c) Increased liquidity of faecal discharge
(iv) Indigestion	(d) A feeling of nausea

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

54.

How many hormones in the given list are not produced by anterior pituitary?
Prolactin(PRL), growth hormone(GH), Oxytocin, Thyroid stimulating hormone(TSH) , vasopressin, somatostatin, Gonadotrophin releasing hormone(GnRH).

1. 6
2. 5
3. 4
4. 3

55.

The state of heart when it not pumping blood effective enough to meet the needs of the body is called

1. CAD.
2. Atherosclerosis.
3. Angina.
4. Heart failure.

56.

In the rest state, a subunit of troponin masks :-

1. Active binding sites for actin on the myosin filaments.
2. Active binding sites for myosin on the myosin filaments.
3. Active binding sites for myosin on the actin filaments.
4. Actine binding sites for actin on the actin filaments.

57.

Which of the following characteristics are common in both Selaginella and Pinus?

(i) Spores are of two types.
(ii) Vascular tissues are not present.
(iii) Main plant body is sporophyte.
(iv) Male and female gametophytes are retained on the sporophyte.

1. (i), (ii) and (iv)
2. (i), (iii) and (iv)
3. (i) and (iii) only
4. (iii) and (iv) only

58.

The cells which give rise to a part of vascular cambium in main root and laterals roots are

1. Parenchymatous cells of pericycle.
2. Collenchymatus cells of endodermis.
3. Parenchymatous cells of endodermis.
4. Meristematic cells of cortex.

59.

Choose the incorrectly matched pair.

1. Contractile vacuole - Excretion.
2. SER - Steroidal hormones synthesis.
3. Xanthophyll - Fat soluble pigment.
4. Eukaryotic flagellum - Extension of basal body.

60.

In G_2 phase of cell cycle
1. RNA synthesis stops.
2. DNA replicates.
3. Deoxyribonucleotide synthesis begins.
4. Tubulin protein synthesis takes place.

61.

Alignment of bivalent chromosomes on the equatorial plate and splitting of centromeres occur respectively in which of the following stages of cell division?

1. Anaphase I and anaphase II.
2. Metaphase II and anaphase I.
3. Metaphase I and anaphase II.
4. Pachytene and telophase I.

62.

The interconnected cells which do not show symplastic movement of water are

1. Mesophyll cells.
2. Tracheids.
3. Xylem parenchyma cells.
4. Cells of endodermis.

63.

Read the following statements and choose the option which is true for them.
Statement-I : During conversion of succinic acid to fumaric acid in Krebs cycle, one molecule of FAD is synthesized.
Statement-II : There are three steps in the Krebs cycle where CO_2 is released.

1. Only statement I is correct.
2. Only statement II is correct.
3. Both the statements I and II are correct.
4. Both the statements I and II are incorrect.

64.

In a flowering plant if auxins are not synthesizing, then effects which would most probably be seen in this plant are
i. Dropping of fruits at early stage.
ii. Inhibition in the growth of lateral buds.
iii. Delayed abscission of older mature leaves.
iv. Inhibition of cell division in cambium.

1. i, ii and iv
2. i, iii and iv
3. ii and iv only
4. i and iii only

65.

Which of the following chordata is characterised with marine habitat, external fertilization and direct development?
1. Petromyzon.
2. Antedon.
3. Hippocampus.
4. Scolodion.

66.

During catalytic cycle of an enzyme action the binding of the __a__ induces the __b__ to alter its shape. Here a and b is _____
1. Substrate, enzyme.
2. Enzyme, substrate.
3. Substrate, Substrate.
4. Enzyme, Enzyme

67.

Select an incorrect match
1. Psilopsida – Psilotum
2. Sphenopsida – Selaginella
3. Lycopsida – Lycopodium
4. Pteropsida – Dryopteris

68.

Interfascicular cambium in a dicot stem is formed from
1. Pericycle cells
2. Cortex cells
3. Medullary ray cells
4. Conjuctive parenchyma

69.

Which organelle is extensive and continuous with the outer membrane of the nucleus?
1. Golgi complex
2. ER
3. Vacuole
4. Lysosome

70.

C_4 and CAM plants have many similarities, like

1. Secondary CO_2 fixation by Rubisco
2. Scotoactive stomata
3. Primary CO_2 fixation by PEPCase in bundle sheath
4. Presence of Kranz anatomy

71.

Fate of pyruvate produced by glycolysis depends on cellular needs, it can enter
1. Lactic acid fermentation
2. Alcoholic fermentation
3. Aerobic respiration
4. All are correct

72.

RQ value for tripalmitin is
1. > 1
2. < 1
3. Zero
4. Infinite

73.

Which of the following statement is correct w.r.t. to excretion?

1. Our lungs remove large amount of CO_2 (180 litres/day) and also significant quantity of water everyday
2. The ascending limb is permeable to water and also allows transport of electrolytes actively or passively
3. Conditional reabsorption of Na^+ and water takes place in proximal convoluted tubule
4. Maximum water reabsorption takes place in proximal convoluted tubule, even in the presence of ADH

74.

