1.

The bacterium Bacillus thuringiensis is widely used in contemporary biology as a/an

1. indicator of water pollution
2. insecticide
3. agent for production of dairy products
4. source of industrial enzyme

2.

Chipko movement was launched for the protection of

1. grasslands
2. forests
3. livestock
4. wet lands

3.

A health disorder that results from the deficiency of thyroxin in adults and characterized by
(i) a low metabolic rate
(ii) increase in body weight
(iii) tendency to retain water in tissues is

1. hypothyroidism
2. simple goitre
3. myxoedema
4. cretinism

4.

Elbow joint is an example of

1. Pivot joint
2. Hinge joint
3. Glinding joint
4. ball and socket joint

5.

The correct sequence of plants in a Hydrosere is

1. Oak → Lamtana → Scirpus → Pistia → Hydrilla → Volvox
2. Volvox → Hydrilla → Pistia → Scirpus → Lantana → Oak
3. Pistia → Volvox → Scirpus → Hydrilla → Oak → Lantana
4. Oak → Lantana → Volvox → Hydrilla → Pistia → Scirpus

6.

Mannitol is the stored food in

1. Chara
2. Porphyra
3. Fucus
4. Gracillaria

7.

The epithelial tissue present on the inner surface of bronchioles and fallopian tubes is

1. cuboidal
2. glandular
3. ciliated
4. squamous

8.

Which one of the following pair of food components in humans reaches the stomach totally undigested?

1. Protein and starch
2. Starch and fat
3. Fat and cellulose
4. Starch and cellulose

9.

Uric acid is the chief nitrogenous component of the excretory products of

1. man
2. earthworm
3. cockroach
4. frog

10.

Which one of the following groups of animals is bilaterally symmetrical and triploblastic?

1. Coelenterates (cnidarians)
2. Ascheminthes (roundworms)
3. Ctenophores
4. Sponges

11.

Tiger is not a resident, in which one of the following national park?

1. Rantharmbhor

2. Sunderbans

3. Gir

4. Jim Corbett

12.

A change in the amount of yolk and its distribution in the egg will affect

1. formation of zygote

2. pattern of cleavage

3. number of blastomeres produced

4. fertilization

13.

When breast feeding is replaced by less nutritive food low in proteins and calories; the infants below the age of one year are likely to suffer from

1. marasmus

2. rickets

3. kwashiorkor

4. pellagra

14.

Stroma in the chloroplasts of higher plants contains

1. light-independent reaction enzymes

2. light-dependent reaction enzymes

3. ribosomes

4. chlorophyll

15.

Which of the following correctly describes the location of some body parts in the earthworm Pheretima?

1. Two pairs of accessory glands in 16-18 segments

2. Four pairs of spermathecae in 4-7 segments

3. One pair of ovaries attached at intersegmental septum of 14th and 15th segments

4. Two pairs of tests in 10th and 11th segments

16.

Foetal ejection reflex in human female is induced by

1. pressure exerted by aminotic fluid

2. release of oxytocin from pituitary

3. fully developed foetus and placenta

4. differentiation of mammary glands

17.

Which one of the following has haplontic life cycle?

1. Funaria

2. Polytrichum

3. Ustilago

4. wheat

18.

Which of the following plants you would select for the production of bioethanol?

1. Brassica

2. Zea mays

3. Pongamia

4. jatropha

19.

Which part of human brain is concerned with the regulation of body temperature?

1. Medulla oblongata

2. Cerebellum

3. Cerebrum

4. Hyprothalamus

20.

Which one of the following is the correct pairing of a body part and the kind of muscle tissue that moves it?

1. Heart wall- Involuntary unstriated muscle

2. Biceps of upper arm- Smooth muscle fibers

3. Abdominal wall- Smooth muscle

4. Iris- Involuntary smooth muscle

21.

In the case of peppered moth **(**Biston betularia) the black-coloured form became dominant over the light-coloured form in England during the industrial revolution. This is an example of

1. natural selection whereby the darker forms were selected

2. appearance of the darker coloures individuals due to very poor sunlight

3. protective mimicry

4. inheritance of darker colour character acquired due to the darker environment

22.

Oxygenic photosynthesis occurs in

1. Chromatium

2. Oscillatoria

3. Rhodospirillum

4. Chlorobium

23.

The genetic defect-Adenosine Deaminase (ADA) deficiency may be cured permanently by

1. periodic infusion of genetically engineered lymphocytes having functional ADA cDNA

2. administering adenosine deaminase activators

3. introducing bone marrow cells producing ADA into cells at early embryonic stages

4. Invitro Cell culture therapy.

24.

The annular and spirally thickened conducting elements generally develop in the protoxylem when the root or stem is

1. maturing

2. elongating

3. widening

4. differentiating

25.

In barley stem, vascular bundles are

1. open and scattered

2. closed and scattered

3. open and in a ring

4. closed and radial

26.

Sickle cell anaemia is:

1. an autosomal linked dominant trait

2. caused by substitution of valine by glutamic acid in the globin chain of haemoglobin

3. caused by a change in base pair of DNA

4. characterized by elongated sickle like RBCs with a nucleus

27.

If a live earthworm is pricked with a needle on its _outer surface without damaging its gut, the fluid that comes out is

1. excretory fluid

2. coelomic fluid

3. harmolymph

4. slimy mucus

28.

There is no DNA in

1. an enucleated ovum

2. mature RBCs

3. a mature spermatozoan

4. hair root

29.

Point mutation involves

1. insertion

2. change in single base pair

3. duplication

4. deletion

30.

Which one of the following has maximum genetic diversity in India?

1. Teak

2. Mango

3. Wheat

4. Tea

31.

In a standard ECG, which one of the following alphabets is the correct representation of the respective activity of the human heart?

1. R-repolarisation of ventricles

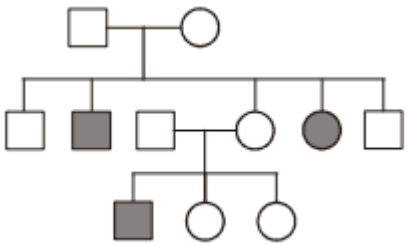
2. S-start of systole

3. T-end of diastole

4. P-depolarisation of the atria

32.

Study the pedigree chart given below



What does it show?

1. Inheritance of a sex-linked inborn error of metabolism

2. Inheritance of a condition like phenylketonuria as an autosomal recessive trait

3. The pedigree chart is wrong as this is not possible

4. Inheritance of a recessive sex-linked disease like haemophilia

33.

Middle lamella is mainly composed of

1. hemicellulose

2. muramic acid

3. calcium pectate

4. phosphoglycerides

34.

Somaclones are obtained by

1. tissue culture

2. plant breeding

3. irradiation

4. genetic engineering

35.

Which one of the following plants is monoecious ?

