1.

The DNA molecule to which the gene of interest is integrated for cloning is called

1. Transformer
2. Vector
3. Template
4. Carrier

2.

Read the different components from I to IV in the list given below and tell the correct order of the components with reference to their arrangement from outer side to inner side in a woody dicot stem.
I. Secondary Cortex
II. Wood
III. Secondary phloem
IV. Phellem
The correct order is

1. III,IV,II,I
2. I,II,IV,III
3. IV,I,III,II
4. IV,III,I,II

3.

Chromatophores take part in

1. Photosynthesis
2. Growth
3. Movement
4. Respiration

4.

Which of the following joints would allow no movement?

1. Fibrous joint
2. Cartilaginous joint
3. Synovial joint
4. Ball and socket joint

5.

The wheat grain has an embryo with one large, shield-shaped cotyledon known as

1. epiblast
2. coleorrhiza
3. scutellum
4. coleoptile

6.

A gene showing co-dominance has

1. One allele dominant on the other
2. Alleles tightly linked on the same chromosome
3. Alleles that is recessive to each other
4. Both alleles independently expressed in the heterozygote

7.

Which of the following structure is not found in a prokaryotic cell?

1. Nuclear envelope
2. Ribosome
3. Mesosome
4. Plasma membrane

8.

The term "linkage" was coined by

1. T.H. Morgan
2. T.Boveri
3. G.Mendel
4. W.Sutton

9.

The imperfect fungi which are decomposers of litter and help in mineral cycling belong to

1. Deuteromycetes
2. Basidiomycetes
3. Phycomycetes
4. Ascomycetes

10.

Match the columns and identify the correct option.

Column I	Column II
A. Thylakoids	1. Disc-shaped sacs in Golgi apparatus
B. Cristae	2. Condensed structure of DNA
C. Cisternae	3. Flat membranous sacs in stroma
D. Chromatin	Infoldings in mitochondria

1. A-4 B-3 C-1 D-2
2. A-3 B-4 C-1 D-2
3. A-3 B-1 C-4 D-2
4. A-3 B-4 C-2 D-1

11.

Select wrong statement.

1. The viroids were discovered by D.J lvanowski

2. W.M Stanley showed that viruses could be crystallized.

3. The term 'contagium vivum fluidum' was coined by MW Beijerinck

4. Mosaic disease in tobacco and AIDS in human beings are caused by viruses.

12.

During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by

1. Leghaemoglobin

2. Xanthophylls

3. Carotene

4. Cytochrome

13.

The species confined to a particular region and not found elsewhere is termed as

1. Keystone

2. Alien

3. Endemic

4. Rare

14.

Which one of the following hormones is not involved in sugar metabolism?

1. Cartisone

2. Aldosterone

3. Insulin

4. Glucagon

15.

Which of the following is not a function of the skeletal system?

1. Production of erythrocytes

2. Storage of minerals

3. Production of body heat

4. Locomotion

16.

Which one of the following is not applicable to RNA?

1. Complementary base pairing

2. 5' phosphoryl and 3' hydroxyl ends

3. Heterocyclic nitrogenous bases

4. Chargaff's rule

17.

Which one is a wrong statement?

1. Archegonia are found in Bryophyta, Pteridophyta and Gymnosperms.

2. Mucor has biflagellate Zoospores

3. Haploid endosperm is typical feature of gymnosperms.

4. Brown algae have chlorophyll a and c fucoxanthin.

18.

A childless couple can be assisted to have a child through a technique called GIFT. The full form of this technique is

1. Gamete Inseminated Fallopian Transfer

2. Gamete Intra Fallopian Transfer

3. Gamete Internal Fertilisation and Transfer

4. Germ Cell Internal Transfer

19.

The wings of a bird and the wings of an insect are

1. Homologous structures and represent divergent evolution

2. Analogous structures and represent convergent evolution

3. Phylogenetic structures and represents divergent evolution

4. Homologous structures and represent convergent evolution

20.

Golden rice is a genetically modified Crop plant where the incorporated gene is meant for biosynthesis of

1. Vitamin-B

2. Vitamin-C

3. Omega 3

4. Vitamin-A

21.

Outbreeding is an important strategy in animal husbandry because it

1. help in accumulation of Superior genes.

2. is useful in producing pure lines of animals.

3. is useful in overcoming inbreeding depression.

4. exposes harmful recessive genes that are eliminated by selection.

22.

Which one of the following hormones though synthesised elsewhere, is stored and released by the master gland ?
(1) Melanocyte stimulating hormone
(2) Antidiuretic hormone
(3) Luteinizing hormone
(4) Prolactin

23.

An association of individuals of different species living in the same habitat and having functional interactions is

1. Ecological niche

2. Biotic community

3. Ecosystem

4. Population

24.

In which of the following both pairs have correct combination?

(a) Gaseous nutrient cycle	Carbon and nitrogen
Sedimentary nutrient cycle	Sulphur and phosphorous
(b) Gaseous nutrient cycle	Carbon and sulphur
Sedimentary nutrient cycle	Nitrogen and phosphorus
(c) Gaseous nutrient cycle	Nitrogen and sulphur
Sedimentary nutrient cycle	Carbon and Phosphorous
(d) Gaseous nutrient cycle	Sulphur and phosphorous
Sedimentary nutrient cycle	Carbon and nitrogen

1. a

2. b

3. c

4. d

25.

Identify the correct order of organization of genetic material from largest to smallest.

1. Chromosome,gene,genome,nucleotide

2. Genome,chromosome,nucleotide,gene

3. Genome,chromosome,gene,nucleotide

4. Chromosome,genome,nucleotide,gene

26.

A jawless fish, which lays eggs in freshwater and whose ammocoetes larvae after metamorphosis return to the ocean is

1. Eptratretus

2. Myxine

3. Neomyxine

4. Petromyzon

27.

Industrial melanism is an example of

1. Neo Darwinism

2. Natural Selection

3. Mutation

4. Neo Lamarckism

28.

Cell wall is absent in :
(1) Nostoc
(2) Aspergillus
(3) Funaria
(4) Mycoplasma

29.

The chitinous exoskeleton of arthropods is formed by the polymerization of

1. Keratine sulphate and chondroitin sulphate

2. D-glucosamine

3. N-acetyl glucosamine

4. Lipoglycans

30.

Filiform apparatus is a characteristic feature of

1. Generative cell
2. nucellar embryo
3. aleurone cell
4. synergids

31.