In nucleic acid the bond between the phosphate and hydroxyl group of sugar is
1. Hydrogen bond
2. Glycosidic bond
3. Ester bond
4. Peptide bond

75.

The maximum volume of air a person can breathe in after a forced expiration is
(A) Vital capacity
(B) ERV + TV + IRV
(C) TLC – RV
(D) ERV – RV

1. (A) only
2. (A) & (B) only
3. (A), (B) & (C) only
4. (A), (B), (C) & (D)

76.

Neurohypophysis store and release hormones which are actually synthesised by hypothalamus and are transported axonally here. Which of the following hormones belong to this category?
1. Glucocorticoid gonadotropins
2. FSH, LH
3. Oxytocin, Vasopressin
4. TSH, ACTH

77.

Which cell organelle principally performs the function of packaging materials, to be delivered either to the intra-cellular targets or secreted outside the cell?
1. Rough endoplasmic reticulum
2. Golgi apparatus
3. Smooth endoplasmic reticulum
4. Lysosomes

78.

In which form sugar is moved into the companion cell and then into the living phloem sieve tube cells?
1. Glucose
2. Fructose
3. Sucrose
4. Glycogen

79.

The amount of CO_2 that can diffuse through the diffusion membrane per unit difference in partial pressure is much higher as compared to that of O_2. This is because

1. Solubility coefficient of CO_2 is higher

2. Solubility coefficient of CO_2 is lesser

3. Amount of gases in blood is independent of partial pressures of the gases in the atmosphere

4. Arterial blood contains more O_2 than CO_2

80.

All the following statements about cellulose are correct, except

1. Cellulose is homopolymer

2. it is the most abundant organic molecule in the biosphere

3. It is branched polymer of β -glucose

4. It has β 1-4 glycosidic bonds

81.

Which one of the following gland is correctly matched with the accompanying description?

1. Thyroid $\rightarrow$ Hyperactivity in children causes cretinism

2. Thymus $\rightarrow$ Starts undergoing atrophy after puberty

3. Parathyroid$\rightarrow$ Secretes parathormone which promotes movement of calcium ions from blood to bones during clacification

4. Pancreas $\rightarrow$ Alpha cells of islet of Langerhans secrete a hormone which stimulates glycogenesis

82.

Which set includes hormones that are involved in carbohydrate metabolism?
1. Insulin, glucagon, epinephrine, calcitonin
2. Insulin, glucagon, epinephrine, cortisol
3. Insulin, glucagon, cortisol, melatonin
4. Insulin, glucagon, nor epinephrine, melatonin

83.

The given table enlists various hormones and their chemical nature.

Hormone	Chemical composition
(1) ___(i)____	Peptide
(2) Testosterone	___(ii)____
(3) Thyroxine	___(iii)____
(4) ___(iv)____	Amino-acid derivative

The information in which alternative completes the given table?

1. i-Cortisol; ii-Steroids; iii-Polypeptide; iv-Estradiol
2. i-Insulin; ii-Proteins; iii-Polypeptide, iv-Epinephrine
3. i-Cortical; ii-Proteins; iii-Iodothyronines; iv-Estradiol
4. i-Insulin; ii-Steroids; iii-Iodothyronines; iv-Epinephrine

84.

Select the incorrect statement regarding facilitated diffusion:-

1. It is a very specific process
2. It is a passive process
3. It helps the hydrophilic substances to be transported across the membrane
4. It is faster than active process

85.

One turn of the helix in a B-form DNA is approximately ?

1. 20 nm
2. 0.34 nm
3. 3.4 nm
4. 2 nm

86.

ABA induces :-

1. Seed dormancy
2. Syngamy
3. Parthenocarpy
4. Germination

87.

A phyllotaxy, where more than two leaves arise at a node, found in

1. Calotropis
2. Alstonia
3. China rose
4. Sunflower

88.

The stage during which chiasmata becomes visible is

1. Pachytene
2. Diplotene
3. Diakinesis
4. Zygotene

89.

Choose the incorrect statement

1. Photoreceptors in the human eye are depolarized in darkness while hyperpolarized during bright light
2. Hypothalamus regulates the body temperature
3. Rhodopsin which is present in rods, a type of photoreceptor cells is a derivative of vitamin C
4. Eustachian tube equalizes pressure on either side of the eardrum

90.

The apical meristem performs all of the given functions, except

1. Produces the primary tissues of the plant body
2. Responsible for primary growth of the plant
3. Growth of roots and stem in length
4. Produces cork

91.

The quantum numbers of most energetic electron in Ne atom in first excited state is

1. 2, 1, 0, +1/2
2. 3, 1, 1, +1/2
3. 3, 0, 0, +1/2
4. 3, 1, 0, +1/2

92.

The masses of photons corresponding to the first lines of the Lymann and the Balmer series of the atomic spectrum of hydrogen are in the ratio of

1. 5:27
2. 1:4

3. 27:5

4. 4:1

93.

Which work done is maximum?

