1.

In the mitochondrial electron transport system, the term Complex III refers to:
1. NADH dehydrogenase
2. Cytochrome c
3. $FADH_2$
4. Cytochrome bc_1 complex

2.

What is another name for thymine?

1. 5 – bromouracil

2. 3 – bromouracil

3. 3 – methyl uracil

4. 5 – methyl uracil

3.

Ozone hole develops over Antarctica each year between:

1. Early January and late April

2. Early March and Late July

3. Late August and Early October

4. Late September and Early December

4.

Vestibular apparatus is a composed of

I.   Semi-circular canals.

II. Otolith organs.

III. Organ of Corti.

IV. Crista and macula.

1. I, II, III & IV

2. I, II only

3. IV only

4. II only

5.

Find incorrect match

1. Joint forest management (JFM) – 1980

2. National forest policy – 1988

3. Chipko movement – 1984

4. Noise as air pollutant – 1987

6.

Which of the following is not a cause for the rapid increase of Indian population today?

1. A rapid decline in death rate

2. An increase in the number of people in reproducible age

3. An increase in the birth rate

4. A decrease in infant mortality and maternal mortality rates

7.

Which of the following is/are under the direct neural regulation of the hypothalamus?

1. Anterior pituitary

2. Posterior pituitary

3. Both 1 and 2

4. Pineal

8.

The maximum volume of air a person can breathe in after a forced expiration is called as:

1. Inspiratory capacity

2. Functional residual capacity

3. Vital capacity

4. Total lung capacity

9.

In which of the following options the PGR is correctly matched with its two functions?

1. Abscisc acid - (i) Induce immediate stomatal closure in leaves.
               (ii) Induce rooting is a twig.

2. Gibberellins - (i) Bolting in rosette plant.
               (ii) Speed up the malting process in brewing industry.

3. Ethylene - (i) Delay leaf senescence.
               (ii) Controls xylem differentiation.

4. Auxin - (i) Used to kill mocotyledonous weeds.
               (ii) Promotes nutrient mobilisation.

10.

Which of the following is the simplest amino acid -

1. Alanine

2. Asparagine

3. Glycine

4. Tyrosine

11.

The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge, is called
1. natural selection
2. convergent evolution
3. non- random evolution
4. adaptive radiation

12.

Darwin's finches are a good example of
1. industrial melanism
2. connecting link
3. adaptive radiation
4. convergent evolution

13.

The chronological order of human evolution
from early to the recent is
1. Australopithecus → Ramapithecus → Homo
habilis → Homo erectus
2. Ramapithecus → Australopithecus → Homo
habilis → Homo erectus
3. Ramapithecus → Homo habilis
→ Australopithecus → Homo erectus
4. Australopithecus → Homo habilis
→ Ramapithecus → Homo erectus

14.

Antitoxin consists of

1. Antibodies

2. Toxoid

3. Antibiotics

4. Live attenuated pathogen

15.

Consider the following statements regarding DNA fingerprinting:

i. The technique was initially developed by Alec Jeffreys.

ii. Hybridisation using labeled VNTR probe.

iii. Sensitivity of the technique has been increased by the use of PCR.

iv. Sequences used for DNA fingerprinting generally code for many proteins.

v. Monozygotic twins have identical DNA fingerprints.

1. All statements are correct

2. Only '4' is incorrect

3. 4 and 5 are incorrect

4. 1, 3, 4, and 5 are correct

16.

Which of the following scientist is responsible for the synthesis of protein in a cell-free system?

1. Har Gobind Khorana

2. Marshall Nirenberg

3. Severo Ochoa

4. Frederic Sanger

17.

How many of the following statements is/are correct for a polygenic inheritance?

(1) They show uniformity.

(2) Controlled by three or more genes

(3) It is not influenced by the environment.

(4) In polygenic inheritance phenotype reflects the contribution of dominant allele only.

Options :

1. 1 and 2

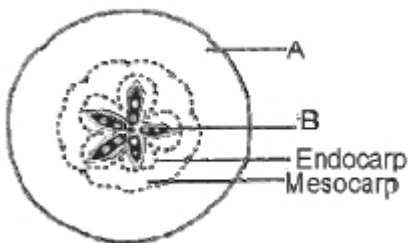2. 2, 3 and 4

3. 1, 3 and 4

4. only 2

18.

Which is not true for haplodiploid sex determination?

1. It is reported in the honeybee.

2. In this male produces sperms by meiosis.

3. They do not have fathers and thus cannot have sons.

4. In this unfertilized egg develops as a male by means of parthenogenesis.

19.

MOET has not been practiced in

a. Cattle   b. Sheep

c. Rabbits   d. Poultry

1. b,c & d

2. b & d

3. d only

4. c only

20.

Look at the diagram given below and answer appropriately

(i) Since ___A___ is associated with fruit, it is called as ___(i)___ .
(ii) Since ___B___ is present, fruit cannot be called as ___(ii)___ .

1. A - Pericarp, (i) - True fruits
2. B - Seed, (ii) - Ex-albuminous
3. A - Thalamus, (i) - True fruit
4. B - Seed, (ii) - Parthenocarpic

21.

A typical anther shows
i. Two lobes with two theca each
ii. Each lobe as dithecous
iii. All cells in a given microsporangium as potential PMC
iv. Thousands of microspores per microsporangium

Out of these statements :

1. ii is incorrect.
2. i and ii are correct.
3. iii and iv are incorrect.
4. i, ii, iii and iv are correct.

22.

Find correct match

	Column-I		Column-II
a.	Thick and swollen cotyledons	(i)	Castor.
b.	Unused endosperm in mature seed	(ii)	Legumes
c.	Unused nucellus in seed	(iii)	Cashew nut.
d.	Thalamus contributes in fruit formation	(iv)	Beet.

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

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

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

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

23.

Exploring molecular, genetic, and species-level diversity for products of economic importance is known as
1. Endemism

2. Bioinformatics

3. Tissue culture

4. Bioprospecting

24.

Select true statement

1. In fishes kidney excrete uric acid

2. Ammonia is 100,000 times less toxic than urea

3. Protonephridia are the excretory structure in planaria

4. Most terrestrial reptiles excrete ammonia

25.

The main cause of the disintegration of the endometrial lining

1. LH surge

2. Degeneration of corpus luteum

3. Ovulation during mid-cycle

4. Implantation leads to pregnancy

26.

Which one of the following statements is incorrect?

1. The medullary zone of the kidney is divided into a few conical masses called medullary pyramids projecting into calyces.