In angiosperms, microsporogenesis and megasporogenesis

1. Occur in anther
2. Form gametes without further divisions
3. Involve meiosis
4. Occur in ovule

32.

Metagenesis refers to

1. The presence of different morphic forms
2. Alternaton of generation between asexual and sexual phrases of an organism
3. Occurance of a drastic change in form during post-embryonic development
4. the presence of segmented body and parthenogenic mode of reproduction

33.

Which of the following immunoglobulins does constitute the largest percentage in human milk?

1. IgD
2. IgM
3. IgA
4. IgG

34.

Destruction of the anterior horn cells of the spinal cord would result in loss of

1. Sensory impulses
2. Voluntary motor impulses
3. Commissural impulses
4. Integrating impulses

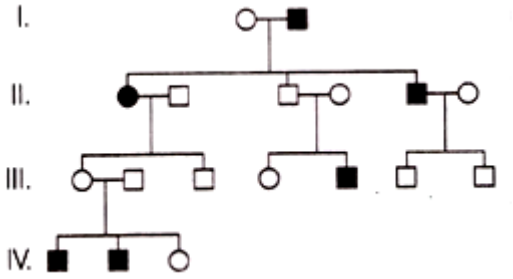
35.

The cutting of DNA at specific locations became possible with the discovery of

1. Restriction enzymes
2. probes
3. Selectable markets
4. ligases

36.

In the following human pedigree, the filled symbols represent the affected individuals. Identify the type of given pedigree



1. Autosomal dominant
2. X-linked recessive
3. Autosomal recessive
4. X-linked dominant

37.

A colour-blind man marries a woman with normal sight who has no history of colour blindness in her family. What is the probability of their grandson being colour blind? (consider the grandsons only through son)

1. 0.5
2. 1
3. Nil
4. 0.25

38.

Flowers are unisexual in

1. Pea
2. Cucumber
3. china rose
4. onion

39.

Roots play insignificant role in absorption of water in

1. Sunflower
2. Pistia
3. China rose
4. Wheat

40.

Balbiani rings are sites of

1. Lipid synthesis
2. Nucleotide synthesis
3. Polysaccharide synthesis
4. RNA and protein synthesis

41.

Which of the following pairs is not correctly match?

Mode of reproduction	Example
(a) Offset	Water hyacinth
(b) Rhizome	Banana
(c) Binary fission	Sargassum
(d) Conidia	Penicilium

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

42.

Ectopic pregnancies are referred to as

1. Pregnancies with genetic abnormality
2. Implantation of embryo at site other than uterus
3. Implantation of defective embryo in the uterus
4. Pregnancies terminated due to the hormonal imbalance

43.

Choose the wrong statement.

1. Penicillium is multicellular and produces antibiotics.
2. Neurospora is used in the study of biochemicalgenetics.
3. Morels and truffles are poisonous mushrooms.
4. Yeast is unicellular and useful in fermentation.

44.

The function of the gap junction is to

1. Performing cementing to keep neighbouring cells together
2. Facilitate communication between adjoining cells by connecting the cytoplasm for rapid transfer of ions, small molecules and some large molecules
3. Separate two cells from each other
4. Stop substance from leaking across a tissue

45.

Axile placentation is present in

1. Dianthus
2. Lemon
3. Pea
4. Argemone

46.

Which of the following is not membrane bound?

1. Vacuoles
2. Ribosomes
3. Lysosome
4. Mesosomes

47.

In his classic experiments on pea plants Mendel did not use

1. Seed color
2. Pod length
3. Seed shape
4. Flower position

48.

During ecological succession

1. The gradual and predictable change in species Composition occurs in a given area
2. The establishment of a new biotic community very fast in its primary phase
3. The number and types of animals re constant
4. The changes lead to a community that is in equilibrium with the environment and is called pioneer community.

49.

The body cells in Cockroach discharge the nitrogenous waste in the hemolymph mainly in the form of

1. Ammonia
2. Potassium urate
3. Urea
4. Calcium carbonate

50.

Which of the following biomolecules have a phosphodiester bond?

1. Fatty acids in a diglyceride
2. Monosaccharides in a polysaccharide
3. Amino acids in a plypeptide
4. Nucleic acids in a nucleoide

51.

The UN Conference of Parties on climate change in the year 2012 was held at

1. Durban
2. Doha
3. Lima
4. Warsaw

52.

Arrange the following events of meiosis in correct Sequences
I. Crossing over
II. Synapsis
III. Terminalisation of chiasmata
IV. Disappearance of nucleolus

1. II,I,IV,III
2. II,I,III,IV
3. I,II,III,IV
4. II,III,IV,I

53.

Root pressure develops due to

1. Active absorption
2. Low osmotic potential in Soil
3. Passive absorption
4. Increase in transpiration

54.

Which one of the following animals has two separate circulatory pathways?

1. Frog
2. Lizard
3. Whale
4. Shark

55.

Which of the following events in not associated with ovulation in human female?

1. Decrease in Oestradiol
2. Full development of Graafian follicle
3. Release of secondary oocyte
4. LH Surge

56.

Most animals that in deep oceanic water are

1. Primary consumers
2. Secondary consumers
3. Tertiary consumers
4. Detritivores

57.

If you suspect major deficiency of antibodies in a person, to which of the following would you look for confirmatory evidence?

1. Fibrinogin in plasma
2. Serum albumins
3. Haemocyres
4. Serum globulins

58.

The structures that help some bacteria to attach to rocks and/or host tissues are

1. Rhizoids
2. Fimbriae
3. Mesosomes
4. Holdfast

59.

Increase in concentration of the toxicant at successive trophic levels is known as

1. Biomagnifications
2. Biodeterioration
3. Biotransformation
4. Biogeochemical cycling

60.

Body having meshwork of cells, internal cavities lined with food filtering flagellated Cells and indirect development is the characteristics of phylum

1. Coelenterata
2. Porifera
3. Mollusca
4. Protozoa

61.

The oxygen evolved during photosynthesis comes from water molecules. Which one of the following pairs of elements involved in this reaction?

1. Manganese and chlorine
2. Manganese and potassium
3. Magnesium and molybdenum
4. Magnesium and chlorine

62.

The primary dentition in human differs from permanent dentition in not having one of the following types of teeth

1. Canine
2. Premolars
3. Molars
4. Incisors

63.