1. Isobaric work 2. Isothermal work

3. Isochoric work 4. Adiabatic work

94.

A large difference between fifth and sixth ionisation energies indicate the element having :-

1. 15 proton in nucleus

2. 13 proton in nucleus

3. 11 proton in nucleus

4. Ionisation energy is NOT related to number of proton in nucleus

95.

One *gm.* of a metal carbonate gave 0.56 *gm.* of its oxide on heating. The equivalent mass of the metal is

1. 40

2. 30

3. 20

4. 10

96.

At constant temperature, if pressure increases by 1%, the percentage decrease of volume is

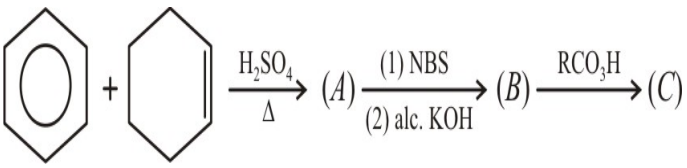
1. 1%

2. 100/101%

3. 1/101%

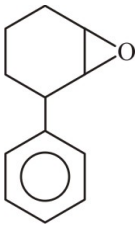
4. 1/100%

97.



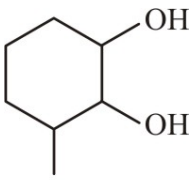
Product (C) is:-

1.

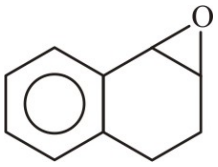


2.

3.



4.



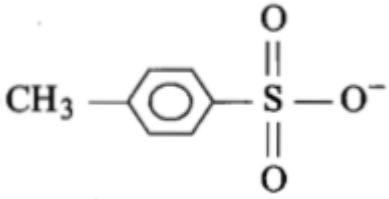
98.

The correct order of nucleophilicity among the following is:

(I) CH_3COO^-

(II) CH_3CO^-

(III) CN^-



(IV)

1. I > II > III > IV

2. IV > III > II > I

3. II > III > I > IV

4. III > II > I > IV

99.

Hydrogen cyanide and hydrogen isocyanide are:

1. tautomers

2. positional isomers

3. metamers

4. chain isomers

100.

How many electrons can fit in the orbital for which n = 3 and l = 1?

1. 2

2. 6

3. 10

4. 14

101.

Which of the following pairs has the same size?

1. Fe^{2+},Ni^{2+}

2. Zr^{4+},Ti^{4+}

3. Zr^{4+},Hf^{4+}

4. Zn^{2+},Hf^{4+}

102.

The oxidation number of *S* in $H_2S_2O_8$ is **[MP PET 2002]**

1. + 2

2. + 4

3. + 6

4. + 7

103.

The correct order of 'S—O' bond length is:

1. $SO_3^{2-} > SO_4^{2-} > SO_2 > SO_3$

2. $SO_3^{-2} > SO^{-2}_4 > SO_2 > SO_3$

3. $SO^{-2}_4 > SO_3^{-2} > SO_2 > SO_3$

4. $SO_4^{-2} > SO_3^{-2} > SO_3 > SO_2$

104.

Which of the following metal on burning in moist air does not give the smell of ammonia?

1. Mg

2. Ca

3. K

4. Li

105.

Which of the following order is correct?

1. $K^+ < Ca^{2+} < p^{3-} < S^{2-}$: Ionic size

2. $Na^+_{(aq.)} > K^+_{(aq.)} > Rb^+_{(aq.)} > Cs^+_{(aq.)}$: Electrical conductance

3. $Al^{3+}_{(aq.)} > Mg^{2+}_{(aq.)} > Na^+_{(aq.)}$: Hydrated size

4. $I^-_{(aq.)} < Br^-_{(aq.)} < Cl^-_{(aq.)} < F^-_{(aq.)}$: Ionic mobility

106.

2 gms of hydrogen diffuses from a container in 10 minutes. How many gms of oxygen would diffuse through the same time under similar conditions?

1. 0.5 gm

2. 4 gm

3. 6 gm

4. 8 gm

107.

100 mL of H_2SO_4 solution having molarity 1M and density 1.5 g/mL is mixed with 400 mL of water. Calculate final molarity of H_2SO_4 solution, if final density is 1.25 g/mL:

1. 4.4 M

2. 0.145 M

3. 0.52 M

4. 0.277 M

108.

For the reaction :
$X_2O_4(l) \rightarrow 2XO_2(g)$

$\Delta U = 2.1$ kcal, $\Delta S = 20$ cal K^{-1} at 300 K
The value of ΔG is

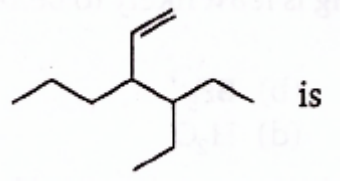
1. 2.7 k cal

2. -2.7 k cal

3. 9.3 k cal

4. -9.3 k cal

109.
The correct IUPAC name of the compound



is

1. 3-ethyl-4-ethenylheptane

2. 3-ethyl-4-propylhex-5-ene

3. 3-(1-ethyl propyl) hex-1-ene

4. 4-ethyl-3-propylhex-1-ene

110.