2. Inside the kidney the cortical region extends in between the medullary pyramids as renal pelvis.

3. glomerulus along with Bowman's capsule is called the renal corpuscle.

4. Renal corpuscle, proximal convoluted tubule (PCT), and distal convoluted tubule (DCT) of the nephron are situated in the cortical region of the kidney.

27.

More conservative and scientifically sound estimate made by Robert May places the global species diversity at about

1. 1.5 million

2. 7 million

3. 1.7 million

4. 17 million

28.

The wider part of the fallopian tube is

1. Infundibulum

2. Isthmus

3. Ampulla

4. Cervix

29.

The mammary glands are paired structures (breasts) that contain glandular tissue and a variable amount of fat. The glandular tissue of the breast is divided into

1. 10-12 mammary lobes

2. 12-16 mammary tubules

3. 15-20 mammary alveoli
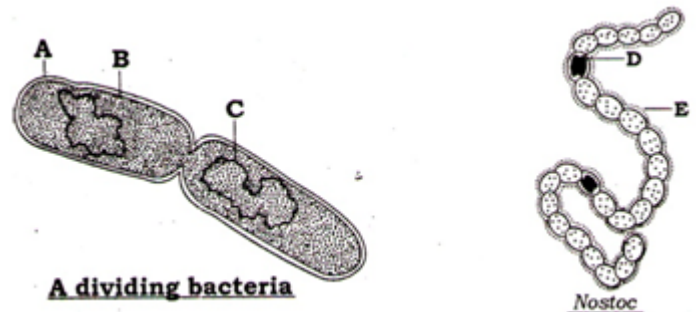
4. 15-20 mammary lobes

30.

Which one is correct about heterosporous pteridophytes?
1. Microspore and megaspores develop into the male and the female gametophytes respectively.
2. The female gametophyte are retained on the parent sporophyte for a variable period.
3. The development of the zygote into the embryo takes place within the female gametophyte.
4. All

31.

Identify the blanks in the following figures –

1. A – Cell wall, B – Cell membrane, C – Heterocyst, D – DNA, E – mucilaginous sheath.
2. A – Cell wall, B – Cell membrane, C – DNA, D – Heterocyst, E – Mucilaginous sheath.
3. A – Mucilaginous sheath, B – Cell membrane, C – DNA, D – Heterocyst, E – Cell wall.
4. A – Cell membrane, D – Cell wall, C – DNA, D – Heterocyst, E – Mucilaginous sheath.

32.

How does a bacterial cell protect its own DNA from restriction enzymes?

1. By adding methyl groups to adenine and cytosines.
2. By reinforcing bacterial DNA structure with covalent phosphodiester bonds.
3. By adding histones to protect the double-stranded DNA.
4. By forming "sticky ends" of bacterial DNA to prevent the enzyme from attaching

33.

The non-cellular organisms that are characterized by having inert crystalline structure outside the living cell
1. Was discovered by J. Pasteur.
2. Are obligate intercellular parasites.
3. Have genetic material as either RNA or DNA.
4. Are cellular organisms.

34.

Decomposition is controlled by several factors. Find out the incorrect option with respect to it.
1. Slower if detritus is rich in lignin and chitin.
2. Quicker if detritus is rich in nitrogen.
3. Cool and moist environment favour decomposition
4. Low temperature and anaerobiosis inhibit decomposition.

35.

Chlorosis is the loss of chlorophyll leading to yellowing of leaves. This symptom is not caused by the deficiency of which of the following elements?
1. N
2. K
3. Mg
4. Ca

36.

How many of the following statements are correct?
(i) In plants each organ receiving some substances & giving out some others.
(ii) Water channels are made up of eight different types of aquaporins.
(iii) Water is often limiting factor for plant growth & productivity in both agricultural & Natural environments.
(iv) Imbibition is also diffusion.

Option :
1. All the above
2. (i), (ii) & (iv)
3. (ii), (iii) & (iv)
4. (iii) & (iv)

37.

Smooth endoplasmic reticulum performs all the functions, except
1. Production of glycoprotein.
2. Synthesis of lipid.
3. Synthesis of glycogen.
4. Synthesis of steroidal hormones

38.

Which of the following is not a correct combination of the hormone with its source organ and target organs:-

	Hormone	Source organ	Target organ
1.	Somatostatin	Hypothalamus	Adenohypophysis
2.	FSH	Ovary	Uterus
3.	TSH	Adenohypophysis	Thyroid
4.	ACTH	Pituitary gland	Adrenal cortex

39.

Given below are four statements (a-d) regarding human blood circulatory system :

(a) Arteries are thick-walled and have narrow lumen as compared to veins.

(b) Angina is acute chest pain when the blood circulation to the brain is reduced.

(c) Persons with blood group AB can donate blood to any person with any blood group under ABO system.

(d) Calcium ions play a very important role in blood clotting.
Which two of the above statements are true?

1. a and b.
2. b and c.
3. c and d.
4. a and d.

40.

A place used for storing, preservation, and exhibition of both plants and animals is called

1. Museum

2. Botanical garden

3. Herbarium

4. Flora

41.

In chemical synapse, postsynaptic membrane receptor binds with
1. Excitatory neurotransmitter.
2. Inhibitory neurotransmitter.
3. Ca^{++} ions.
4. Both 1 and 2

42.

From RNA interference technique
1. Toxins are made to kill soil parasites.
2. Made crops more tolerant to abiotic stresses.
3. Plants are made resistant to soil parasites.
4. Plants are developed to get the enhanced nutritional value of food

43.

Consider the given floral characters w.r.t. Fabaceae
(a) Zygomorphic flowers
(b) Vexillary calyx
(c) Marginal placentation
(d) Endospermic seed
(e) Diadelphous stamens

1. b, d & e are incorrect
2. a, c & e are correct
3. b, c & e are incorrect
4. a, b, c, d & e are correct

44.

Select incorrect statement/s
(a) Both phloem loading and unloading are active processes
(b) Loading of phloem sets up root pressure that facilitates the mass movement in the phloem
(c) As the hydrostatic pressure in the phloem sieve tube increases, pressure flow begins and the sap moves through
the phloem

1. Both (b) & (c)
2. Both (a) & (c)
3. Only (b)
4. Only (c)

45.

The most distinctive feature of echinoderms is the presence of a water vascular system which helps in
(A) Locomotion
(B) Excretion
(C) Respiration
(D) Reproduction

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

46.