Coconut water from a tender coconut is

1. Immature embryo
2. Free nuclear endosperm
3. Innermost layers of the seed coat
4. Degenerated nucellus

64.

Which of the following layers in an antral follicle is acellular?

1. Granulosa
2. Theca interna
3. Stroma
4. Zona pellucida

65.

The introduction of t-DNA into plants involves

1. Infection of the plant by Argobacterium tumefaciens
2. Altering the pH of soil, heat-shocking the plants
3. Exposing the plants to Cold for a brief period
4. Allowing the plant roots to stand in water

66.

In which group of organisms the Cell walls form two thin overlapping shells which fit together?

1. Chrysophytes
2. Euglenoids
3. Dinoflagellates
4. Slime moulds

67.

Human urine is usually acidic because

1. hydrogen ions are actively secreted into the filtrate.
2. the sodium transporter exchanges one hydrogen ion for each sodium ion, in peritubular capillaries.
3. excreted plasma proteins are acidic
4. Potassium and sodium exchange generates acidity

68.

In photosynthesis, the light-independent reactions take place at

1. Thylakoid lumen
2. photosystem I
3. photosystem II
4. Stromal matrix

69.

In mammalian eye, the ‘fovea’ is the center of the visual field, where

1. Highly density of cones occurs, but has no rods

2. The optic nerve leaves the eye

3. Only rods are present

4. More rods than cones are found

70.

Pick up the wrong statement.

1. Cell wall is absent in Animalia.

2. Protista have photosynthetic and heterotropic modes of nutrition

3. Some fungi are edible

4. Nuclear membrane is present in Monera.

71.

Among China rose, mustard, brinjal, potato, guava, cucumber, onion and tulip, how many plants have superior ovary?

1. Five

2. Six

3. Three

4. Four

72.

Name the pulmonary disease in which alveolar surface area involved in gas exchange is drastically reduced due to damage in the alveolar walls.

1. Pleurisky

2. Emphysema

3. Pneumonia

4. Asthma

73.

A column of water within xylem vessels of tall trees does not break under its weight because of

1. Dissolved sugar in water

2. Tensile strength of water

3. Lignification of xylem vessels

4. Positive root pressure

74.

Acid rain is caused by increases in the atmospheric concentration of

1. SO_2 and NO_2

2. SO_3 and CO

3. CO_2 and CO

4. O_3 and dust

75.

The enzyme that is not present in succus entericulus is

1. maltase.

2. nucleases.

3. nucleosidases.

4. lipases.

76.

In which of the following interactions both partners are adversely affected?

1. Competition

2. Predation

3. Parasitism

4. Mutualism

77.

Match the following list of microbes and their importance

A. *Saccharomyces cerevisiae*	1. Production of immuno suppressive agents
B. *Monascus purpureus*	2. Ripening of swiss cheese
C. *Trichoderma polysporum*	3. Commercial production of ethanol
D. *Propionibacterium sharmanii*	4. Production of blood-cholesterol lowering agents

1. A-3 B-4 C-1 D-2

2. A-4 B-3 C-2 D-1

3. A-4 B-2 C-1 D-3

4. A-3 B-1 C-4 D-2

78.

A pleiotropic gene

1. Is expressed only in primitive plants

2. Is a gene evolved during Pliocene

3. Controls a trait only in combination with another gene

4. Controls multiple traits in an individual

79.

A protoplast is a cell

1. Without plasma membrane
2. Without nucleus
3. Undergoing division
4. Without cell wall

80.

Which of the following are most suitable indicators of SO_2 pollution in the environment?

1. Lichens
2. Conifers
3. Algae
4. Fungi

81.

Grafted kidney may be rejected in a patient due to

1. Humonal immune response
2. Cell-mediated immune response
3. Passive immune response
4. Innate immune response

82.

Which one of the following fruits is parthenocarpic?

1. Brinjal
2. Apple
3. Jackfruit
4. Banana

83.

Which of the following diseases is caused by a protozoan?

1. Syphilis
2. Influenza
3. Babesiosis
4. Blastomycosis

84.

In human females, meiosis-II is not completed until?

1. Puberty
2. Fertilization
3. Uterine implantation
4. Birth

85.

Male gametophyte in angiosperms produces

1. Two sperms and a vegetative cell
2. Single sperm and a vegetative cell
3. Single sperm and two vegetative cell
4. Three sperms

86.

Doctors use stethoscope to hear the sounds produced during each cardiac cycle. The second sound is heard when

1. AV valves open up
2. Ventricullar Walls vibrate due to gushing in of blood from atria
3. Semi lunar valces close down after the blood flows into vessels from ventricles
4. AV node receives signal from SA node

87.

Auxin can be bioassayed by

1. Avena coleoptiles curvature
2. Hydroponics
3. Ptometer
4. Lettuce hypocotyls elongation

88.

Satellite DNA is important because it

1. Codes for proteins needed in cell cycle
2. Shows high degree of polymorphism in population and also the same degree of polymorphism in an idividual which is inheritable from parents to children
3. Does not code for proteins and is same in all members of the population
4. Codes for enzymes needed for DNA replication.

89.

Cellular organelles with membranes are

1. Nuclei,ribosome's and mitochondria
2. Chromosomes, ribosome's and endoplasmic reticulum
3. Endoplasmic reticulum,ribosomes and nuclei
4. Lysosomes,Golgi apparatus and mitochondria.

90.

Eutrophication of water bodies leading to killing of fishes is mainly due to non-availability of

1. Food
2. Light
3. Essential minerals
4. Oxygen

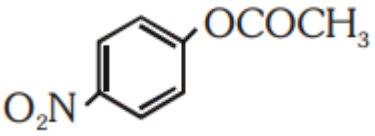
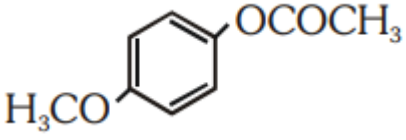
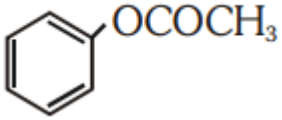
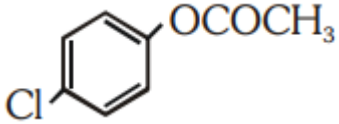
91.

In which of the following pairs, both the species are not isostructural?

1. $SiCl_4$, PCl_4^+
2. Diamond, silicon carbide
3. NH_3, PH_3
4. XeF_4, XeO_4

92.