Which of the following is the most basic oxide?

1. Al_2O_3

2. Sb_2O_3

3. Bi_2O_3

4. SeO_2

111.

A gas at 350 K and 15 bar has molar volume 20 percent smaller than that for an ideal gas under the same conditions. The correct option about the gas and its compressibility factor (Z) is:

1. Z<1 and repulsive forces are dominant

2. Z>1 and attractive forces are dominant

3. Z>1 and repulsive forces are dominant

4. Z<1 and attractive forces are dominant

112.

When Al is added to the potassium hydroxide solution:

1. no reaction takes place

2. oxygen is evolved

3. water is produced

4. hydrogen is evolved

113.

lf equal moles of water and urea are take in a vessel what will be the mass percentage of urea in the solution?

1. 22.086

2. 11.536

3. 46.146

4. 76.92

114.

Find the number of valence electrons present in 0.53 gram of Na_2CO_3.

1. 3.01×10^{23}

2. 7.22×10^{22}

3. 12.046×10^{23}

4. 6.023×10^{23}

115.

The volume of carbon dioxide gas evolved at STP by heating 7.3 g of $Mg(HCO_3)_2$ will be

1. 1000 mL

2. 1120 mL

3. 2230 mL

4. 3240 mL

116.

An example of a reversible reaction is

1. $KNO_3(aq) + NaCl(aq) = KCl(aq) + NaNO_3(aq)$

2. $2\,Na(s) + H_2O(l) = 2\,NaOH(aq) + H_2(g)$

3. $AgNO_3(aq) + HCl(aq) = AgCl(s) + NaNO_3(aq)$

4. $Pb\,(NO_3)_{2(aq)} + 2\,NaI_{(aq)} = PbI_{2(s)} + NaNO_{3(aq)}$

117.

The number of primary amines of formula $C_4H_{11}N$ are

1. 1

2. 3

3. 4

4. 5

118.

Arrange the following groups in order of decreasing - I (inductive) effects:

$NO_2,\ C(CH_3)_3,\ CH_3,\ OCH_3,\ Br$

1. $NO_2 > Br > OCH_3 > C(CH_3)_3 > CH_3$

2. $NO_2 > Br > OCH_3 > CH_3 > C(CH_3)_3$

3. $NO_2 > OCH_3 > Br > C(CH_3)_3 > CH_3$

4. $NO_2 > OCH_3 > C(CH_3)_3 > Br > CH_3$

119.

Which of the following compounds does not dissolve in concentrated H_2SO_4 even on warming?

1. aniline

2. benzene

3. ethylene

4. hexane

120.

Which of the following shows acidic character?

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

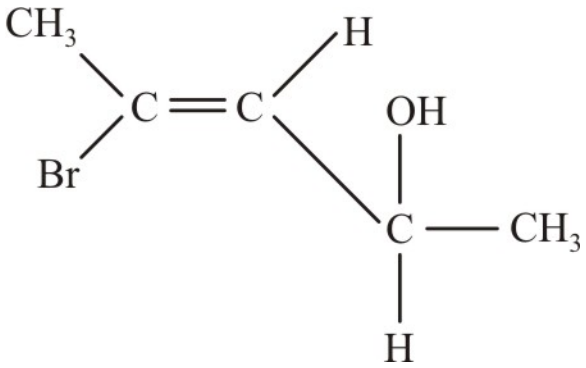
121.

Ethene and ethyne can be distinguished by

1. Br_2 water
2. $KMnO_4$ solution
3. cuprous chloride solution
4. any of the above

122.

The compound, whose stereochemical formula is shown below, exhibits A-geometrical isomers and B-optical isomers



The values of A and B are

1. 4 and 4
2. 4 and 2
3. 2 and 4
4. 2 and 2

123.

The pH of 0.05 M aqueous solution of diethylamine is 12. Its K_b is

1. 2×10^{-3}
2. 2.5×10^{-3}
3. 3×10^{-3}
4. 4.5×10^{-3}

124.

The correct order of relative basic strength of the following is

1. $C_2H_5O^- > CH \equiv C^- > OH^-$
2. $CH \equiv C^- > {}_-OH > C_2H_5O^-$
3. $CH \equiv C^- > C_2H_5O^- > OH^-$
4. $C_2H_5O^- > OH^- > CH \equiv C^-$

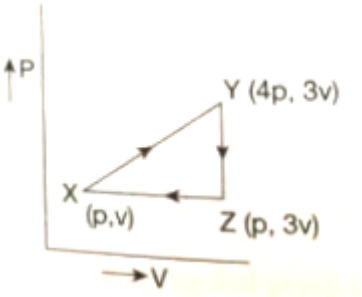
125.

If a gas absorbs 200 J of heat and expands by 500 cm^3 against constant pressure of 2 x 10^5 Nm^{-2} then change in internal energy is

1. -200 J
2. -100J
3. +100J
4. + 300J

126.