1. Marchantia

2. Pinus

3. Cycas

4. Papaya

36.

Which one of the following is the correct matching of three items and their grouping category?

Items	Group
(a) Malleus, incus cochlea	Ear ossicles
(b) Ilium, ischium, pubis	Coxal bones of pelvic girdle
(c) Actin, myosin rhodopsin	Muscle proteins
(d) Cytosine, uracil thiamine	pyrimidines

1. (a)

2. (b)

3. (c)

4. (d)

37.

Plasmodesmata are

1. lignified cemented layers between cells

2. locomotory structures

3. membranes connecting the nucleus with plasmalemma

4. connections between adjacent cells

38.

Which of the following is a pair of viral diseases?

1. Ringworm, AIDS

2. Common cold, AIDS

3. Dysentery, common cold

4. Thyphoid, tuberculosis

39.

Aerobic respiratory pathway is appropriately termed

1. catabolic
2. parabolic
3. amphibolic
4. anabolic

40.

Which of the following is not used as a biopesticide?

1. Bacillus thuringiensis
2. Trichoderma harzianum
3. Nucleopolyhedrovirus(NPV)
4. Xanthomonas campestris

41.

Alzhimer disease in humans is associated with the deficiency of

1. dopamine
2. glutamic acid
3. acetylcholine
4. Gamma Amino Butyric Acid (GABA)

42.

Cytoskeleton is made up of

1. calcium carbonate granules
2. callose deposits
3. cellulosic microfihrils
4. proteinaceous filaments

43.

Compared to blood our lymph has

1. no plasma
2. plasma without proteins
3. more WBCs and no RBCs
4. more RBCs and less WBCs

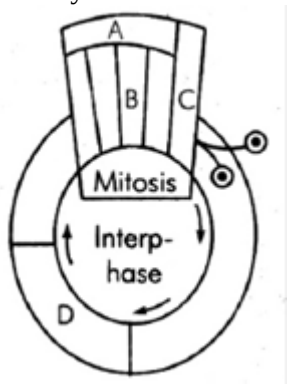
44.

Which one of the following is the most likely root cause why menstruation is not taking place in regularly cycling human female ?

1. Fertilization of the ovum
2. Maintenance of the hypertropical endometrial lining
3. Maintenance of high concentration of sex-hormones in the blood stream
4. Retention of well-developes corpus luteum

45.

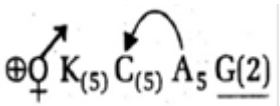
Given below is a schematic break-up of the phases/stages of cell cycle



Which one of the following is. the correct indication of the stage/phase in the cell cycle?

1. B-Metaphase
2. C-Karyokinesis
3. D-Synthetic phase
4. A-Cytokinesis

46.

The floral formula  is that of

1. tulip
2. soybean
3. sunnhemp
4. tobacco

47.

The most popularly known blood grouping is the ABO grouping. It is named ABO and not ABC, because 'O' in it refers to having

1. other antigens besides A and B on RBCs

2. over dominance of this type on the genes for A and B types

3. one antibody only- either anti A or anti-B on the RBCs

4. no antigens A and B on RBCs

48.

Which one of the following statement is true regarding digesting and absorption of food in humans?

1. Oxyntic cells in our stomach secrete the proenzyme pepsinogen

2. Fructose qand amino acids are absorbed through intestinal mucosa with the help of carrier ions like Na^+.

3. Chylomicrons are small lipoprotein particles that are transported from intestine into blood capillaries.

4. About 60% of starch is hydrolysed by salivary amylase in our mouth.

49.

Anatomically fairly old dicotyledonous root is distinguished from the dicotyledonous stem by

1. absence of secondary xylem

2. absence of secondary phloem

3. presence of cortex

4. position of protoxylem

50.

Manganese is required in

1. nucleic acid synthesis

2. plant cell wall formation

3. photolysis of water during photosynthesis

4. chlorophyll synthesis

51.

Which one of the following is commonly used in transfer of foreign DNA into crop plants?

1. Trichoderma harzianum

2. Meloidogyne incognita

3. Agro bacterium tumefaciens

4. Penicillium expansum

52.

Removal of introns and joining the exons in a defined order in a transcription unit is called

1. splicing

2. tailing

3. transformation

4. capping

53.

Whose experiments cracked the DNA and discovered unequivocally that a genetic code is a triplet?

1. Nirenberg and Mathaei

2. Hershey and CHase

3. Morgan and Sturtevant

4. Beadle and Tatum

54.

Seminal plasma in human is rich in

1. fructose, calcium and certain enzymes

2. fructose and calcium but has no enzymes

3. glucose and certain enzymes but has no calcium

4. fructose and certain enzymes but poor in calcium

55.

Phylogenetic system of classification is based on

1. evolutionary relationships

2. morphological features

3. chemical constituents

4. floral characters

56.

Synapsis occurs between

1. a male and a female gamete

2. mRNA and ribosomes

3. spindle fibres and centromere

4. two homologous chromosomes

57.

Which one of the following pairs of animal comprises 'jawless fishes'?

1. Lampreys and eels

2. MAckerals and rohu

3. Lampreys and hag fishes

4. Guppies and hag fishes

58.

Select the incorrect statement from the following

1. linkage is an exception to the principle of independent assortment in heredity

2. galactosemia is an inborn error of metabolism

3. small population size result in random genetic drift in a population

4. baldness is a sex-limites trait

59.

The cell junctions called tight, adhering and gap junctions are found in

1. muscular tissue

2. connective tissue

3. epithelial tissue

4. neural tissue

60.

Which one of the following types of organisms occupy more than one trophic level in a pond ecosystem?

1. Phytoplankton

2. Fish

3. Zooplankton

4. Frog

61.

Use of anti - histamine and steroids give a quick relief from

1. allergy

2. nausea

3. cough

4. headache

62.

Which one is the wrong pairing for the disease and its causal organism?

1. Late blight of potato : Alternaria solani

2. Black rust of wheat-Puccinia graminis

3. Loose smut of wheat-Ustilago nuda

4. Root-knot of vegetables-Meloidogyne sp

63.

Given below is a diagrammatic sketch of a portion of human male reproductive system. Select the correct set of the names of the parts labelled A, B, C, D

(a)	Ureter	Prostate	Seminal vesicle	Bulbourethralgland
(b)	Vasdeferens	Seminalvesicle	Prostate	Bulbourethralgland
(c)	Vasdeferens	Seminalvesiclethral gland	Bulboure	Prostate
(d)	Ureter	Seminalvesicle	Prostate	Bulbourethral gland

1. (a)

2. (b)

3. (c)

4. (d)

64.

Vegetative propagation in mint occurs by

1. runner

2. offset

3. rhizome

4. sucker

65.

What will happen if the stretch receptors of the urinary bladder wall are totally removed?

1. Urine will not collect in the bladder

2. Micturition will continue

3. Urine will continue to collect normally in the bladder

4. There will be no micturition

66.