Which one of the following esters gets hydrolyzed most easily under alkaline conditions?

1. 
2. 
3. 
4. 

93.

Reaction of phenol with chloroform in the presence of dilute sodium hydroxide finally introduces, which one of the following functional group?

1. $-CH_2Cl$
2. $-COOH$
3. $-CHCl_2$
4. $-CHO$

94.

Which of the following reaction(s) can be used for the preparation of alkyl halides?

I. $CH_3CH_2OH + HCl \xrightarrow{\text{anh. } ZnCl_2}$
II. $CH_3CH_2OH + HCl \rightarrow$
III. $(CH_3)_3COH + HCl \rightarrow$
IV. $(CH_3)_2CHOH + HCl \xrightarrow{\text{anh. } ZnCl_2}$

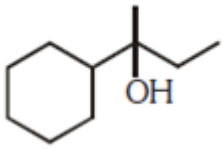
1. I, III and IV
2. I and II
3. Only IV
4. III and IV

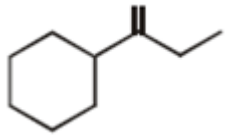
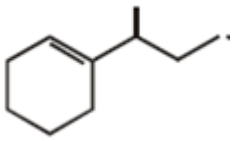
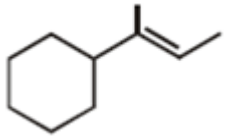
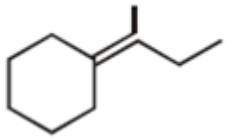
95.

In an S_N1 reaction on chiral centers there is

1. 100% racemisation
2. Inversion more than retension leading to partial racemisation
3. 100% retention
4. 100% Inversion

96.

Which of the following is not the product of dehydration of  ?

1. 
2. 
3. 
4. 

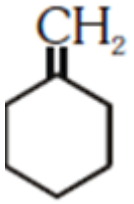
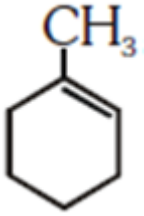
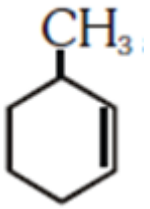
97.

On heating which of the following releases CO_2 most easily?

1. K_2CO_3
2. Na_2CO_3
3. $MgCO_3$
4. $CaCO_3$

98.

In the reaction with HCl, an alkene reacts in accordance with Markovnikov's rule,
to give a product 1-chloro-1-methylcyclohexane. The possible alkane is

1. 
2. 
3. (1) and (2)
4. 

99.

Number of possible isomers for the complex $[Co(en)_2Cl_2]Cl$ will be (en=ethylenediamine)

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

100.

A gas such as carbon monoxide would be most likely to obey the ideal gas law at

1. High temperature and low pressures
2. Low temperature and high pressures
3. High temperature and high pressures
4. Low temperature and low pressures

101.

If Avogadro number N_A, is changed from $6.022 \times 10^{23}\ mol^{-1}$ to $6.022 \times 10^{20}\ mol^{-1}$ this would change

1. The definition of mass in units of grams

2. The mass of one mole of carbon

3. The ration of chemical species to each other in a balanced equation

4. The ratio of elements to each other in a compound

102.

Gadolinium belongs to 4f series. It's atomic number is 64. Which of the following is the correct electronic configuration of gadolinium?

1. $[Xe]4f^8\ 6d^2$

2. $[Xe]4f^9\ 5s^1$

3. $[Xe]4f^7\ 5d^1 6s^2$

4. $[Xe]4f^6\ 5d^2 6s^2$

103.

What is the pH of the resulting solution when equal volumes of 0.1 M NaOH and 0.01 M HCl are mixed?

1. 12.65

2. 2.0

3. 7.0

4. 1.04

104.

Decreasing order of stability of O_2, O_2^-, O_2^+ and O_2^{2-} is

1. $O_2^+ > O_2 > O_2^- > O_2^{2-}$

2. $O_2^{2-} > O_2^- > O_2 > O_2^+$

3. $O_2 > O_2^+ > O_2^{2-} > O_2^-$

4. $O_2^- > O_2^{2-} > O_2^+ > O_2$

105.

The correct statement regarding defects in the crystalline solid is

1. Schottky defects have no effect on the density of crystalline solids

2. Frenkel defects decreases the density of crystalline solids

3. Frenkel defect is a dislocation defect

4. Frenkel defect is found in halides of alkaline metals.

106.

Which of the following statements is not correct for a nucleophile?

1. Nucleophile is a lewis acid.

2. Ammonia is a nucleophile.

3. Nucleophiles attack low electrons density sites.

4. Nucleophiles are not electron seeking.

107.

The hybridization involved in complex $[Ni(CN)_4]^{2-}$ is (Atomic number of Ni=28)

1. dsp^2

2. sp^3

3. d^2sp^2

4. d^2sp^3

108.

The stability of +1 oxidation state among Al, Ga, In and Tl increases in the sequence

1. Ga<ln<Al<Tl

2. Al<Ga<ln<Tl

3. Tl<ln<Ga<Al

4. ln<Tl<Ga<Al

109.

The sum of coordination number and oxidation number of the metal M in the complex $[M(en)_2(C_2O_4)]Cl$ is -

1. 9

2. 6

3. 7

4. 8

110.

Which of the statements given below is incorrect?

1. Cl_2O_7 is an anhydride of perchloric acid

2. O_3 molecule is bent

3. ONF is isoelectronic with NO_2^-

4. OF_2 is an oxide of fluorine

111.

In the extraction of copper from its sulphide ore, the metal finally obtained by the reduction of cuprous oxide with

1. Iron (II) sulphide
2. Carbon monoxide
3. Copper (I) sulphide
4. Sulphur dioxide

112.

Which one of the following pairs of solution is not an acidic buffer?

1. $HClO_4$ and $NaClO_4$
2. CH_3COOH and CH_3COONa
3. H_2CO_3 and Na_2CO_3
4. H_3PO_4 and Na_3PO_4

113.

Assuming complete ionization, same moles of which of the following compounds will require the least amount of acidified $KMnO_4$ for complex oxidation?

1. $FeSO_4$
2. $FeSO_3$
3. FeC_2O_4
4. $Fe(NO_2)_2$

114.

The number of structural isomers possible from the molecular formula C_3H_9N is

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

115.