Which of the following statement is incorrect w.r.t. vertebrates?
1. Vertebrates possess notochord during the embryonic period
2. Notochord is replaced by a cartilaginous or bony vertebral column in the adult
3. All vertebrates are chordates but all chordates are not vertebrates
4. Vertebrates have a dorsal muscular heart with two, three, or four chambers

47.

Which of the following is both a green house gas as well as ozone depleting substance?
1. CO_2
2. SO_2
3. CFC
4. Water vapour

48.

Which of the following option is not true for penicillin?

1. Its full potential as an effective antibiotic was established much later by Ernest Chain and Howard Florey.

2. This antibiotic was extensively used to treat American soldiers wounded in World War II.

3. Produced by the bacteria.

4. both 2 and 3

49.

Monascus purpureus is a

i. Bacteria
ii. Yeast
iii. Produces cyclosporin A
iv. Produces statins

1. i, iii

2. ii, iii

3. i, iv

4. ii, iv

50.

Which is the characteristic feature of metaphase?

1. Spindle fibres attach to kinetochores of chromosomes.
2. Initiation of condensation of chromosomal material.
3. Chromosomes cluster at opposite spindle poles.
4. Disappearance of Golgi complexes, endoplasmic reticulum, nucleolus, and the nuclear envelope.

51.

Which stage of meiosis - I is characterized by the appearance of recombination nodules?
1. Diplotene
2. Zygotene
3. Diakinesis
4. Pachytene

52.

Read the following four statements (1 – 4), find out certain mistakes in two of them.
(1) In our stomach lactic acid bacteria play a beneficial role by checking the growth of disease-causing microbes.
(2) Lactic acid bacteria produce acid, that coagulates and completely digests the milk protein.
(3) Lactic acid bacteria improves the nutritional quality by increasing the amount of Riboflavin
(4) Lactic acid bacteria require a suitable temperature for their multiplication.

Which of the two statements given above are not correct?

1. Statements (1) and (2)

2. Statement (1) and (3)

3. Statement (2) and (3)

4. Statements (2) and (4)

53.

Which of the following statements is incorrect?

1. The reaction centre of the photosystems is made up of a single chlorophyll a molecule

2. The reaction centre is same in both the photosystems

3. The reaction centre chlorophyll a of PS1 has an absorption peak at 700 nm

4. The various pigments are organised into light-harvesting complexes within the photosystems

54.

According to the chemiosmotic hypothesis, there is a basic difference between respiration and photosynthesis. This is _____

1. In chloroplast, H+ accumulation takes place in the lumen of thylakoid but in mitochondria, this takes place in perimitochondrial space.

2. Accumulation of H+ in chloroplast takes place in matrix i.e., stroma and in mitochondria, this takes place in cristae.

3. In both the mitochondria and chloroplast the accumulation of H+ takes place in inter-membranous space but with a high rate in mitochondria

4. Both 1 and 3 are correct.

55.

Which of the following statements is false?

1. The breakdown of most of the biomacromolecules occurs in duodenum

2. Simple substances (digested foods) are absorbed in the jejunum and ileum

3. Very significant digestive activity occurs in the large intestine

4. Undigested and unabsorbed substances are passed on to the large intestine

56.

In rocky intertidal communities removal of which of the following predator became the cause of the destruction of 10 species of invertebrates

1. Monarch butterfly

2. Starfish pisaster

3. Paramecium Aurelia

4. Abingdon tortoise

57.

Annelids do not represent:-

1. Circumpharyngeal nerve ring

2. Longitudinal muscles in the gut

3. Metameric segmentation

4. Mesodermal pouches in body cavity

58.

The hormone that reduces the destruction of bones it also enhances deposition of Ca^{+2} in bones thus making them in solid and strong. This hormone is:-

1. Collips hormone

2. Thyrocalcitonin

3. Thyroxine

4. Vasopressin

59.

Which of the following statement is incorrect w.r.t cockroach?

1. The exoskeleton of each segment consists of four plate-like pieces called sclerites

2. Labium bears tactile and gustatory sensory setae

3. In cockroach, malpighian tubules, fat bodies, nephrocytes, cuticle, and uricose glands (in some species) Helps in excretion

4. Internally mesenteron is lined by cuticle and covered by a very thin and transparent peritrophic membrane

60.

Specialised junctions between epithelial cells which help to stop substances from leaking across the tissue is

1. Tight junction

2. Interdigitations

3. Gap junctions

4. Desmosomes

61.

Which of the following statement is incorrect?

1. Golden rice in vitamin A

2. Human protein $(\alpha - 1\ antitryp\sin)$ obtained from transgenic animals is used to treat emphysema

3. Human protein-enriched milk, which contained the human alpha-lactalbumin was produced by the transgenic cow, Molly

4. TPA (Tissue Plasminogen Activator) is used by doctors to dissolve clots after a heart attack in patients

62.

The historic convention on biological diversity "The Earth Summit" was held in

1. Canada

2. Johannesburg

3. Kyoto

4. Rio de Janeiro

63.

Choose the **odd** one out w.r.t structure formed in the different organisms during suspended phase

1. Bacteria, fungi   - Thick wall spores

2. Higher plants   - Seed, vegetative propagules

3. Zooplanktons   - Diapause stage

4. Ectothermic organisms   -   Torpid state during favourable season

64.

Which of the following statements is **false**?

1. The capacity to generate a whole plant from any cell is called totipotency

2. In tissue culture, the nutrient medium must provide a carbon source such as sucrose, nitrogen source such as urea, vitamins and growth regulators like auxins, cytokinins

3. When a plant is infected with a virus, the meristem (apical and axillary) is free of virus

4. Somatic hybrids are obtained by fusing isolated protoplasts from two different varieties of plants

65.

Mark the incorrect statement

1. Radial symmetry is advantageous to sedentary mode of life

2. Notochord is mesodermal in origin placed between dorsal hollow nerve cord and alimentary canal in some animals

3. Pseudocoel (false coelom) derived from blastocoel of the embryo and is bounded by ectoderm and mesoderm

4. Cephalization is the concentration of sense organs, nervous tissue (brain), and food capturing organs at the anterior end

66.

Which of the following is natural method of contraception?

1. Lactational amenorrhoea

2. lUDs

3. Cervical cap

4. Condoms

67.

The first movements of the fetus and appearance of hair on the head are usually observed during the

1. 5th month of pregnancy

2. 6th month of pregnancy

3. 4th month of pregnancy

4. 7th month of pregnancy

68.