One of the synthetic auxin is

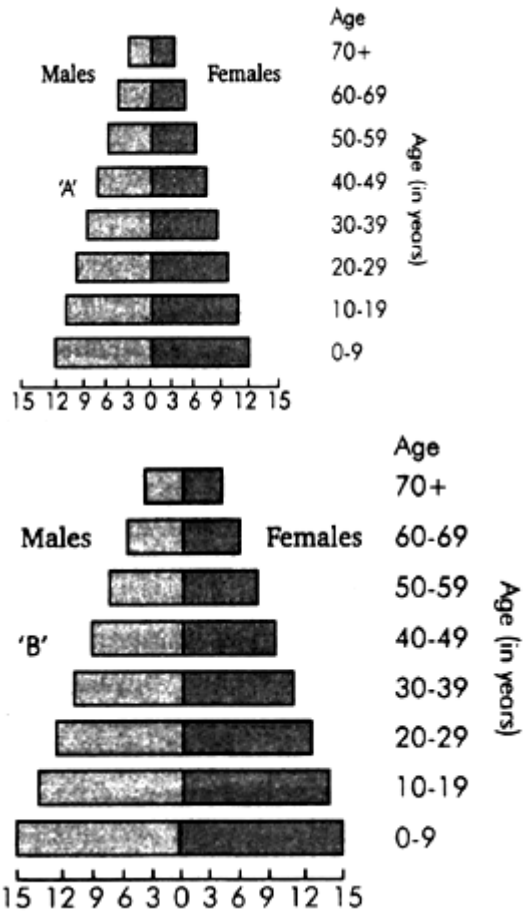
1. NAA

2. IAA
3. GA

4. IBA

67.

A country with a high rate of population growth took measures to reduce it. The figure below shows age sex pyramids of populations. A and B twenty years apart. Select the correct interpretation about them



Interpretations

1. 'A' is more recent and shows slight reduction in the growth rate

2. 'B' is more earlier pyramid and shows stabilised growth rate

3. 'B' is more recent showing that population is very young

4. 'A' is the earlier pyramid and no change has occured in the growth rate

68.

The correct sequence of spermatogenetic stages leading to the formation of sperms in a mature human testis is

1. spermatocyte-spermatogonia- spematid-sperms

2. spermatogonia-spermatocyte-spermatid-sperms

3. spermatid-spermatocyte-spermatogonia-sperms

4. spermatogonia-spermatid-spermatocyte-sperms

69.

What is true about Bt toxin?

1. the inactive protoxin gets converted into active form in the insect gut

2. Bt protein exists as active toxin in the Bacillus

3. The activated toxin enters the ovaries of the pest to sterilize it and thus prevent its multiplication

4. the concerned Bacillus has antitoxins

70.

The kind of tissue that forms the supportive structure in our pinna (external ears) is also found in

1. Vertebrae

2. Nails

3. Ear ossicled

4. tip of the nose

71.

DDT residues are rapidly passed through food chain causing biomagnification because DDT is

1. lipo soluble

2. moderately toxic

3. non-toxic to aquatic animals

4. water soluble

72.

Which one of the following is a vascular cryptogam?

1. Equisetum

2. Ginkgo

3. Marchantia

4. Cedrus

73.

Steps taken by the Government of India to control air pollution include

1. compulsory mixing of 20% ethyl alcohol with petrol and 20% biodiesel with diesel

2. compulsory PUC (Pollution Under Control) certification of petrol driven vehicles, which tests for carbon monoxide and hydrocarbons

3. permission to use only pure diesel with a maximum of 500 ppm Sulphur as fuel for vehicles

4. use of non-pollutiong Compressed natural Gas(CNG) only as fuel by all buses and trucks

74.

Montreal protocol aims at

1. reduction of ozone depleting substances

2. biodiversity conservation

3. control of water pollution

4. control of CO_2 emission

75.

Which one of the following acids is a derivative of carotenoids?

1. Indole-butyric acid

2. Indole-3-acetic acid

3. Gibberellic acid

4. Abscisic acid`

76.

Guard cells help in

1. protection against grazing

2. transpiration

3. guttation

4. fighting against infection

77.

Palisade parenchyma is absent in leaves of

1. Sorghum

2. mustard

3. soybean

4. gram

78.

Cotyledons and testa are edible parts of

1. groundnut and pomegranate

2. walnut and tamarind

3. french bean and coconut

4. cashew nut and litchi

79.

Which one of the following is considered important in the development of seed habit?

1. Dependent sporophyte

2. Heterospory

3. Halplontic life cycle

4. Free-living gametophyte

80.

T.O. Diener discovered a

1. free infectious RNA

2. free infectious DNA

3. infectious protein

4. bacteriophage

81.

Polyethene glycol method is used for

1. gene transfer without a vector

2. biodiesel production

3. seedless fruit production

4. energy production from sewage

82.

Which one of the following pairs is wrongly matched?

1. Detergents-Lipase

2. Alcohol-Nitrogenase

3. Fruit juice-Pectinase

4. Textile-Amylase

83.

A person likely to develop tetanus is immunised by administering

1. dead germs

2. preformed antibodies

3. wide spectrum antibiotics

4. weakened germs

84.

Biochemical Oxygen Demand (BOD) in a river water

1. remains unchanged when algal bloom occurs

2. has no relationship with concentration of oxygen in the water

3. gives a measure of Salmonella in the water

4. increases when sewage gets mixed with river water

85.

Which one of the following is the correct matching of the events occurring during menstrual cycle?

1. Ovulation-LH and FSH attain peak level and sharp fall in the secretion of progesterone

2. Proliferative phase-Rapid regeneration of myometrium and maturation of Graafian follicle

3. Development of corpus luteum-Secretory phase and increased secretion of progesterone

4. Menstruation-Breakdown of myometrium and ovum not fertilized

86.

Cyclic -photophosphorylation results in the formation of

1. NADPH

2. ATP and NADPH

3. ATP, NADPH and O_2

4. ATP

87.

Globulins contained in human blood plasma are primarily involved in

1. defence mechanisms of body

2. osmotic balance of body fluids

3. oxygen transport in the blood

4. clotting of blood

88.

Which of the following is a symbiotic nitrogen fixer?

1. Glomus

2. Azotobacter

3. Frankia

4. Azolla

89.

An example of axile placentation is

1. Argemone

2. Dianthus

3. Lemon

4. Marigold

90.

Semiconservative replication of DNA was first demonstrated in

1. Drosophila melanogaster

2. Escherichia coli

3. Streptococcus pneumoniae

4. Salmonella typhimurium

91.

A young infant may be feeding entirely on mother's milk, which is white in colour but the stools, which the infant passes out is quite yellowish. What is this yellow colour due to?\

1. Intestinal juice

2. Bile pigments passed through bile juice

3. Undigested mil protein casein

4. pancreatic juice poured into duodenum

92.