20.0 g of a magnesium carbonate sample decomposes on heating to give carbon dioxide and 8.0 magnesium oxide. What will be the percentage purity of magnesium carbonate in the sample? (Atomic weight of Mg=24)

1. 75
2. 96
3. 60
4. 84

116.

Two possible stereo-structures of $CH_3CHOH.COOH$, which are optically active, are called

1. Diastereomers
2. Atropisomers
3. Enantiomers
4. Mesomers

117.

The heat of combustion of carbon to CO_2 is -393.5 KJ/mol. The heat released upon the formation of 35.2 g of CO_2 from carbon and oxygen gas is

1. -315 KJ
2. +315 KJ
3. -630 KJ
4. +630 KJ

118.

The rate Constant of the reaction A $\rightarrow$ B is 0, 6 X 10^{-3} mole per second. If the Concentration of A is 5, then concentration of B after 20 min is

1. 1.08M
2. 3.60M
3. 0.36M
4. 0.72M

119.

The formation of the oxide ion O^{2-} (g), from oxygen atom requires first an exothermic and then an endothermic step as shown below,

$O(g)+e^- \rightarrow O^-$; $\Delta_f H^0 = -141$ KJ mol^{-1}

$O^-(g)+e^- \rightarrow O^{2-}(g)$; $\Delta_f H^0 = +780$ KJ mol^{-1}

Thus, process of formation of O^{2-} in gas phase is unfavorable even though O^{2-} is isoelectronic with neon. It is due to the fact that

1. Electron repulsion outweighs the stability gained by achieving noble gas Configuration
2. O^- ion has comparatively smaller size than oxygen atom
3. Oxygen is more electronegative
4. Addition of electron in oxygen result in large size of the ion

120.

What is the mass of precipitate formed when 50 mL of 16.9% solution of $AgNO_3$ is mixed with 50 mL of 5.8% NaCl solution? (Ag = 107.8, N = 14, O = 16, Na= 23, Cl = 35.5)

1. 28 g

2. 3.5 g

3. 7 g

4. 14 g

121.

Which is the correct order of increasing energy of the listed orbital's in the atom of titanium?

1. 3s 4s 3p 3d

2. 4s 3s 3p 3d

3. 3s 3p 3d 4s

4. 3s 3p 4s 3d

122.

Reaction of a carbonyl compound with one of the following reagents involves nucleophilic addition followed by the elimination of water. The reagents is

1. A Grignard reagent

2. Hydrazine in presence of feebly acidic solution

3. Hydrocyanic acid

4. Sodium hydrogen sulphite

123.

The variation of the boiling point of the hydrogen halides is in the order HF > HI >HBr>HCl, What explains the higher boiling point of hydrogen fluoride?

1. The electro negativity of flourine is much higherthan for other elements in the group

2. There is strong hydrogen bonding between HF molecules

3. The bond energy of HF molecules is greater than in other hydrogen halides

4. The effect of nuclear shielding is much reducedin flourine which polarizes the HF molecule

124.

The IUPAC name of complex ion, $[Fe(CN)_6]^{3-}$ is

1. hexacyanoiron(III) ion

2. hexacyanitoferrate(III) ion

3. tricynoferrate(III) ion

4. hexacyanidoferrate(III) ion

125.

Method by which aniline cannot be prepared is

1. Hydrolysis phenyl isocyanide with acidic solution

2. Degradation of benzamide with bromine in alkaline Solution

3. Reduction of nitrobenzene with H/Pd in ethanol

4. potassium salt of phthalimide treated with chlorobenzene followed by the hydrolysis aqueous NaOH solution

126.

If the equilibrium constant for $N_2(g) + O_2(g) \rightleftarrows 2\,NO(g)$ is K, the equilibrium constant for

$\frac{1}{2}N_2(g) + \frac{1}{2}O_2(g) \rightleftarrows NO(g)$will be,

1. $K^{\frac{1}{2}}$

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

3. K

4. K^2

127.

Strong reducing behavior of H_3PO_2 is due to

1. Presence of one-OH group and two P-H bonds

2. High electron gain enthalpy of phosphorus

3. High oxidation state of phosphorus

4. Presence of two -OH groups and one P-H bonds

128.

2,3-dimethyl-2-butene can be prepared by heating which of the following compounds with a strong acid?

1. $(CH_3)_2CH - \underset{\underset{CH_3}{|}}{CH} - CH = CH_2$

2. $(CH_3)_3C - CH = CH_2$

3. $(CH_3)_2C = CH - CH_2 - CH_3$

4. $(CH_3)_2CH - CH_2 - CH = CH_2$

129.

Aqueous solution of which of the following compounds is the best conductor of electric current?

1. Acetic acid, $C_2H_4O_2$

2. Hydrochloric acid, HCl

3. Ammonia, NH_3

4. Fructose, $C_6H_{12}O_6$

130.

The vacant space in bcc lattice cell is

1. 26%

2. 48%

3. 23%

4. 32%

131.

What is the mole fraction of the solute in a 1.00 m aqueous solution?

1. 0.177

2. 0.1770

3. 0.0534

4. 0.0177

132.

The oxidation of benzene by V_2O_5 in the presence of air produces

1. Benzoic anhydride

2. Maleic anhydride

3. Benzoic acid

4. Benzaldehyde

133.

Caprolactam is used for the manufacture of :

1. Nylon - 6

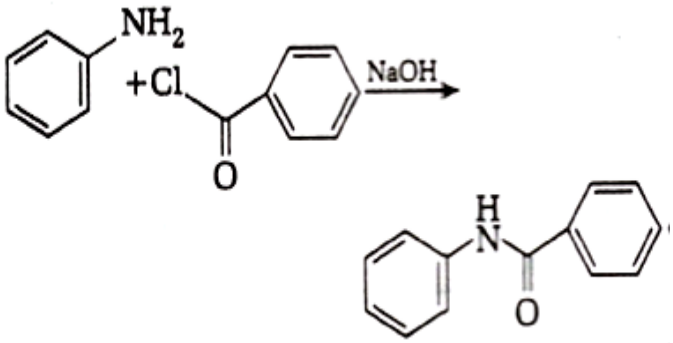
2. Teflon

3. Terylene

4. Nylon - 6, 6

134.

The following reaction,



Is known by the name

1. Friedel-Crafts reaction

2. Perkins reaction

3. Acetylation reaction

4. Schotten-Baumann reaction

135.