As the housefly is related with *Entamoeba histolytica*, *Aedes* mosquito is related with

1 Filariasis

2 Dengue

3 Virus

4 *Plasmodium*

69.

In which of the following methods, micro-particles of gold or tungsten are used to transfer the foreign DNA molecules in the host cell?

1. Electroporation

2. Direct DNA injection

3. Biolistic method

4. Micro-injection method

70.

Most enzymes consist of two parts i.e.

1. Holoenzyme and prosthetic group

2. Enzyme and coenzyme

3. Apoenzyme and enzyme

4. Apoenzyme and cofactor

71.

In which of the following disorders alveolar walls are damaged, surface area for gaseous exchange is reduced and the air sacs remain filled with air even after expiration?

1. Pneumonia

2. Coryza

3. Emphysema

4. SARS

72.

Thorn is

1. Modification leaf

2. Axillary bud modified

3. Climbing structure

4. Always non-woody

73.

The contraction of which of the following muscles will cause constriction of pupil in the presence of bright light?

1. Radial iris muscles

2. Circular iris muscles

3. Suspensory ligaments

4. Superior rectus

74.

Which one of the following disorder of bones is characterized by microarchitectural deterioration of the bone, increased fragility, and prone to fracture?

1. Osteoarthritis

2. Gouty arthritis

3. Osteoporosis

4. Rheumatoid arthritis

75.

Absence of sex organs, general absence of asexual spores and plasmogamy by means of somatogamy are features characteristic to

1. Ascomycetes

2. Deuteromycetes

3. Basidiomycetes

4. Phycpmycetes

76.

What is incorrect for genetic maps?

1. Alfred Sturtevant prepared it for the first time using monohybrid test cross

2. It is a measure of the distance between genes present on the same chromosome

3. Stronger the linkage lesser is the distance between two genes

4. It was extensively used in the case of the Human Genome Sequencing Project

77.

Find out the incorrect match

1. Lysosome   - Intracellular scavenging

2. Golgi complex   - Metabolism of xenobiotics

3. Elaioplast   - Oil and fat storage

4. Glyoxysomes   - Gluconeogenesis

78.

Thin, amorphous, and cementing layer between two adjacent cells, is

1. Primary wall

2. Middle lamella

3. Secondary wall

4. Plasma membrane

79.

Egg apparatus consists of

1. Central cell + egg cell

2. Synergids + polar nuclei + egg cell

3. Synergids + oosphere

4. Antipodal cells + synergids + egg

80.

Mark the odd one (w.r.t. zygote)

1. Formed in the water or inside the body of the organism

2. Develops a thick wall in all organisms

3. The vital link between the two generations

4. Divides by meiosis in the haplontic life cycle

81.

Ecosystem which shows above pyramid of biomass possess _____ and _____ pyramid of number and energy respectively.

1. Inverted, upright

2. Upright, upright

3. Upright, inverted

4. Spindle, upright

82.

Which of the following statement is true?

1. In Alstonia the petioles expand, become green, and synthesize food.
2. Leaves are modified into tendrils for climbing as in pumpkins.
3. Imbricate aestivation of petals occur in the flower of Calotropis.
4. In palmately compound leaves the leaflets are attached at a common point

83.

Assisted reproductive technology, IVF involves the transfer of:-

1. Ovum into fallopian tube

2. Zygote into uterus

3. Zygote into fallopian tube

4. Embryo with 16 blastomeres into fallopian tube

84.

Select incorrect statement w.r.t. anatomical features of monocot root.

1. Pericycle produces lateral roots and part of vascular cambium

2. Exodermis is present in older roots

3. Conjunctive parenchyma does not produce cambium

4. Well developed pith is present

85.

In which character an isobilateral leaf differs from the dorsiventral leaf?
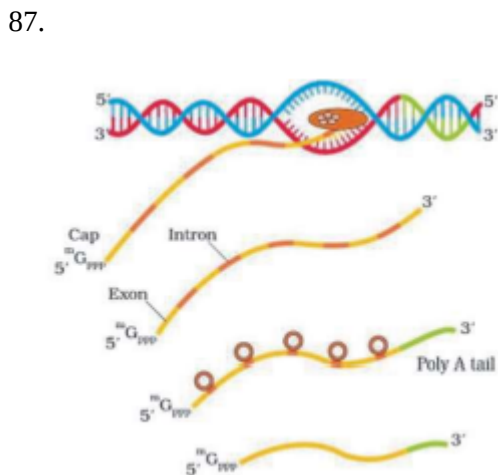
1. Scattered vascular bundles

2. Undifferentiated mesophylls

3. Absence of stomata with guard cells

4. Conjoint, collateral, and closed vascular bundle

86.

Read the following statements (A-D) :

(A) Autosomal recessive trait can't be transmitted from normal parents to the   offspring
(B) In mendelian cross, blending of alleles are observed at F1 generation
(C) Dominance is not an autonomous feature of gene or gene product
(D) Dominance is not universal

Find which are only correct statements?

1. A & D

2. C & D

3. A, B & D

4. All are correct

87.

Messenger RNA (m RNA)

Above given figure represents:-

1. Capping

2. Polyadenylation

3. Splicing

4. hnRNA processing

88.

During ventricular diastole, which of the following event take place earliest?

1. Closure of semilunar valve

2. Opening of cuspid valve

3. 'Lub' sound appears

4. Both 1 and 3

89.

Motor neuron along with muscle fibers are connected & constitute:-

1. Motor end plate

2. Motor unit

3. Neuromuscular junction

4. Motor reticular junction

90.

Select the **correct** statement

1. ATP formation occurs both in chloroplast and mitochondria

2. RQ of protein is 1.5

3. RQ of fatty acid is more than one

4. Cytochrome a_3 has both Fe^{3+} and Fe^{2+}

91.

Which of the following sets of quantum numbers represent an impossible arrangement -

	n	l	m	s
1.	3	2	-2	(+)1/2
2.	4	0	0	(-)1/2
3.	3	2	-3	(+)1/2
4.	5	3	0	(-)1/2

92.

The decreasing order of boiling points of $1°, 2°$ and $3°$ alcohol is:

1. $1° > 2° > 3°$

2. $3° > 2° > 1°$

3. $2° > 1° > 3°$

4. none of these

93.

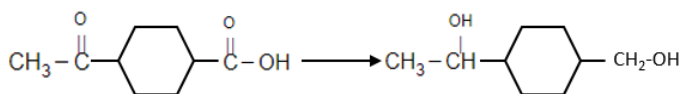Which of the following has largest size in aqueous solution.