The net work done for an ideal gas is given as



1. $-3PV$
2. 3PV
3. PV
4. Zero

127.

Which of the following is not an endothermic reaction?

1. combustion of methane
2. decomposition of water
3. dehydrogenation of ethane or ethylene
4. conversion of graphite to diamond

128.

The number and type of bonds between two carbon atoms in calcium carbide are

1. one sigma, two pi
2. two sigma, two pi
3. one sigma, one pi
4. two sigma, one pi

129.

Which of the following are Lewis acids?

(i) BF_3 (ii) H_2O (iii) H^+ (iv) AlF_3

1. only (i)
2. (i) and (ii)
3. (i) , (iii) and (iv)
4. all of the above

130.

Most common oxidation state of cerium (Ce) is :

1. +2, +3
2. +2, +4
3. +3, +4
4. +3, +5

131.

Which of the following pairs will not produce dihydrogen gas ?

1. Cu + HCl (dil.)
2. Fe + H_2SO_4
3. Mg + steam
4. Na + alcohol

132.

Hydrogen absorbed on palladium is known as:

1. atomic H
2. nascent H
3. occluded H
4. heavy H

133.

The correct order of ease of hydrolysis is

1. $CCl_4 < SiCl_4 < PCl_5 < AlCl_3$
2. $AlCl_3 < CCl_4 < PCl_5 < SiCl_4$
3. $CCl_4 < AlCl_3 < PCl_5 < SiCl_4$
4. $CCl_4 < AlCl_3 < SiCl_4 < PCl_5$

134.

A diatomic molecule has a dipole moment of 1.2 D. If its bond length is equal to 10^{-10} m then the fraction of an electronic charge on each atom will be:

1. 42%
2. 52%
3. 37%
4. 25%

135.

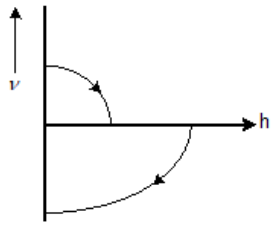
The correct order of decreasing second ionization enthalpy of Ti(22), V(23), Cr (24) and Mn(25) is

1. Cr > Mn > V > Ti
2. V > Mn > Cr > Ti
3. Mn > Cr > Ti > V
4. Ti > V > Cr > Mn

136.

A ball is dropped vertically from a height h above the ground. It hits the ground and bounces up vertically to a height h/2. Neglecting subsequent motion and air resistance, its velocity v varies with the height h as

1.



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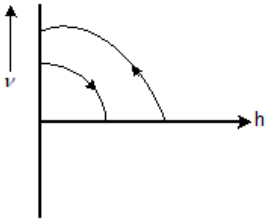
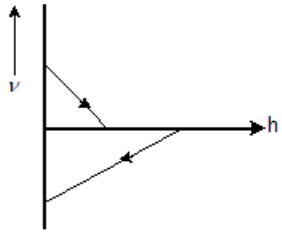
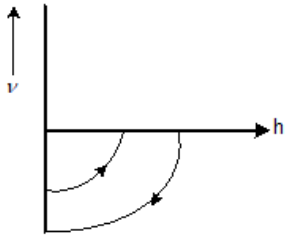


3.



4. 

137.

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. $[M^0L^0T^{-1}]$

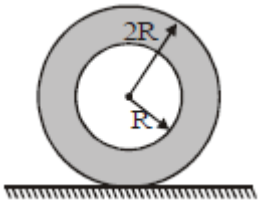
2. $[M^0L^0T^0]$

3. $[M^0LT^{-1}]$

4. $[M^0L^2T^{-2}]$

138.

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

139.

A particle of mass M is at a distance 'a' from center 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.

140.

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 5×10^8 N $-$ m^2. Find the velocity of mass when rubber cord is unstreched(in m/s).

1. 5

2. 3

3. 7

4. 2

141.

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. ($v_{sound} = 330\ m/s$)

1. $\frac{32}{31}f$

2. $\frac{47}{23}f$

3. $\frac{31}{32}f$

4. f

142.

A particle is projected from a horizontal plane (x-z plane) such that its velocity vector at time t is given by $\vec{V} = a\hat{i} + (b - ct)\hat{j}$. Its range on the horizontal plane is given by

1. $\frac{ba}{c}$

2. $\frac{2ba}{c}$

3. $\frac{3ba}{c}$

4. None

143.

The pressure in monoatomic gas increases linearly from 4 atm to 8 atm when its volume increases from 0.2 m^3 to 0.5 m^3. The increase in internal energy is-

1. 480 kJ

2. 550 kJ

3. 200 kJ

4. 100 kJ

144.

A 50 kg mass is swinging in a vertical plane on a string, from rest. Then the power delivered when mass is moving with a velocity of 2 m/sec upwards in a direction making an angle 60° with the vertical is- (g = 9.8 m/s^2)

1. 980 W

2. 490 W

3. $490\sqrt{3}\ W$

4. 245 W

145.