The number of water molecules is maximum in

1. 18 molecules of water

2. 1.8 g of water

3. 18 g of water

4. 18 moles of water

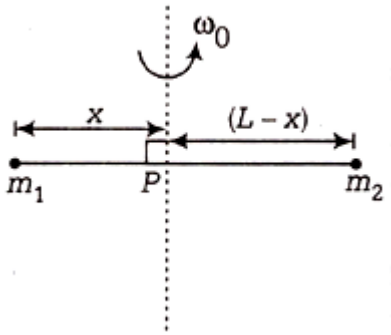
136.

The cylindrical tube of a spray pump has radius R, one end of which has n fine holes, each of radius r. If the speed of the liquid in the tube is v, the speed of the ejection of the liquid through the holes is:

1. $\frac{vR^2}{n^2r^2}$
2. $\frac{vR^2}{nr^2}$
3. $\frac{vR^2}{n^3r^2}$
4. $\frac{v^2R}{nr}$

137.

Point masses m_1 and m_2, are placed at the opposite ends of a rigid rod of length L and negligible mass. The rod is to be set rotating about an axis perpendicular to it. The position of point P on this rod through which the axis should pass so that the work required to set the rod rotating with angular velocity ω_0 is minimum is given by:



1. $x = \frac{m_1L}{m_1+m_2}$
2. $x = \frac{m_1}{m_2}L$
3. $x = \frac{m_2}{m_1}L$
4. $x = \frac{m_2L}{m_1+m_2}$

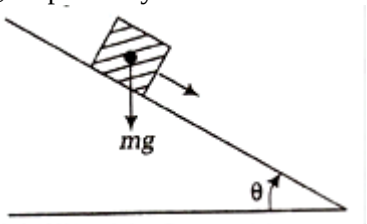
138.

A proton and an alpha particle both enter a region of uniform magnetic field B, moving at right angles to the field B. If the radius of circular orbits for both the particles is equal and the kinetic energy acquired by proton is 1 MeV, the energy acquired by the alpha particle will be-

1. 4 MeV
2. 0.5 MeV
3. 1.5 MeV
4. 1 MeV

139.

A plank with a box on it at one end is gradually raised about the other end. As the angle of inclination with the horizontal reaches 30^o, the box starts to slip and slides 4.0 m down the plank in 4.0 s. The coefficients of static and kinetic friction between the box and the plank will be, respectively:



1. 0.6 and 0.6
2. 0.6 and 0.5
3. 0.5 and 0.6
4. 0.4 and 0.3

140.

An ideal gas is compressed to half its initial volume using several processes. Which of the process results in the maximum work done on the gas?

1. Adiabatic
2. Isobaric
3. Isochoric
4. Isothermal

141.

A ball is thrown vertically downwards from a height of 20 m with an initial velocity v_0. It collides with the ground, losses 50% of its energy in a collision, and rebounds to the same height. The initial velocity v_0 is:

[Take, g = 10 ms^{-1}]

1. 14 ms^{-1}

2. 20 ms^{-1}

3. 28 ms^{-1}

4. 10 ms^{-1}

142.

In the spectrum of hydrogen, the ratio of the longest wavelength in the Lyman series to the longest wavelength in the Balmer series is-

1. $\frac{4}{9}$

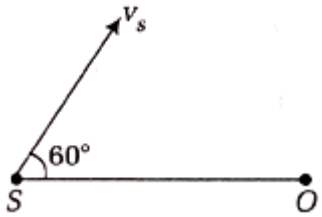
2. $\frac{9}{4}$

3. $\frac{27}{5}$

4. $\frac{5}{27}$

143.

A source of sound S emitting waves of frequency 100 Hz and an observer O is located at some distance from each other. The source is moving with a speed of 19.4 ms^{-1} at an angle of 60^0 with the source-observer line as shown in the figure. The observer is at rest. The apparent frequency observed by the observer (velocity of sound in air 330 ms^{-1}), is:



1. 100 Hz

2. 103 Hz

3. 106 Hz

4. 97 Hz

144.

If dimensions of critical velocity v_c of a liquid flowing through a tube are expressed as $[\eta^x \rho^y r^z]$, where η, ρ and r are the coefficient of viscosity of the liquid, the density of liquid and radius of the tube respectively, then the values of x, y and z are given by:

1. 1, -1, -1

2. -1, -1, 1

3. -1, -1, -1

4. 1, 1, 1,

145.

4.0 gm of a gas occupies 22.4 litres at NTP. The specific heat capacity of the gas at constant volume is 5.0 JK^{-1} mol^{-1}. If the speed of sound in the gas at NTP is 952 ms^{-1}, then the molar heat capacity at constant pressure is:
[Take R = 8.31 JK^{-1} mol^{-1}]

1. 8.0 JK^{-1} mol^{-1}

2. 7.5 JK^{-1} mol^{-1}

3. 7.0 JK^{-1} mol^{-1}

4. 8.5 JK^{-1} mol^{-1}

146.

If vectors $A = \cos\omega\hat{i} + \sin\omega\hat{j}$ and $B = \cos\frac{\omega t}{2}\hat{i} + \sin\frac{\omega t}{2}\hat{j}$ are functions of time, then the value of t at which they are orthogonal to each other

1. $t = \frac{\pi}{4\omega}$

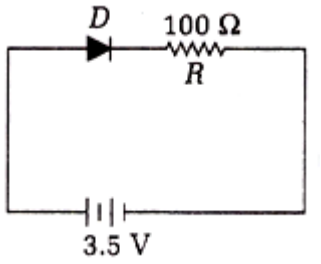
2. $t = \frac{\pi}{2\omega}$

3. $t = \frac{\pi}{\omega}$

4. t = 0

147.

In the given figure, a diode D is connected to an external resistance R=100Ω and an e.m.f. of 3.5 V. If the barrier potential developed across the diode is 0.5 V, the current in the circuit will be:



1. 30 mA
2. 40 mA
3. 20 mA
4. 35 mA

148.

If potential [in volts] in a region is expressed as V [x, y, z] = 6xy- y + 2yz, the electric field [in N/C] at point [1, 1, 0] is -

1. $-(3\hat{i} + 5\hat{j} + 3\hat{k})$
2. $-(6\hat{i} + 5\hat{j} + 2\hat{k})$
3. $-(2\hat{i} + 3\hat{j} + \hat{k})$
4. $-(6\hat{i} + 9\hat{j} + \hat{k})$

149.