1. Rb^+

2. Na^+

3. K^+

4. Li^+

94.

When the temperature of 23 ml of dry CO_2 gas is changed from 10° to 30°C at constant pressure of 760 mm, the volume of gas becomes closest to which one of the following

1. 7.7 ml

2. 25.5 ml

3. 24.6 ml

4. 69 ml
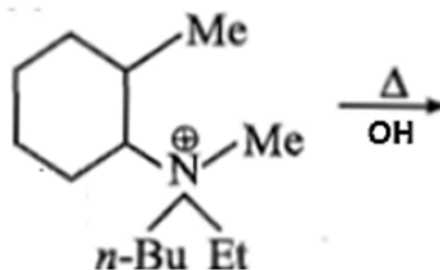
95.

Above conversion can be done by:
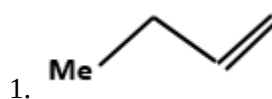
1. $NaBH_4$

2. $LiAlH_4$

3. PCC

4. $KMnO_4$

96.

The reactivity order of alkyl halides depends upon:

1. Nature of alkyl group only

2. Nature of halogen atom only

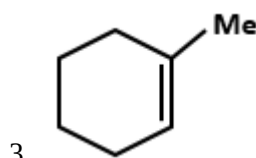3. Nature of both alkyl group and a halogen atom

4. None of the above

97.

The alkene formed as a major product in the given elimination reaction is:

1.

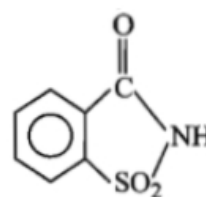2. $CH_2 = CH_2$

3.

4.

98.

One of the essential alpha-amino acid is:

1. lysine

2. glycine

3. serine

4. proline

99.

Which is correct about saccharin?

1. It is

2. It is 550 times sweeter than sugar

3. It is used as a sweetening agent

4. All of the above

100.

Which of the following is optically active?

1. Glycerine

2. Acetaldehyde

3. Glyceraldehyde

4. Ketone

101.

Which of the following organic compounds polymerizes to form the polyester dacron?

1. Propylene and para HO — (C_6H_4)—OH

2. Benzoic acid and ethanol

3. Terephthalic acid and ethylene glycol

4. Benzoic acid and para HO — (C_6H_4)—OH

102.

Which one of the following is not a common component of photochemical smog?

1. Ozone

2. Acrolein

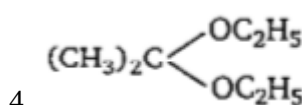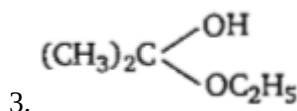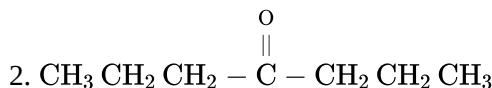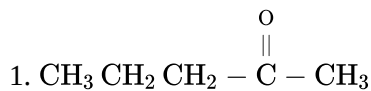3. Peroxyacetyl nitrate

4. Chlorofluorocarbons

103.

What is the activation energy for a reaction if its rate doubles when the temperature is

raised from 20°C to 35°C? (R=8.314 J mol^{-1} K^{-1})

1. 342 kJ mol^{-1}

2. 269 kJ mol^{-1}

3. 34.7 kJ mol^{-1}

4. 15.1 kJ mol^{-1}

104.

Acetone is treated with excess of ethanol in the presence of hydrochloric acid. The product obtained is

1. $CH_3\ CH_2\ CH_2 - \overset{\overset{\displaystyle O}{\|}}{C} - CH_3$

2. $CH_3\ CH_2\ CH_2 - \overset{\overset{\displaystyle O}{\|}}{C} - CH_2\ CH_2\ CH_3$

3. $(CH_3)_2C\begin{cases} OH \\ OC_2H_5 \end{cases}$

4. $(CH_3)_2C\begin{cases} OC_2H_5 \\ OC_2H_5 \end{cases}$

105.

During the kinetic Study of the reaction, $2A+B \rightarrow C+D$, following results were obtained

Run	[A]/mol L^{-1}	[B]/mol L^{-1}	Initial rate of formation of D/mol L^{-1} min^{-1}
I	0.1	0.1	6.0x10^{-3}
II	0.3	0.2	7.2x10^{-2}
III	0.3	0.4	2.88x10^{-1}
IV	0.4	0.1	2.40x10^{-2}

Based on the above data which one of the following is correct ?

1. rate=k[A]^2[B]

2. rate=k[A][B]

3. rate=k[A]^2[B]^2

4. rate=k[A][B]^2

106.

The osmotic pressure of 5% (mass-volume) solution of cane sugar at 150°C (mol. mass of sugar = 342) is

1. 4 *atm*

2. 5.07 *atm*

3. 3.55 *atm*

4. 2.45 *atm*

107.

The work done in ergs for the reversible expansion of one mole of an ideal gas from a volume of 10 liters to 20 liters at 25°C is

1. $-2.303 \times 298 \times 0.082 \ \log 2$

2. $-298 \times 10^7 \times 8.31 \times 2.303 \ \log 2$

3. $2.303 \times 298 \times 0.082 \ \log 0.5$

4. $-8.31 \times 10^7 \times 298 - 2.303 \ \log 0.5$

108.

Leaching of Ag_2S is carried out by heating it with a dilute solution of:

1. NaCN only

2. HCl

3. NaOH

4. NaCN in presence of O_2

109.

IP_1 and IP_2 Mg are 178 and 348 Kcal mol^{-1}. The energy required for the reaction, $Mg \rightarrow Mg^{2+} + 2e^-$ is :

1. +170 Kacl

2. +526Kacl

3. -170Kacl

4. -526Kacl

110.

Bond angle between two hybrid orbitals is 105°.% S character orbital is:

1. between 30-31%

2. between 9- 12%

3. between 25 -26%

4. between 22-23%

111.

What is electronic arrangement of metal atom/ionic octahedral complex with d^4 configuration , if $\Delta_0<$ pairing energy ?

1. $t_{2g}^4 e_g^0$

2. $e_g^4 t_{2g}^0$

3. $t_{2g}^3 e_g^1$

4. $e_g^2 t_{2g}^2$

112.