A fruit developed from hypanthodium inflorescences is called

1. hesperidium

2. sorosis

3. syconus

4. caryopsis

93.

Which one of the following statements is correct ?

1. Patients, who had undergone surgery are given cannabinoids to relieve pain

2. Benign tumours show the property of metastasis

3. heroin accelerates body fuctions

4. Malignant tumours may exhibit metastasis

94.

Transgenic plants are

1. produced by a somatic embryo in artificial medium

2. generated by introducing foreign DNA into a cell and regenerating a plant from that cell

3. Produced after protoplast fusion in artificial medium

4. grown in artificial medium after hybridization in the field

95.

The letter T , in T- lymphocyte refers to

1. thyroid

2. thalamus

3. tonsil

4. thymus

96.

Global agreement in specific control strategies to reduce the release of ozone depleting substance, was adopted by

1. Rio de Janeiro Conference

2. The Montreal Protocol

3. The Koyoto Protocol

4. The Vienna Convention

97.

Reduction in vascular tissue, mechanical tissue and cuticle is characteristic of

1. xerophytes

2. mesophytes

3. epiphytes

4. hydrophyte

98.

An example of a seed with endosperm perisperm and carnucle is

1. cotton

2. coffee

3. lily

4. castor

99.

What is not true for genetic code?

1. A codon in mRNA is read in non-contiguous fashion
2. It is nearly universal
3. It is degenerate
4. It is unambiguous

100.

Peripatus is a connecting link between

1. Ctenophora and Plantyhelminthes
2. Mollusca and Echinodermata
3. Annelida and Arthropoda
4. Coelenterata and Poriphera

101.

Which of the following molecules acts as a Lewis acid?

1. $(CH_3)_3B$
2. $(CH_3)_2O$
3. $(CH_3)_3P$
4. $(CH_3)_3N$

102.

Which of the following reactions is an example of nucleophilic substitution reaction?

1. $RX + KOH \rightarrow + ROH + KX$
2. $2RX + 2Na \rightarrow R — R + 2NaX$
3. $RX + H_2 \rightarrow RH + HX$
4. $RX + Mg \rightarrow RMg\ X$

103.

From the following bond energies :

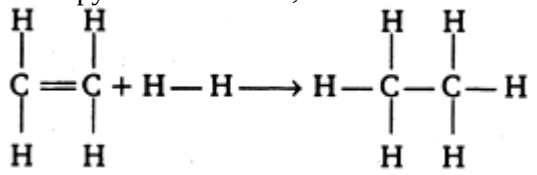
H—H bond energy: 431.37 kJ mol^{-1}

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

C—C bond energy: 336.49 kJ mol^{-1}

C—H bond energy: 410.50 kJ mol^{-1}

Enthalpy for the reaction,



will be

1. 1523.6 kJ mol^{-1}
2. -243.6 kJ mol^{-1}
3. -120.0 kJ mol^{-1}
4. 553.0 kJ mor^{-1}

104.

Which one of the elements with the following outer orbital configurations may exhibit the largest number of oxidation states?

1. $3d^3, 4s^2$
2. $3d^5, 4s^1$
3. $3d^5, 4s^2$
4. $3d^2, 4s^2$

105.

The ionization constant of ammonium hydroxide is 1.77 x 10^{-5} at 298 K. Hydrolysis constant of ammonium Chloride is

1. 5.65 x 10^{-10}
2. 6.50 x 10^{-12}
3. 5.65 x 10^{-13}
4. 5.65 x 10^{-12}

106.
Which of the following oxides is not expected to react with sodium hydroxide?

1. B_2O_3

2. CaO

3. SiO_2

4. BeO

107.
Which of the following does not show optical isomerism?(en = ethylenediamine)

1. $[Co(en)_2Cl_2]^+$

2. $[Co(NH_3)_3Cl_3]$

3. $[Co(en)Cl_2(NH_3)_2]^+$

4. $[Co(en)_3]^{3+}$

108.
Which one of the following is employed as a tranquilizer?

1. Equanil

2. Naproxen

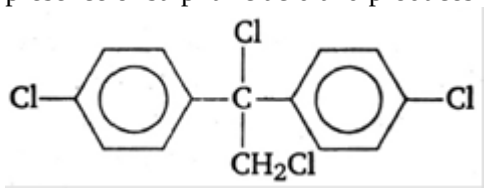
3. Tetracycline

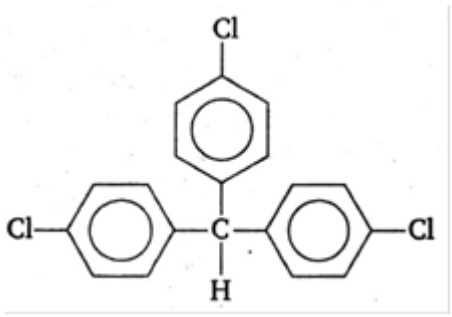
4. Chlorpheninamine

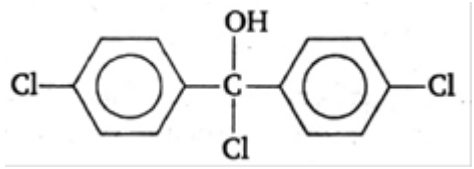
109.
$Al_2O_3$is reduced by electrolysis at low potentials and high currents. If 4.0 x 10^4 A of current is passed through molten Al_2O3 for 6 hours, what mass of aluminium is produced ? (Assume 100% current efficiency, at. mass of Al = 27 g mol^{-1})

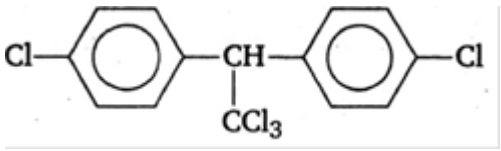
1. 9.0 x 10^3 g
2. 8.1 X 10^4 g
3. 2.4 x 10^5 g
4. 1.3 X 10^4 g

110.
Trichloroacetaldehyde, CCl_3CHO reacts with chlorobenzene in presence of sulphuric acid and produces

1. 

2. 

3. 

4. 

111.
Which of the following complex ions is expected to absorb visible light?
(At. no. Zn = 30, Sc = 21, Ti = 22, Cr = 24)

1. $[Sc(H_2O)_3(NH_3)_3]^{3+}$

2. $[Ti(en)_2 (NH_3)_2]^{4+}$

3. $[Cr(NH_3)_6]^{3+}$

4. $[Zn(NH_3)_6]^{2+}$

112.

Half-life period of a first order reaction is 1386 s. The specific rate constant of the reaction is

1. $5.0 \times 10^{-3} s^{-1}$

2. $0.5 \times 10^{-2} s^{-1}$

3. $0.5 \times 10^{-3} s^{-1}$

4. $5.0 \times 10^{-2} s^{-1}$

113.