A car is moving on a circular level road of curvature 300 m. If the coefficient of friction is 0.3 and acceleration due to gravity is 10 ms^{-2}, the maximum speed that car can have is-

1. $30\,\mathrm{kmh}^{-1}$

2. $81\ \mathrm{kmh}^{-1}$

3. $108\ \mathrm{kmh}^{-1}$

4. $162\ \mathrm{kmh}^{-1}$

146.

The root mean square velocity of the gas molecules is 300 m/s. What will be the root mean square speed of the molecules if the atomic weight is doubled and absolute temperature is halved?

1. 300 m/s

2. 150 m/s

3. 600 m/s

4. 75 m/s

147.

A man weighing 80 kg is standing in a trolley weighing 320 kg. The trolley is resting on frictionless horizontal rails. If the man starts walking on the trolley with a speed of 1 m/s, then after 4 sec his displacement relative to the ground will be

1. 5 m

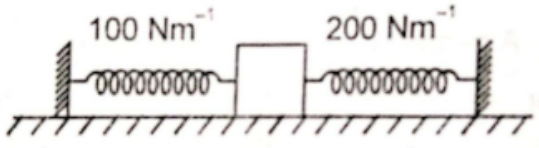
2. 4.8 m

3. 3.2 m

4. 3.0 m

148.

A mass of 30 g is attached with two springs having spring constant 100 N/m and 200 N/m and other ends of springs are attached to rigid walls as shown in the given figure. The angular frequency of oscillation is



1. $\frac{100}{2\pi}\ \mathrm{rad/s}$

2. $\frac{100}{\pi}\ \mathrm{rad/s}$

3. 100 rad/s

4. 200π rad/s

149.

A particle is executing linear simple harmonic motion with amplitude a and angular frequency 'ω'. Its average speed for its motion from extreme to mean position is

1. $\frac{a\omega}{4}$
2. $\frac{a\omega}{2\pi}$

3. $\frac{2a\omega}{\pi}$

4. $\frac{a\omega}{\sqrt{3}\pi}$

150.

Displacement as a function of time is given as y = 2sinωt + 2cosωt. The amplitude of the function is:

1. $2\sqrt{2}$

2. 2

3. 4

4. 8

151.

Due to the force $\vec{F} = \left(4\hat{i} + 4\hat{j}\right)\mathrm{N}$, a body shifted from origin to the point (5 m, 6 m). The work done by the force is

1. 44 J

2. 22 J

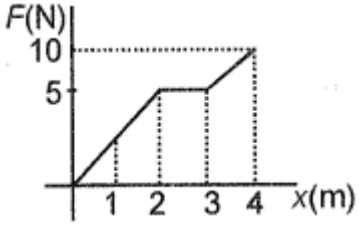
3. 4 J

4. Zero

152.

A body of 10 kg is subjected to a force as shown

in the figure. The block moves along a straight line under the influence of this force. The change in kinetic energy when the body moves from x = 0 to x = 4 m will be



1. 15J
2. 12.5 J
3. 17.5J
4. 19.2 J

153.

Two progressive waves are represented by y_1 = 5*sin(200t −3.14x)* and $y_2 = 10\sin\left(200t - 3.14x + \frac{\pi}{3}\right)$ (x is in metre and t is in second). Path difference between two waves is

1. $\frac{100}{\pi}m$
2. $\frac{1}{3}m$
3. $3.14 \times \frac{\pi}{3}\text{m}$
4. $\frac{\pi^2}{9}m$

154.

If the speed of sound in air is 320 m/s, then with what frequency of sound, the air column of 2 m long pipe closed at one end will resonate?

1. 120 Hz
2. 200 Hz
3. 280 Hz
4. All of these

155.

A string is fixed at both the ends and vibrating in the third harmonic. The equation of vibration is given as $Y = 0.05(\text{m})\ \sin(0.005\,\text{cm}^{-1}\,x)\ \cos[(200\pi\,\text{s}^{-1})\,t]$. Find the length of the string

1. 600π cm
2. 600 cm
3. 200 cm
4. 200π cm

156.

Water is heated from 0°C to 6°C. Its density-

1. Decreases
2. First decreases and then increases
3. First increases and then decreases
4. Remains constant

157.

If a uniform metallic rod heated from one end is in steady-state, then temperature of every cross-section of rod is

1. Equal and constant
2. Equal and vary with time
3. Different and constant
4. Different and vary with time

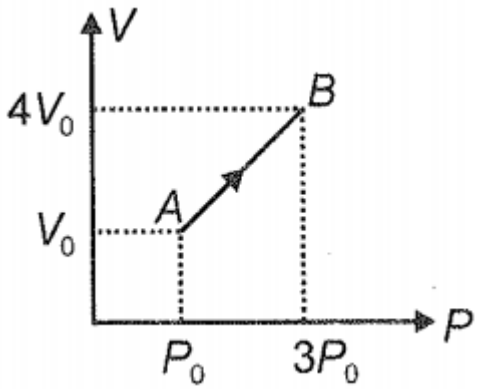
158.