Amongst $\left[\text{Co}\left(\text{ox}\right)_3\right]^{3-}$, $[\text{CoF}_6]^{3-}$ and $[\text{Co}(\text{NH}_3)6]^{3+}$

1. $\left[\text{Co}\left(\text{ox}\right)_3\right]^{3-}$ and $[\text{CoF}_6]^{3-}$ are paramagnetic and $\left[\text{Co}\left(\text{NH}_3\right)_6\right]^{3+}$ is diamagnetic.

2. $\left[\text{Co}\left(\text{ox}\right)_3\right]^{3-}$ and $\left[\text{Co}\left(\text{NH}_3\right)_6\right]^{3+}$ are paramagnetic and $[\text{CoF}_6]^{3-}$ is diamagnetic.

3. $\left[\text{Co}\left(\text{ox}\right)_3\right]^{3-}$ and $\left[\text{Co}\left(\text{NH}_3\right)_6\right]^{3+}$ are diamagnetic and $[\text{CoF}_6]^{3}$ is paramagnetic.

4. $\left[\text{Co}\left(\text{NH}_3\right)_6\right]^{3+}$ and $[\text{CoF}_6]^{3-}$ are paramagnetic and $\left[\text{Co}\left(\text{ox}\right)_3\right]^{3+}$ is diamagnetic.

113.

The colour of hydrogen is –

1. Blue

2. Yellow

3. Orange

4. No colour

114.

Alkali metals dissolve in liquid ammonia to give a blue colored solution which is due to the presence of

1. M^- atoms

2. M^+ ions

3. Solvated anions

4. Solvated electrons

115.

Xenon crystallizes in face center cubic lattice and the edge of the unit cell is 620 pm, then the radius of the Xenon atom is-

1. 219.20 pm

2. 438.5 pm

3. 265.5 pm

4. 536.94 pm

116.

During discharge of a lead storage cell the density of sulphuric acid in the cell-

1. Increases

2. Decreases

3. Remains unchanged

4. Initially increases but decreases subsequently

117.

The $k = 4.95 \times 10^{-5} S\ cm^{-1}$ for a 0.00099 M solution. Calculate the reciprocal of the degree of dissociation of acetic acid, if $\wedge_m^0$ for acetic acid is 400 S $cm^2 mol^{-1}$

1. 7

2. 8

3. 9

4. 10

118.

Which of the following has maximum bond strength-

1. O_2

2. O_2^+

3. O_2^-

4. O_2^{2-}

119.

When 0.1 mol MnO_4^{2-} is oxidized the quantity of electricity required to completely oxidise MnO_4^{2-} to MnO_4^- is

1. 96500 C

2. 2 x 96500 C

3. 9650 C

4. 96.50 C

120.

Which of the following species decomposes easily?

1. Pbl_2

2. Pbl_4

3. $Pb(CH_3COO)_4$

4. $PbCl_2$

121.

The number of electrons with the azimuthal quantum number l = 1 and 2 for $_{24}Cr$ in ground state are:

1. 16 and 5

2. 12 and 5

3. 16 and 4

4. 12 and 4

122.

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

123.

The amount of Zinc (atomic weight=65) necessary to produce 224 mL of H_2 by the reaction with an acid will be

1. 0.65 g

2. 7.6 g

3. 6.5 g

4. 8.5 g

124.

Which is incorrectly matched?

Common name	IUPAC name
1. Benzalacetophenone	(E)-1,3-diphenylprop-2-en-1-one
2. Glutaric acid	Pentenedioic acid
3. Adipic acid	Hexan-1, 6-dioic acid
4. Pyruvic acid	2-Oxopropanoic acid

125.

At what concentration of CH_3COOH will the $[H^+]$ obtained will be same as that obtained from 10^{-2} M HCOOH, $\left(Ka(CH_3COOH) = 10^{-5},\ Ka(HCOOH) = 10^{-4}\right)$

1. 10 M

2. 5 M

3. 10^{-1} M

4. 6 M

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.

The oxidation state of chromium in the final product formed by the reaction between KI and acidified potassium dichromate solution, is

1. +2

2. +3

3. +4

4. +6

128.

Toluene when refluxed with Br_2 in the presence of light mainly gives

1. p-bromotoluene

2. benzyl bromide

3. o-bromotoluene

4. mixture of o- and p-bromotolene

129.

Which of the following oxyacid contains both P-H and P-P bond simultaneously?

1. $H_4P_2O_5$

2. $H_4P_2O_7$

3. $H_4P_2O_6$

4. None

130.

A compound A when reacted with PCl_5 and then with ammonia gave B. B when treated with bromine and caustic potash produced C. C on treatement with $NaNO_2$ and HCl at $0°C$ and then boiling produced orthocresol. Compound A is:

1. *o*-toluic acid

2. *o*-chlorotoluene

3. *o*-bromotoluene

4. *m*-toluic acid

131.

Nitrobenzene can be prepared from benzene by using a mixture of conc. HNO_3 and conc. H_2SO_4. In the mixture, nitric acid acts as a/an:

1. reducing agent

2. acid

3. base

4. catalyst

132.

Which one of the following ions exhibits d–d transition and paramagnetism as well?

1. CrO_4^{2-}

2. $Cr_2O_7^{2-}$

3. MnO_4^-

4. MnO_4^{2-}

133.

Which of the following represents the correct order of increasing Electron Affinity for the elements, O, S, F and Cl ?

1. Cl<F<O<S

2. O<S<F<Cl

3. F<S<O<Cl

4. S<O<Cl<F

134.

The stability of interhalogens compounds follows the order:

1. $IF_3 > BrF_3 > CIF_3$

2. $BrF_3 > IF_3 > ClF_3$

3. $ClF_3 > BrF_3 > IF_3$

4. $ClF_3 > IF_3 > BrF_3$

135.

What is the molarity of H_2SO_4 solution that has a density 1.84 g/cc at $35°C$ and contains 98% H_2SO_4 by weight?

1. 1.84 M

2. 81.4 M

3. 18.4 M

4. 184 M

136.

The pressure at the bottom of a tank of water is 3P, where P is atmospheric pressure. If the water is drawn out until the level of water is lowered by one fifth, then the pressure at the bottom of the tank is :

1. 2P

2. 13P/5

3. 8P/5

4. 4P/5

137.

A particle is projected at an angle θ with horizontal with an initial speed **u**. When it makes an angle α with horizontal, its speed is

1. $u\cos\theta$

2. $u\cos\theta\cos\alpha$

3. $\frac{u\sin\theta}{\sin\alpha}$

4. $\frac{u\cos\theta}{\cos\alpha}$

138.