Consider the following reaction,

$\text{Phenol} \xrightarrow{\text{Zn dust}} X \xrightarrow[\text{Anhy. } AlCl_3]{CH_3Cl} Y \xrightarrow{\text{Alkaline } KMnO_4} Z$

the product, Z, is

1. toluene

2. benzaldehyde

3. benzoic acid

4. benzene

114.

Copper crystallises in a face-centred cubic lattice with a unit cell length of 361 pm. What is the radius of the copper atom in pm?

1. 128

2. 157

3. 181

4. 108(Face

115.

For the reaction, A + B → products, it is observed that
(1) On doubling the initial concentration of A only, the rate of reaction is also doubled and
(2) On doubling the initial concentrations of both A and B, there is a change by a factor of 8 in the rate of the reaction.
The rate of this reaction is, given by

1. rate = $k\,[A]^2[B]$

2. rate = $k\,[A][B]^2$

3. rate = $k\,[A]^2[B]^2$

4. rate = $k\,[A][B]$

116.

According to the MO theory, which of the following lists ranks the nitrogen species in terms of increasing bond order?

1. $N_2^- < N_2 < N_2^{2-}$

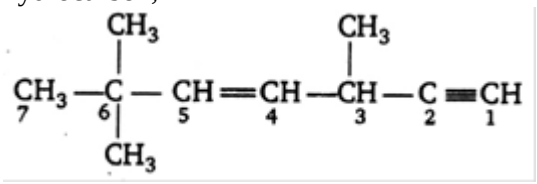
2. $N_2^{2-} < N_2^- < N_2$

3. $N_2 < N_2^{2-} < N_2^-$

4. $N_2^- < N_2^{2-} < N_2$

117.

The state of hybridisation of C_2, C_3, C_5 and $C_6$of the hydrocarbon,



is in the following sequence

1. sp, sp^3, sp^2 and sp^3

2. sp^3, sp^2, sp^2 and sp

3. sp, sp^2, sp^2 and sp^3

4. sp, sp^2, sp^3 and sp2

118.

Among the following which is the strongest oxidising agent ?

1. F_2

2. Br_2

3. l_2

4. Cl_2

119.

The equivalent conductance of $\frac{M}{32}$ solution of a weak monobasic acid is 8.0 mho $cm^2$and at infinite dilution is 400 mho cm^2. The dissociation constant of this acid is

1. 1.25×10^{-5}

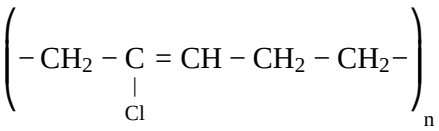
2. 1.25×10^{-6}

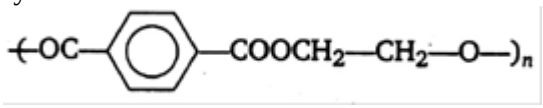
3. 6.25×10^{-4}

4. 1.25×10^{-4}

120.
Structures of some common polymers are given. Which one is not correctly presented?

1. Teflon
$(-CF_2-CF_2-)_n$

2. Neoprene


3. Terylene


4. Nylon 66
$[-NH(CH_2)_6NHCO(CH_2)_4-CO-]_n$

121.

Oxidation numbers of P in PO_4^{3-}, of S in SO_4^{2-} and that of Cr in $Cr_2O_7^{2-}$ are respectively,

1. +5, +6 and +6

2. +3, +6 and +5

3. +5, +3 and +6

4. -3, +6 and +6

122.

The IUPAC name of the compound having the formula $CH{\equiv}C{-}CH{=}CH_2$ is

1. 3-butene-1-yne

2. 1-butyn-3-ene

3. but-1-yne-3-ene

4. 1-butene-3-yne

123.

In the case of alkali metals, the covalent character decreases in the order

1. MCl>Ml>MBr>MF

2. MF>MCl>MBr>Ml

3. MF>MCl>Ml>MBr

4. Ml>MBr>MCl>MF

124.

Given,
(i) $Cu^{2+} + 2e^- \rightarrow Cu \quad E^o = 0.337$ V
(ii) $Cu^{2+} + e^- \rightarrow Cu^+ \quad E^o = 0.153$ V
Electrode potential, E^0 for the reaction,
$Cu^1 + e^- \rightarrow Cu$, will be

1. 0.52 V

2. 0.90 V

3. 0.30 V

4. 0.38 V

125.

For the reaction, $N_2 + 3H_2 \rightarrow 2NH_3$, if $\frac{d[NH_3]}{dt} = 2 \times 10^{-4}$ mol $L^{-1}s^{-1}$, the value of $\frac{-d[H_2]}{dt}$ would be

1. 3×10^{-4} mol L^{-1} s^{-1}

2. 4×10^{-4} mol L^{-1} s^{-1}

3. 6×10^{-4} mol L^{-1} s^{-1}

4. 1×10^{-4} mol L^{-1} s^{-1}

126.

What is the $[OH^-]$ in the final solution prepared by mixing 20.0 mL of 0.050 M HCl with 30.0 mL of 0.10 M $Ba(OH)_2$?

1. 0.10 M

2. 0.40 M

3. 0.0050 M

4. 0.12 M

127.

Out of TiF_6^{2-}, CoF_6^{3-}, Cu_2Cl_2 and $NiCl_4^{2-}$ (Z of Ti = 22, Co=27, Cu = 29, Ni= 28) the colourless species are

1. TiF_6^{2-} and CoF_6^{3-}

2. Cu_2Cl_2 and $NiCl_4^{2-}$

3. TiF_6^{2-} and Cu_2Cl_2

4. CoF_6^{3-} and $NiCl_4^{2-}$

128.

Amongst the elements with following electronic configurations, which one of them may have the highest ionisation energy ?

1. [Ne] $3s^2\ 3p^3$

2. [Ne] $3s^2\ 3p^2$

3. [Ar] $3d^{10}\ 4s^2\ 4p^3$

4. [Ne] $3s^2\ 3p^1$

129.

Maximum number of electrons in a subshell of an atom is determined by the following

1. 4l+2

2. 2l+1

3. 4l- 2

4. $2n^2$

130.

Lithium metal crystallises in a body centred cubic crystal. If the length of the side of the unit cell of lithium is 351 pm, the atomic radius of the lithium will be

1. 240.8 pm

2. 151.8 pm

3. 75.5 pm

4. 300.5 pm

131.

The segment of DNA, which acts as the instrumental manual for the synthesis of the protein is

1. nucleotide

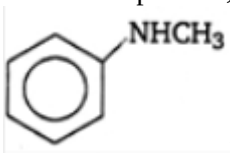
2. ribose

3. gene

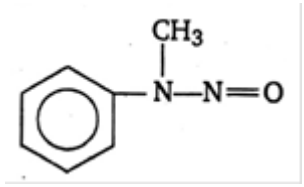
4. nucleoside

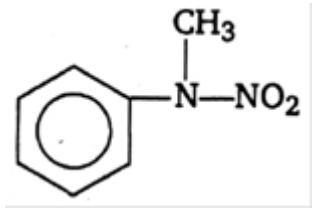
132.