A diatomic ideal gas initially at temperature T_1 is enclosed in a cylinder fitted with a frictionless piston. The gas is allowed to expand adiabatically to a temperature is T_2. If the length of gas column in the cylinder initially and finally is L_1 and L_2 respectively, then $\frac{T_1}{T_2}$ is:

1. $\left(\frac{L_2}{L_1}\right)^{2/5}$
2. $\left(\frac{L_2}{L_1}\right)^{5/2}$
3. $\left(\frac{L_1}{L_2}\right)^{2/3}$
4. $\left(\frac{L_2}{L_1}\right)^{3/2}$

159.

The work done for given process AB is-



1. $6P_0V_0$

2. $5P_0V_0$

3. $3P_0V_0$

4. $2P_0V_0$

160.

The temperature of the sink and source of an ideal engine is $500\ K\ and\ 1000\ K$ is respectively. In which of the following cases, the increase in efficiency will be maximum?

1. Temperature of the sink is lowered by $100^\circ C$

2. Temperature of the source is increased by $100^\circ C$

3. Temperature of sink is lowered by $50^\circ C$

4. Temperature of the source is increased by $50^\circ C$

161.

A satellite moving in a circular orbit has binding energy E_1. When its orbit's radius increases, the binding energy becomes E_2. The change in gravitational potential energy is:

1. $(\mathrm{E}_1 - \mathrm{E}_2)$

2. $2(\mathrm{E}_1 - \mathrm{E}_2)$

3. $(\mathrm{E}_2 - \mathrm{E}_1)$

4. $2(\mathrm{E}_2 - \mathrm{E}_1)$

162.

If the pressure of a gas is doubled, then the average kinetic energy per unit volume of the gas will be:

1. Half of its initial value

2. Double its initial value

3. One-fourth of its initial value

4. Four times its initial value

163.

A solid sphere slides from top to bottom of a smooth inclined plane. It takes time T. If it rolls on a rough inclined plane of same dimension, then time taken by it to reach from top to bottom will be:

1. $\sqrt{3}T$

2. $\sqrt{\frac{2}{5}}T$

3. $\sqrt{\frac{5}{3}}T$

4. $\sqrt{\frac{7}{5}}T$

164.

A particle of mass M revolves in a circular path of radius R with constant angular momentum L. The linear momentum of the particle is-

1. $\frac{L}{MR}$

2. $\frac{L}{R}$

3. $\frac{L^2}{MR^2}$

4. $\frac{MR}{L}$

165.

A uniform thin rod of mass 4 kg and length 8 m is folded to form a circular ring, then the moment of inertia (in kg-m^2) of ring about one of its diameter will be

1. $\frac{8}{\pi^2}$

2. $\frac{16}{\pi^2}$

3. $\frac{32}{\pi^2}$

4. $\frac{64}{\pi^2}$

166.

The rotational analouge of equation $F = \frac{mdv}{dt}$ is

1. $\tau = \frac{dL}{dt}$

2. $\tau = I\frac{d\omega}{dt}$

3. $\tau = I\frac{dI}{dt}\omega$

4. $\tau = \frac{Id\omega}{dt} + \frac{dI}{dt}\omega$

167.

The position vector of a planet w.r.t. sun sweeps area A during the first week of January 2001. The area swept by it during the month of February 2004 is-

1. 28 A

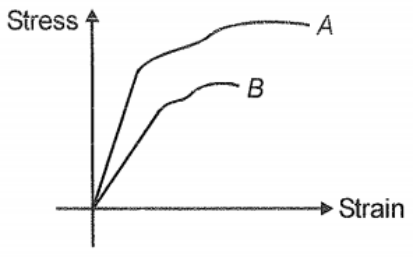
2. 4 A

3. 7 A

4. $\frac{29\mathrm{A}}{7}$

168.

The stress-strain curve for two materials A and B are shown in the figure. Select correct statement-



1. Material A is less brittle and less elastic as compared to B

2. Material A is more ductile and less elastic as compared to B

3. Material A is less brittle and more elastic than B

4. Material B is more brittle and more elastic than A

169.

15% volume of a cubical block is outside water. The relative density of the block is:

1. 0.15

2. 0.30

3. 0.60

4. 0.85

170.

A liquid wets a solid. The meniscus of the liquid in a long vertical capillary of that solid is

1. Flat

2. Concave upward

3. Convex upward

4. Cylindrical upward

171.

A lead sphere of mass m falls in a viscous liquid with terminal velocity v. Another lead sphere of mass M falls through the liquid with terminal velocity 4v. The ratio M/m is:

1. 2

2. 4

3. 8

4. 16

172.