Which of the following gives the value of the magnetic field according to Biot-Savart's law?

1. $\frac{i\Delta l\sin(\theta)}{r^2}$

2. $\frac{\mu_0}{4\pi}\frac{i\Delta l\sin(\theta)}{r}$

3. $\frac{\mu_0}{4\pi}\frac{i\Delta l\sin(\theta)}{r^2}$

4. $\frac{\mu_0}{4\pi}i\,\Delta\,l\sin(\theta)$

139.

A bullet of mass m moving with velocity v strikes a suspended wooden block of mass M. If the block rises to a height h, find v.

1. $\sqrt{(2gh)}$

2. $\frac{(M+m)}{m}\sqrt{(2gh)}$

3. $\frac{m}{(M+m)}\sqrt{2gh}$

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

140.

The displacement of a particle is given by $y = 5\times10^{-4}\sin(100t - 50x)$, where x is in meter and t is in sec. Find out the velocity of the wave **:**

1. 5000 m/sec

2. 2 m/sec

3. 0.5 m/sec

4. 300 m/sec

141.

In an isothermal change, an ideal gas obeys -

1. Boyle's law

2. Charles law

3. Gay-Lussac law

4. None of the above

142.

A capillary tube of radius 0.20 mm is dipped vertically in the water. The height of the water column raised in the tube will be (surface tension of water= 0.075 N/m and density of water= 1000 kg/m^3. Taking g=10m/s^2 and contact angle 0˚).

1. 7.5 cm.

2. 6 cm

3. 5 cm

4. 3 cm

143.

To break a wire, a force of $10^6\ N/m^2$ is required. If the density of the material is $3\times10^3\ kg/m^3$, then the length of the wire which will break by its own weight will be :

1. 34 m

2. 30 m

3. 300 m

4. 3 m
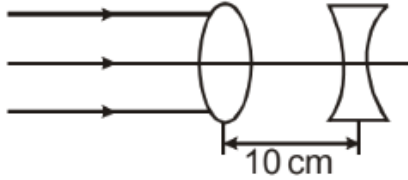
144.

If threshold wavelength for a photosensitive plate is 4000 Å, what will be the value of saturation current if radiation of wavelength 5000 Å is incident?

1. Zero.

2. 1 mA.

3. 3 mA.

4. Data is insufficient to predict.

145.

In the diagram shown below, the rays passing through the concave lens become parallel to the principal axis. If focal length of the convex lens is 30 cm, the focal length of concave lens will be

1. -10 cm

2. -20 cm

3. -30 cm

4. -40 cm

146.

The average energy of molecule for each degree of freedom is

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

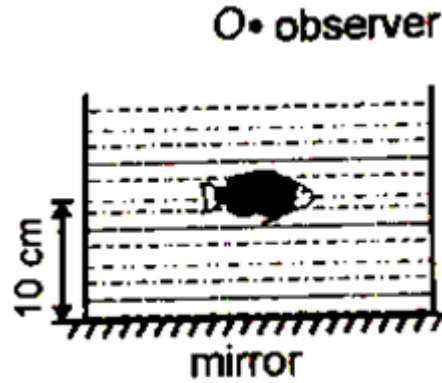2. $\frac{kT}{2}$

3. $\frac{3}{4}kT$

4. kT

147.
Light travels faster in air than that in glass. This is accordance with
1. Wave theory of light
2. Corpuscular theory of light
3. Neither 1 nor 2
4. Both 1 and 2

148.

A plane mirror is placed at the bottom of a fish tank filled with water of refractive index $\frac{4}{3}$. The fish is at a height 10 cm above the plane mirror. An observer O is vertically above the fish outside water. The apparent distance between fish and its image is-

1. 15 cm

2. 30 cm

3. 35 cm

4. 45 cm

149.

Which of the energy band diagrams shown in the figure corresponds to that of a semiconductor?

150.

A parallel plate capacitor consists of two circular plates each of radius 2 cm, separated by a distance of 0.1 mm. If the voltage across the plates is varying at the rate of 5×10^{13} V/s, then the value of displacement current is :

1. 5.50 A

2. $5.56 \times 10^2 \ A$

3. 5.56×10^3 A

4. $2.28 \times 10^4 \ A$

151.

The total energy of a particle, executing simple harmonic motion is

1. $\propto \ x$

2. $\propto \ x^2$

3. Independent of x

4. $\propto \ x^{1/2}$

152.

A couple produces:

1. Purely linear motion

2. Purely rotational motion

3. Linear and rotational motion

4. No motion

153.

When the separation between two point charges is increased, the electric potential energy of the charges

1. Increases

2. Decreases

3. First increases then decrease

4. May increase or decrease

154.

The magnetic moment of a bar magnet of length L and area of cross-section A is M. If the magnet is cut into four identical parts each of length L and area of cross-section $\frac{A}{4}$, then magnetic moment of each part is :

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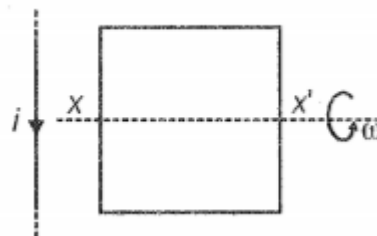
2. $\frac{M}{2}$

3. M

4. 4M

155.

A bar magnet is released along the vertical axis of the conducting coil. The acceleration of the bar magnet is:

1. Greater than g

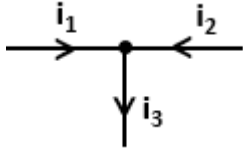2. Less than g

3. Equal to g

4. Zero

156.

In the figure as shown, straight wire carries a constant current. The direction of induced current in the rotating loop about an axis xx' at the instant shown

1. is anticlockwise.

2. is clockwise.

3. there is no current in the loop.

4. maybe clockwise or anticlockwise.

157.

If current i_1 = 3A sinωt and current i_2 = 4A cosωt, then i_3 is

1. $5A\sin(\omega t + 53°)$
2. $5A\sin(\omega t + 37°)$
3. $5A\sin(\omega t + 45°)$
4. $5A\sin(\omega t + 30°)$

158.

Current sensitivity of a moving coil galvanometer is 1 rad A^{-1} and its resistance is 5Ω. Its voltage sensitivity is

1. $0.2\ rad\ V^{-1}$
2. $0.1\ rad\ V^{-1}$
3. $1\ rad\ V^{-1}$
4. $2\ rad\ V^{-1}$

159.