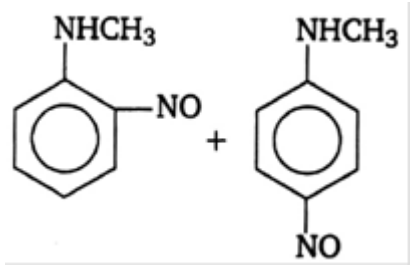
Predict the product,

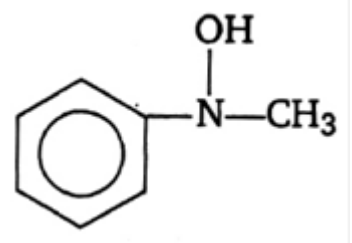


+ $NaNO_2$ + HCl → Product

1. 

2. 

3. 

4. 

133.

Which of the following compounds will exhibit cis-trans (geometrical) isomerism?

1. 2-butene

2. Butanol

3. 2-butyne

4. 2-butenol

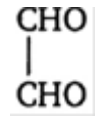
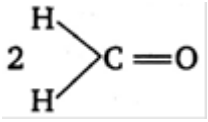
134.

The values of ΔH and ΔS for the reaction, $C_{(graphite)} + CO_2(g) \rightarrow 2CO(g)$ are 170 kJ and 170 JK^{-1}, respectively. This reaction will be spontaneous at

1. 710 K
2. 910 K
3. 1110 K
4. 510 K

135.

$H_2COH.CH_2OH$ on heating with per-iodic acid gives

1. $2CO_2$
2. 2 HCOOH
3. 
4. 

136.

The dissociation constants for acetic acid and HCN at 25 °C are 1.5 x $10^{-5}$and 4.5 x 10^{-10}, respectively. The equilibrium constant for the equilibrium,

$CN^- + CH_3COOH \rightleftarrows HCN + CH_3Coo^-$

would be

1. 3.0×10^5
2. 3.0×10^{-5}
3. 3.0×10^{-4}
4. 3.0×10^4

137.

Nitrobenzene can be prepared from benzene by using a mixutre 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

138.

In the reaction,

$BrO_3^-(aq) + 5\,Br^-(aq) + 6H^+ \rightarrow 3Br_2(l) + 3H_2O(l)$

The rate of appearance of bromine (Br_2) is related to rate of disappearance of bromide ions as following

1. $\frac{d[Br_2]}{dt} = -\frac{3}{5}\frac{d[Br^-]}{dt}$
2. $\frac{d[Br_2]}{dt} = -\frac{5}{3}\frac{d[Br]}{dt}$
3. $\frac{d[Br_2]}{dt} = \frac{5}{3}\frac{d[Br^-]}{dt}$
4. $\frac{d[Br_2]}{dt} = \frac{3}{5}\frac{d[Br^-]}{dt}$

139.

In which of the following molecules/ions BF_3, NO_2^-, NH_2^- and H_2O, the central atom is sp^2hybridised ?

1. NO_2^- and NH_2^-
2. NH_2^- and H_2O
3. NO_2^- and H_2O
4. BF_3 and NO_2^-

140.

Which of the following hormones contains iodine?

1. Insuline
2. Testosterone
3. Adernaline
4. Thyroxine

141.

10 g of hydrogen and 64 of oxygen were filled in a steel vessel and exploded. Amount of water produced in this reaction will be

1. 2 mol

2. 3 mol

3. 4 mol

4. 1 mol

142.

The energy absorbed by each molecule (A_2) of a substance is 4.4 x 10^{-19} J and bond energy per molecule is 4.0 x 10^{-19} J. The kinetic energy of the molecule per atom will be

1. 2.0×10^{-20} J

2. 2.2×10^{-19} J

3. 2.0×10^{-19} J

4. 4.0×10^{-20} J

143.

The straight chain polymer is formed by

1. hydrolysis of CH_3SiCl_3 followed by condensation polymerization

2. hydrolysis of $(CH_3)_3SiCl$ followed by condensation polymerization

3. hrdrolysis of $(CH_3)_4Si$ by addition polymerisation

4. hydrolysis of $(CH_3)_2SiCl_2$ followed by condensation polymerization

144.

The stability of +1 oxidation state increases in the sequence

1. Al <Ga<In<Tl

2. Tl<In<Ga<Al

3. In<Tl<Ga<Al

4. Ga<In<Al<Tl

145.

Consider the following reaction, ethanol $\xrightarrow{PBr_3}$ X $\xrightarrow{\text{alc. KOH}}$ Y $\xrightarrow[(ii)\,H_2O,\ \text{heat}]{(i)\,H_2SO_4,\ \text{room temperature}}$ Z;

the product Z, is

1. $CH_2 = CH_2$

2. $CH_3CH_2 - O - CH_2 - CH_3$

3. $CH_3 - CH_2 - O - SO_3H$

4. CH_3CH_2OH

146.

A 0.0020 m aqueous solution of an ionic compound $Co(NH_3)_5(NO_2)Cl$ freezes at - 0.0073C. Number of moles of ions which 1 mol of ionic compound produces on being dissolved in water will be (k1 = -1.86 C I m)

1. 2

2. 3

3. 4

4. 1

147.

What is the dominant intermolecular force or bond that must be overcome in converting liquid CH_3OH to a gas ?

1. Hydrogen bonding

2. Dipole-dipole interaction

3. Covalent bonds

4. London dispersion force

148.

Benzene reacts with CH_3Cl in the presence of anhydrous $AlCl_3$ to form

1. toluene

2. chlorobenzene

3. benzylchloride

4. xylene

149.

Which of the following is not permissible arrangement of electrons in an atom ?

1. n= 4, l= 0, m= 0, s= -1/2

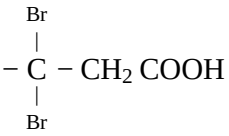
2. n= 5, l= 3, m= 0, s= +1/2

3. n= 3, l= 2, m= -3, s= -1/2

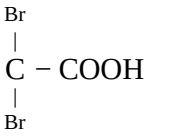
4. n= 3, l= 2, m= 2, s= -1/2

150.
Propanoic acid with Br_2/P yields a dibromo product. Its structure would be

1. $CH_2Br - CHBr - COOH$

2. 

3. $CH_2Br - CH_2 - COBr$

4. 