A ball is projected with velocity 5 m/s at an angle of 60° with horizontal from the ground. The speed of the ball at the instant when its velocity is perpendicular to its initial direction of motion is ($g = 10\ m/s^2$)

1. $\frac{5}{\sqrt{3}}$ m/s

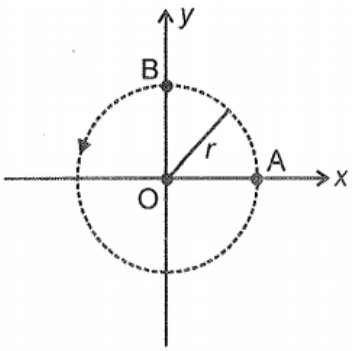
2. 5 m/s

3. $5\sqrt{2}$ m/s

4. 10 m/s

173.

A particle is moving with speed v on a circle (of radius r and centred at the origin) as shown in the given figure in anticlockwise fashion. The average acceleration of the particle during its motion from point A to point B is:



1. $\frac{-2v^2}{\pi r}\left(\hat{i} - \hat{j}\right)$

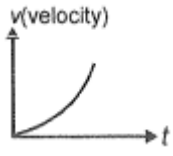
2. $\frac{-2v^2}{\pi r}\left(\hat{i} + \hat{j}\right)$

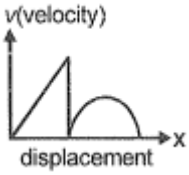
3. $\frac{2v^2}{\pi r}\left(\hat{i} - \hat{j}\right)$

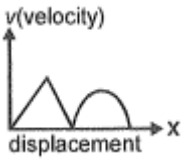
4. $\frac{2v^2}{\pi r}\left(\hat{i} + \hat{j}\right)$

174.

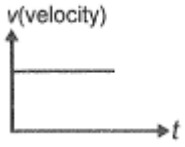
Which of the following graph is not possible?

1. 

2. 

3. 

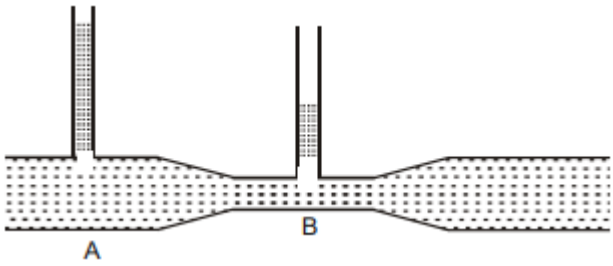
4.



175.

Water flows through a horizontal tube as shown in figure. If the difference of heights of water column in vertical tubes is 80 cm and the area of cross-section at A and B are 5 cm^2 and 3 cm^2 respectively, then rate of flow of water at A(in cc/sec) :-

[$Take\ g\ = 10\ m/s^2$]



1. 15×10^2
2. 15×10^3
3. 150
4. None of these

176.

5 g of water at 30°C and 5 g of ice at –20°C are mixed together in a calorimeter. The water equivalent of the calorimeter is negligible and specific heat and latent heat of ice are 0.5 cal/g°C and 80 cal/g respectively. The final temperature of the mixture is:-

1. 0°C
2. –8°C
3. –4°C
4. 2°C

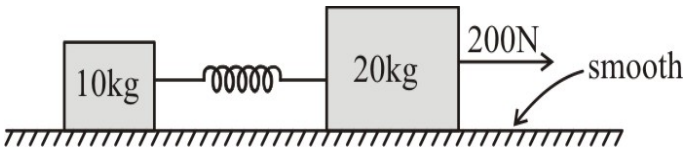
177.

In damped oscillations, damping force is directly proportional to speed of oscillator. If amplitude becomes half of its maximum value in 1 s then after 2 s, amplitude will be (Initial amplitude = A_0)

1. $\frac{1}{4}A_0$
2. $\frac{1}{2}A_0$
3. A_0
4. $\frac{\sqrt{3}A_0}{2}$

178.

Two masses of 10 kg and 20 kg respectively are connected by a massless spring as shown in figure. A force of 200 N acts on the 20 kg mass. At the instant shown the 10 kg mass has acceleration 12 m/s^2 towards right. The acceleration of 20 kg mass at this instant is-



1. 12 m/s^2
2. 4 m/s^2
3. 10 m/s^2
4. Zero

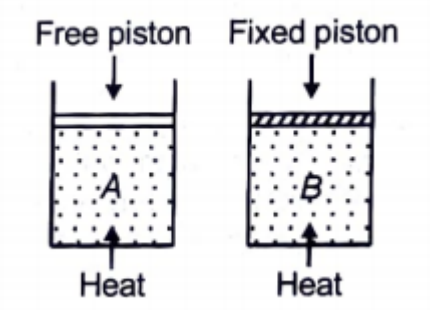
179.

The thickness of a pencil measured by using a screw gauge (least count 0.001 cm) comes out to be 0.802 cm. The percentage error in the measurement is-

1. 0.125%
2. 2.43%
3. 4.12%
4. 2.14%

180.

Two cylinders contain same amount of ideal monoatomic gas. Same amount of heat is given to two cylinders. If temperature rise in cylinder A is T_0 then temperature rise in cylinder B will be



1. $\frac{4}{3}T_0$
2. $2T_0$
3. $\frac{T_0}{2}$

4. $\frac{5}{3}T_0$

Fill OMR Sheet