The potential energy U of a system is given by $U = A - Bx^2$ (where x is the position of its particle and A, B are constants). The magnitude of the force acting on the particle is

1. Constant
2. Proportional to x
3. Proportional to x^2
4. Proportional to $\left(\frac{1}{x}\right)$

160.

A radionuclide decays 50% in 1 h. If the activity of the radionuclide is A_0 at a certain instant, then after two hours, the activity will become

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

161.

A metal rod is placed on smooth horizontal surface at temperature $25°C$. Now temperature of surroundings is increased up to $100°C$, then during heating of rod

1. Mechanical strain developed in rod is nonzero
2. Mechanical stress developed in rod is nonzero
3. Length of rod will increase
4. All of these

162.

An electric dipole is placed at the centre of a sphere. Which of the following is correct?

1. The electric flux through the sphere is zero
2. The electric field is zero at every point on the sphere
3. The electric field is zero at every point inside the sphere
4. The electric field is uniform inside the sphere

163.

Two-point charges +2 μC and +6 μC repel each other with a force of 60 N. If a charge -4 μC is added to each of them, the force between them will become

1. 60 N
2. 360 N
3. 20 N
4. 40 N

164.

If y=a sin(bt-cx), where y and x represent length; t represents time, then which of the following has the same dimensions as that of $\frac{ab^2}{c}$?

1. $(Speed)^2$
2. Momentum
3. Angle
4. Acceleration

165.

Centre of mass of a system of particles

1. Depends on frame of reference
2. Does not depend on frame of reference
3. May change due to internal forces
4. All of these

166.

A thin uniform rod has moment of inertia l about an axis parallel to its length at a certain distance. If on heating, its length increases by 2%, then moment of inertia of rod will change by

1. 0%

2 . 1%

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

4. 4%

167.

A cell of emf 2V and internal resistance 1 Ω, is connected across a resistor of resistance 3 Ω. The voltage across the terminals of the cell will be

1. 1.5 V

2. 2.0 V

3. 1.39 V

4. 1.79 V

168.

Three identical point masses each of mass 1 kg lie at three points (0, 0), (0, 0.2 m), (0.2 m, 0). The net gravitational force on the mass at the origin is

1. $6.67 \times 10^{-9} \left(\hat{i} + \hat{j} \right)$ N

2. $1.67 \times 10^{-9} \left(\hat{i} + \hat{j} \right)$ N

3. $1.67 \times 10^{-9} \left(\hat{i} - \hat{j} \right)$ N

4. $1.67 \times 10^{-9} \left(-\hat{i} - \hat{j} \right)$ N

169.

A car travels A to B with speed V_1 and returns to A with speed V_2. The average speed of the car V is

1. Zero

2. $\frac{V_1 + V_2}{2}$

3. $\frac{2V_1 V_2}{V_1 + V_2}$

4. $\frac{V_1 V_2}{2(V_1 + V_2)}$

170.

The de-Broglie wavelength of an electron in first orbit of hydrogen atom is equal to

1. Diameter of the orbit

2. Perimeter of the orbit

3. Half the perimeter of the orbit

4. Half the radius of first orbit

171.

The forward biased diode is

1. −4 V   −3 V

2. +3 V   +5 V

3. 0 V   −2 V

4. −2V   +2 V

172.

A man starts from point 'P' and goes 20 m due East, then 5 m due North, then 35 m due West and finally 25 m due South. His displacement from point 'P' is

1. 25 m at $\tan^{-1}\left(\frac{4}{3}\right)$ West of South

2. 85 m in South-West

3. 25 m at $\tan^{-1}\left(\frac{3}{4}\right)$ West of South

4. 15 m at $\tan^{-1}\left(\frac{3}{4}\right)$ West of South

173.

A ball of mass 1 kg projected with velocity 20 m/s from the origin of an XY coordinate axes at an angle 30° with horizontal. The change in momentum in 1 s is

1. $-10\sqrt{3} \text{ kg} - m/s \, \hat{j}$

2. $-20\sqrt{3} \text{ kg} - m/s \, \hat{j}$

3. $-10 \text{ kg} - m/s \, \hat{j}$

4. $-20 \text{ kg} - m/s \, \hat{j}$

174.

In a certain region of space with volume 0.2 m^3, the electric potential is found to be 5 V throughout. The magnitude of electric field in this region is:

1. 0.5 N/C

2. 1 N/C

3. 5 N/C

4. zero

175.

A point mass 'm' is moved in a vertical circle of radius 'r' with the help of a string. The velocity of the mass is $\sqrt{7gr}$ at the lowest point. The tension in the string at the lowest point is :

1. 6 mg

2. 7 mg

3. 8 mg

4. 1 mg

176.

Identify the correct definition.

1. If after every certain interval of time, a particle repeats its motion then motion is called periodic motion.

2. To and fro motion of a particle is called oscillatory motion.

3. Oscillatory motion described in terms of single sine and cosine functions is called simple harmonic motion.
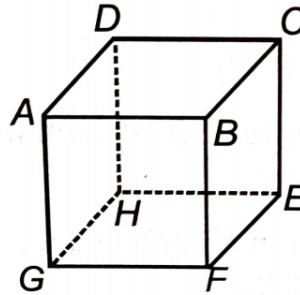
4. All of these

177.

According to classical theory, the Rutherford atom was

1. Electrostatically stable

2. Electrodynamically unstable

3. Semi stable

4. Stable

178.

Twelve wires of equal resistance R are connected to form a cube. The effective resistance between two diagonal ends A and E will be

1. $\frac{5R}{6}$

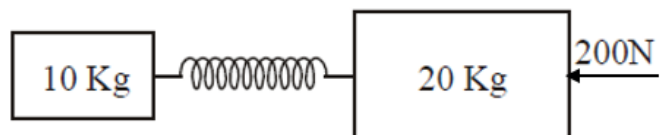2. $\frac{6R}{5}$

3. 12 R

4. 3 R

179.

Select the incorrect relation(where symbols have their usual meanings)

1. $C_P = \frac{\gamma R}{\gamma - 1}$

2. $C_P - C_V = R$

3. $\Delta U = \frac{P_f V_f - P_i V_i}{1 - \gamma}$

4. $C_V = \frac{R}{\gamma - 1}$

180.

Two masses of 10 kg and 20 kg respectively are connected by massless spring as shown in the 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. What is the acceleration of 20 kg mass?

1. 12 m/s^2

2. 4 m/s^2

3. 10 m/s^2

4. zero

Fill OMR Sheet