151.
An explosion blows a rock into three parts. Two parts go off at right angles to each other. These two are, 1 kg first part moving with a velocity of 12 ms^{-1} and 2 kg second part moving with a velocity of 8 ms-1 If the third part flies off with a velocity of 4 ms^{-1}, its mass would be:
1. 5 kg
2. 7 kg
3. 17 kg
4. 3 kg

152.
A conducting circular loop is placed in a uniform magnetic field 0.04 T with its plane perpendicular to the magnetic field. The radius of the loop starts shrinking at rate of 2 mm/s .The induced emf in the loop when the radius is 2 cm is:

1. 3.2 πμV
2. 4.8 πμV
3. 0.8 πμV
4. 1.6 πμV

153.
If the dimensions of a physical quantity are given by $M^aL^bT^c$, then the physical quantity will be:
1. Pressure if a = 1, b = -1, c = - 2
2. Velocity if a = 1, b = 0, c = - 1
3. Acceleration if a = 1, b = 1, c = - 2
4. Force if a = 0, b =-1, c = - 2

154.
In the nuclear decay given below:
$${}^{A}_{Z}X \rightarrow {}^{A}_{Z+1}Y \rightarrow {}^{A-4}_{Z-1}B \rightarrow {}^{A-4}_{Z-1}B$$
the particles emitted in the sequence are:

1. β, α, γ
2. γ, β, α
3. β, γ, α
4. α, β, γ

155.
Three concentric spherical shells have radii a, b, and c (a < b < c) and have surface charge densities σ, − σ and σ respectively. If V_A, V_B and V_C denote the potentials of the three shells, then for c = a + b, we have
1. $V_c = V_A \neq V_B$
2. $V_c = V_B \neq V_A$
3. $V_c \neq V_B \neq V_A$
4. $V_c = V_B = V_A$

156.
A bus is moving with a speed of 10 ms^{-1} on a straight road. A scooterist wishes to overtake the bus in 100 s. If the bus is at a distance of 1 km from the scooterist, with what speed should the scooterist chase the bus?
1. 20 ms^{-1}
2. 40 ms^{-1}
3. 25 ms^{-1}
4. 10 ms^{-1}

157.
Under the influence of a uniform magnetic field, a charged particle moves with constant speed v in a circle of radius R. The time period of rotation of the particle:

1. Depends on v and not on R
2. Depends on R and not on v
3. is independent of both v and R
4. Depends on both v and R

158.
A wave in a string has an amplitude of 2 cm. The wave travels in the +ve direction of the x-axis with a speed of 128 m/s and it is noted that 5 complete waves fit in 4 m length of the string. The equation describing the wave is:

1. y = (0.02)m sin(7.85x+1005t)

2. y = (0.02)m sin(15.7x -2010t)

3. y = (0.02)m sin(15.7x+2010t)

4. y = (0.02)m sin(7.85x -1005t)

159.
A simple pendulum performs simple harmonic motion about x = 0 with an amplitude a and time period T. The speed of the pendulum at x = $\frac{a}{2}$ will be:

1. $\frac{\pi a\sqrt{3}}{2T}$
2. $\frac{\pi a}{T}$
3. $\frac{3\pi^2 a}{T}$
4. $\frac{\pi a\sqrt{3}}{T}$

160.
A *p-n* photodiode is fabricated from a semiconductor with a band-gap of 2.5 eV. It can detect a signal of wavelength:

1. 6000 Å

2. 4000 nm

3. 6000 nm

4. 4000 Å

161.
A body of mass 1 kg is thrown upwards with a velocity 20 ms^{-1}. It momentarily comes to rest after attaining a height of 18 m. How much energy is lost due to air friction? (g =10 ms^{-2})

1. 20 J

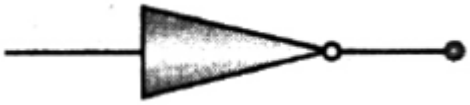
2. 30 J

3. 40 J

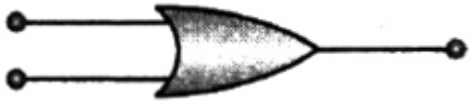
4. 10 J

162.
The symbolic representation of four logic gates:

(i) 

(ii) 

(iii) 

(iv) 

The logic symbols for OR, NOT and NAND gates are respectively:

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

163.
If $\vec{F}$ is the force acting on a particle having position vector $\vec{r}$ and $\vec{\tau}$ be the torque of this force about the origin, then:

1. $\vec{r} \cdot \vec{\tau} \neq 0$ and $\vec{F} \cdot \vec{\tau} = 0$
2. $\vec{r} \cdot \vec{\tau} > 0$ and $\vec{F} \cdot \vec{\tau} < 0$
3. $\vec{r} \cdot \vec{\tau} = 0$ and $\vec{F} \cdot \vec{\tau} = 0$
4. $\vec{r} \cdot \vec{\tau} = 0$ and $\vec{F} \cdot \vec{\tau} \neq 0$

164.
If a diamagnetic substance is brought near the north or the south pole of a bar magnet, it is
1. Repelled by both the poles
2. Repelled by the north pole and attracted by the south pole
3. Attracted by the north pole and repelled by the south pole
4. Attracted by both the poles

165.
The mass of a lift is 2000 kg. When the tension in the supporting cable is 28000 N, then its acceleration is: (g=10 m/s^2)

1. 30 ms^{-2} downwards
2. 4 ms^{-2} upwards
3. 4 ms^{-2} downwards
4. 14 ms^{-2} upwards

166.
The number of beta particles emitted by a radioactive substance is twice the number of alpha particles emitted by it. The resulting daughter is an:

1. isobar of parent
2. Isomer of parent
3. Isotone of parent
4. Isotope of parent

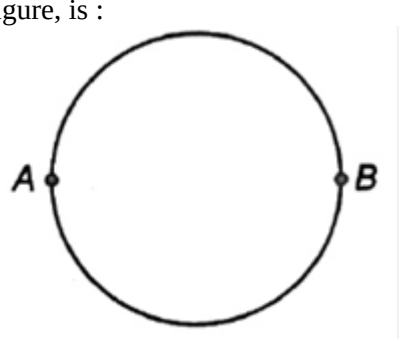
167.
A rectangular, a square, a circular and an elliptical loop, all in the (x-y) plane, are moving out of a uniform magnetic field with a constant velocity, $\vec{v} = v\hat{i}$. The magnetic field is directed along the negative z-axis direction. The induced emf, during the passage of these loops out of the field region will not remain constant for:

1. the rectangular, circular and elliptical loops
2. the circular and the elliptical loops
3. only the elliptical loop
4. any of the four loops

168.
A particle starts its motion from rest under the action of a constant force. If the distance covered in the first 10 sec is S_1 and that covered in the first 20 sec is S_2, then

1. $S_2 = 2S_1$
2. $S_2 = 3S_1$
3. $S_2 = 4S_1$
4. $S_2 = S_1$

169.
A wire of resistance 12 Ωm^{-1} is bent to form a complete circle of radius 10 cm. The resistance between its two diametrically opposite points, A and B as shown in the figure, is :