A remote sensing satellite of earth revolves in a circular orbit at a height of 0.25×10^6m above the surface of the earth. If earth's radius is 6.38×10^5 m and g= 9.8 ms^{-2}, then the orbital speed of the satellite is:

1. 7.76 kms^{-1}
2. 8.56 kms^{-1}
3. 9.13 kms^{-1}
4. 6.67 kms^{-1}

150.

Two metal wires of identical dimensions are connected in series. If σ_1 and σ_2 are the conductivities of the metal wires respectively, the effective conductivity of the combination is:

1. $\frac{2\sigma_1\sigma_2}{\sigma_1+\sigma_2}$
2. $\frac{\sigma_1+\sigma_2}{2\sigma_1\sigma_2}$
3. $\frac{\sigma_1+\sigma_2}{\sigma_1\sigma_2}$
4. $\frac{\sigma_1\sigma_2}{\sigma_1+\sigma_2}$

151.

A satellite S is moving in an elliptical orbit around the earth. The mass of the satellite is very small as compared to the mass of the earth. Then,

1. The angular momentum of S about the centre of the earth changes in direction, but its magnitude remains constant.
2. The total mechanical energy of S varies periodically with time.
3. The linear momentum of S remains constant in magnitude.
4. The acceleration of S is always directed towards the centre of the earth.

152.

Two particles A and B, move with constant velocities v_1 and v_2. At the initial moment, their position vectors are r_1 and r_2 respectively. The condition for particles A and B for their collision is

1. $\frac{r_1-r_2}{|r_1-r_2|} = \frac{v_2-v_1}{|v_2-v_1|}$
2. $r_1 \cdot v_1 = r_2 \cdot v_2$
3. $r_1 \times v_1 = r_2 \times v_2$
4. $r_1 - r_2 = v_1 - v_2$

153.

Two stones of masses m and 2m are whirled in horizontal circles, the heavier one in a radius $\frac{r}{2}$ and the lighter one in radius r. The tangential speed if lighter stone is n times that of the value of heavier stone when they experience same centripetal forces. The value of n is

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

154.

A parallel plate air capacitor has capacity C, distance of separation between plates is d and potential difference V is applied between the plates. Force of attraction between the plates of the parallel plate air capacitor is

1. $\frac{C^2V^2}{2d}$
2. $\frac{CV^2}{2d}$
3. $\frac{CV^2}{d}$
4. $\frac{C^2V^2}{2d^2}$

155.

The position vector of a particle R as a function of time t is given by

$\vec{R} = 4\sin[2\pi t]\hat{i} + 4\cos[2\pi t]\hat{j}$

Where R is in meters, t is in seconds and $\hat{i}$, $\hat{j}$ denote unit vectors along x and y-directions, respectively. Which one of the following statements is wrong for the motion of the particle?

1. Acceleration is along $-\vec{R}$.
2. Magnitude of the acceleration vector is $\frac{v^2}{R}$, where v is the velocity of the particle.
3. Magnitude of the velocity of the particle 8 m/s.
4. Path of the particle is a circle of radius 4m.

156.

A series R-C circuit is connected to an alternating voltage source. Consider two situations:

1) When the capacitor is air-filled.
2) When the capacitor is mica filled.

Current through the resistor is *I* and voltage across the capacitor is V then:

1. $V_a < V_b$
2. $V_a > V_b$
3. $i_a > i_b$
4. $V_a = V_b$

157.

A string is stretched between fixed points separated by 75.0 cm. It is observed to have resonant frequencies of 420 Hz and 315 Hz. There are no other resonant frequencies between these two. The lowest resonant frequency for this string is:

1. 155 Hz
2. 205 Hz
3. 10.5 Hz
4. 105 Hz

158.

The coefficient of performance of a refrigerator is 5. If the temperature inside the freezer is -20^0C, the temperature of the surroundings to which it rejects heat is:

1. 31^oC
2. 41^oC
3. 11^oC
4. 21^oC

159.

A photoelectric surface is illuminated successively by the monochromatic light of wavelength λ and $\frac{\lambda}{2}$. If the maximum kinetic energy of the emitted photoelectrons in the second case is 3 times that in the first case, the work function of the surface of the mineral is :
[h=Plank's constant, c=speed of light]

1. $\frac{hc}{2\lambda}$
2. $\frac{hc}{\lambda}$
3. $\frac{2hc}{\lambda}$
4. $\frac{hc}{3\lambda}$

160.

In an astronomical telescope in normal adjustment, a straight line of length L is drawn on inside part of the objective lens. The eye-piece forms a real image of this line. The length of this image is I. The magnification of the telescope is :

1. $\frac{L}{I} + 1$
2. $\frac{L}{I} - 1$
3. $\frac{L+1}{I-1}$
4. $\frac{L}{I}$

161.

Two slits in young's experiment have widths in the ratio 1:25. The ratio of intensity at the maxima and minima in the interference pattern $\frac{I_{max}}{I_{min}}$ is

1. $\frac{9}{4}$
2. $\frac{121}{49}$
3. $\frac{49}{121}$
4. $\frac{4}{9}$

162.

Water rises to height 'h' in capillary tube. If the length of capillary tube above the surface of water is made less than 'h', then -
(1) water does not rise at all.
(2) water rises upto the tip of capillary tube and then starts overflowing like a fountain.
(3) water rises upto the top of capillary tube and stays there without overflowing.
(4) water rises upto a point a little below the top and stays there.

163.

Two vessels separately contain two ideal gases A and B at the same temperature, the pressure of A being twice that of B. Under such conditions, the density of A is found to be 1.5 times the density of B. The ratio of molecular weight of A and B is:

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

164.

A circuit contains an ammeter, a battery of 30 V, and a resistance 40.8 Ω all connected in series. If the ammeter has the coil of resistance 480 Ω and a shunt of 20 Ω, then reading in the ammeter will be:

1. 0.5 A
2. 0.02 A
3. 2 A
4. 1 A

165.

The value of the coefficient of volume expansion of glycerine is $5 \times 10^{-4}\ K^{-1}$. The fractional change in the density of glycerine for a rise of 40 ^{0}C in its temperature is:

1. 0.015
2. 0.020
3. 0.025
4. 0.010

166.

The heart of a man pumps 5 L of blood through the arteries per minute at a pressure of 150 mm of mercury. If the density of mercury be 13.6×10^3 kg/m^3 and g = 10 m/s^2, then the power of the heart in watt is:

1. 1.70

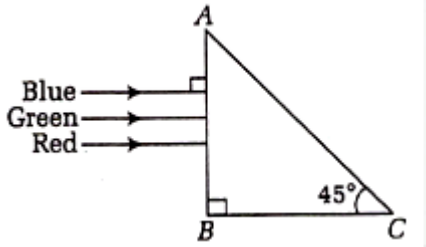
2. 2.35

3. 3.0

4. 1.50

167.

A beam of light consisting of red, green, and blue colors is incident on a right-angled prism. The refractive index of the material of the prism for the red, green, and blue wavelengths is 1.39, 1.44, and 1.47 respectively.



The prism will :

1. separate the blue color part from the red and green color

2. separate all the three colors from one another

3. Not separate the three colors at all

4. Separate the red color part from the green and blue colors

168.

A rectangular coil of length 0.12 m and width 0.1 m having 50 turns of wire is suspended vertically in a uniform magnetic field of strength 0.2 Wb/m^2. The coil carries a current of 2 A. If the plane of the coil is inclined at an angle of 30^o with the direction of the field, the torque required to keep the coil in stable equilibrium will be:

1. 0.15 Nm

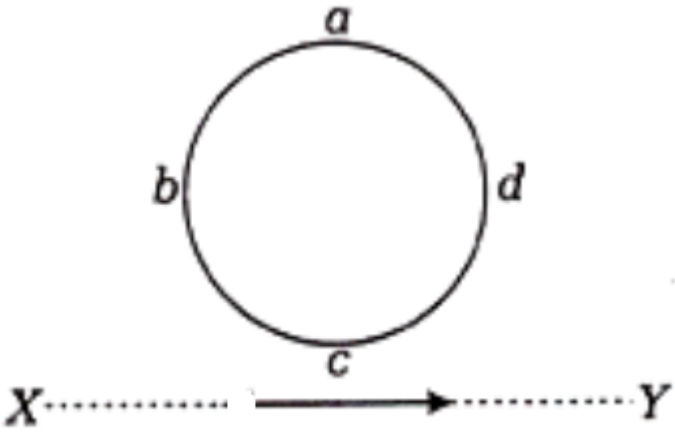
2. 0.20 Nm

3. 0.24 Nm

4. 0.12 Nm

169.

An electron moves on a straight-line path XY as shown. The abcd is a coil adjacent to the path of electrons. What will be the direction of current if any, induced in the coil?



1. abcd

2. adcb

3. The current will reverse its direction as the electron goes past the coil

4. No current included

170.

A nucleus of uranium decays at rest into nuclei of thorium and helium. Then,

1. The nucleus helium has more kinetic energy than the thorium nucleus

2. The helium nucleus has less momentum than the thorium nucleus

3. The helium nucleus has more momentum than the thorium nucleus

4. The helium nucleus has less kinetic energy than the thorium nucleus

171.

A force $\vec{F} = \alpha\hat{i} + 3\hat{j} + 6\hat{k}$ is acting at a point $\vec{r} = 2\hat{i} - 6\hat{j} - 12\hat{k}$. The value of α for which angular momentum about the origin is conserved is:

1. -1

2. 2

3. zero

4. 1

172.

A particle is executing a simple harmonic motion. Its maximum acceleration is α and maximum velocity is β. Then its time period of vibration will be:

1. $\frac{\beta^2}{\alpha^2}$
2. $\frac{\beta}{\alpha}$
3. $\frac{\beta^2}{\alpha}$
4. $\frac{2\pi\beta}{\alpha}$

173.

The energy of the EM waves is of the order of 15 KeV. To which part of the spectrum does it belong?

1. X-rays
2. Infrared rays
3. Ultraviolet rays
4. γ-rays

174.

Light of wavelength 500 nm is incident on metal with work function 2.28 eV. The de-Broglie wavelength of the emitted electron is :

1. $< 2.8 \times 10^{-10}$m
2. $< 2.8 \times 10^{-9}$m
3. $\geq 2.8 \times 10^{-9}$m
4. $\leq 2.8 \times 10^{-12}$m

175.

At the first minimum adjacent to the central maximum of a single slit diffraction pattern, the phase difference between the Huygen's wavelet from the edge of the slit and the wavelet from the midpoint of the slit is

1. $\frac{\pi}{4}$radian
2. $\frac{\pi}{2}$radian
3. π radian
4. $\frac{\pi}{8}$radian

176.

On a frictionless surface, a block of mass M moving at speed V collides elasticity with another block of the same mass M which is initially at rest. After collision, the first block moves at an angle θ to its initial direction and has a speed $\frac{v}{3}$. The second block's speed after collision is:

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

177.

A potentiometer wire of length L and a resistance r are connected in series with a battery of e.m.f. $E_0$and resistance r_1. An unknown e.m.f. is balanced at a length l of the potentiometer wire. The e.m.f. E will be given by :

1. $\frac{LE_0r}{lr_1}$
2. $\frac{E_0r}{(r+r_1)} \cdot \frac{l}{L}$
3. $\frac{E_0l}{L}$
4. $\frac{LE_0r}{(r+r_1)1}$

178.

The Young's modulus of steel is twice that of brass. Two wires of the same length and of the same area of cross-section, one of steel and another of brass, are suspended from the same roof. If we want the lower ends of the wires to be at the same level, then the weights added to the steel and brass wires must be in the ratio of:

1. 1:2
2. 2:1
3. 4:1
4. 1:1

179.

The input signal is given to a CE amplifier having a voltage gain of 150 is $V_i = 2\cos[15t + \frac{II}{3}]$. The corresponding output signal will be:

1. 30 cos $[15t + \frac{\pi}{3}]$

2. 75 cos $[15t + \frac{2\pi}{3}]$

3. 2 cos $[15t + \frac{5\pi}{3}]$

4. 300 cos $[15t + \frac{4\pi}{3}]$

180.

An automobile moves on a road with a speed of 54 km h^{-1}. The radius of its wheels is 0.45 m and the moment of inertia of the wheel about its axis of rotation is 3 kg m^2. If the vehicle is brought to rest in 15 s, the magnitude of average torque transmitted by its brakes to the wheel is:

1. 6.66 kg m^2 s^{-2}

2. 8.58 kg m^2 s^{-2}

3. 10.86 kg m^2 s^{-2}

4. 2.86 kg m^2 s^{-2}

Fill OMR Sheet