1. 0.6 $\pi\Omega$
2. 3 $\pi\Omega$
3. 61 $\pi\Omega$
4. 6 $\pi\Omega$

170.
The electric field part of an electromagnetic wave in a medium is represented by

$E_x = 0$;

$E_y = 2.5\frac{N}{C}\cos[(2\pi \times 10^6 \frac{rad}{m})t - (\pi \times 10^{-2}\frac{rad}{s})x]$

$E_s = 0$. The wave is

1. Moving along y-direction with frequency 21π x 10^6 Hz and wavelength 200 m.
2. Moving along x-direction with frequency 10^6 Hz and wavelength 100m
3. Moving along x-direction with frequency 10^6 Hz and wavelength 200m
4. Moving along x-direction with frequency 10^6 Hz and wavelength 800m

171.
A thin circular ring of mass M and radius R is rotating in a horizontal plane about an axis vertical to its plane with a constant angular velocity ω. If two objects each of mass m be attached gently to the opposite ends of a diameter of the ring, the ring will then rotate with an angular velocity:

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

172.
A transistor is operated in common-emitter configuration at V_c = 2 volt such that a change in the base current from 100 µA to 200 µA produces a change in the collector current from 5 mA to 10 mA. The current gain is:

1. 75

2. 100

3. 150

4. 50

173.
A black body at 227 °C radiates heat at the rate of 7 cal-cm^{-2}s^{-1}. At a temperature of 727 °C, the rate of heat radiated in the same units will be:
1. 60
2. 50
3. 112
4. 80

174.
A student measures the terminal potential difference (V) of a cell (of emf E and internal resistance r) as a function of the current (I) flowing through it. The slope and intercept of the graph between V and I, respectively, equal to :

1. E and -r

2. -r and E

3. r and -E

4. -E and r

175.
Two bodies of mass 1 kg and 3 kg have position vector $\hat{i} + 2\hat{j} + \hat{k}$ and $-3\hat{i} - 2\hat{j} + \hat{k}$ respectively. The centre of mass of this system has a position vector:

1. $-2\hat{i}+2\hat{k}$
2. $-2\hat{i}-\hat{j}+\hat{k}$
3. $2\hat{i}-\hat{j}-2\hat{k}$
4. $-\hat{i}+\hat{j}+\hat{k}$

176.
The internal energy change in a system that has absorbed 2 kcal of heat and done 500 J of work is:

1. 8900 J

2. 6400 J

3. 5400 J

4. 7900 J

177.
An engine pumps water continuously through a hose. Water leaves the hose with a velocity v and m is the mass per unit length of the water jet. What is the rate at which kinetic energy is imparted to water?
1. $\frac{1}{2}mv^3$
2. mv^3
3. $\frac{1}{2}mv^2$
4. $\frac{1}{2}m^2v^2$

178.
The driver of a car travelling with speed 30 m/s towards a hill sounds a horn of frequency 600 Hz. If the velocity of sound in air is 330 m/s the frequency of reflected sound as heard by the driver is:
1. 550 Hz
2. 555.5 Hz
3. 720 Hz
4. 500 Hz

179.
In a Rutherford scattering experiment, when a projectile of charge Z_1 and mass M_1 approaches a target nucleus of charge Z_2 and mass M_2, the distance of the closest approach is r_0. The energy of the projectile is

1. Directly proportional to M_1 x M_2

2. Directly proportional to Z_1Z_2

3. Inversely proportional to Z_1

4. Directly proportional to mass M_1

180.
Three capacitors each of capacitance C and of breakdown voltage V are joined in series. The capacitance and breakdown voltage of the combination will be

1. $\frac{C}{3}$, $\frac{V}{3}$
2. 3C, $\frac{V}{3}$
3. $\frac{C}{3}$, 3V
4. 3C, 3V

181.
The magnetic force acting on a charged particle of charge -2 μC in a magnetic field of 2T acting in y-direction, when the particle velocity is $(2\hat{i}+ 3\hat{j}]) \times 10^6$ ms^{-1} is:

1. 8 N in - z-direction

2. 4 N in z-direction

3. 8 N in y-direction

4. 8 N in z-direction

182.
Which one of the following equations of motion represents simple harmonic motion where k, k_0, k_1, and a are all positive?

1. Acceleration = $-k_0x + k_1x^2$

2. Acceleration = -k(x + a)

3. Acceleration = k(x + a)

4. Acceleration = kx

183.
Monochromatic light of wavelength 667 nm is produced by a helium-neon laser. The power emitted is 9mW. The number of photons arriving per second on the average at a target irradiated by this beam is

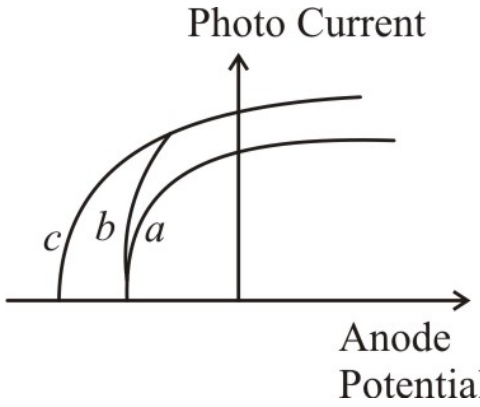
1. 9×10^{17}

2. 3×10^{16}

3. 9×10^{15}

4. 3×10^{19}

184.
The figure shows a plot of photocurrent versus anode potential for a photosensitive surface for three different radiations. Which one of the following is a correct statement?



1. Curves a and b represent incident radiations of different frequencies and different intensities

2. Curves a and b represent incident radiations of the same frequency but of different intensities

3. Curves b and c represent incident radiations of different frequencies and different intensities

4. Curves b and c represent incident radiations of same frequency having the same intensity

185.
Power dissipated in an L-C-R series circuit connected to an AC source of emf E is:

1. $\frac{\varepsilon^2 R}{\left[R^2 + \left(L\omega - \frac{1}{C\omega}\right)^2\right]}$
2. $\frac{\varepsilon^2 \sqrt{R^2 + \left(L\omega - \frac{1}{C\omega}\right)^2}}{R}$
3. $\frac{\varepsilon^2 \left[R^2 + \left(L\omega - \frac{1}{C\omega}\right)^2\right]}{R}$
4. $\frac{\varepsilon^2 R}{\sqrt{R^2 + \left(L\omega - \frac{1}{C\omega}\right)^2}}$

186.

The electric potential at a point (x, y, z) is given by $V = -x^2y - xz^3 + 4$

The electric field $\vec{E}$ at that point is

1. $\vec{E} = (2xy + z^3)\hat{i} + x^2\hat{j} + 3xz^2\hat{k}$
2. $\vec{E} = 2xy\hat{i} + (x^2 + y^2)\hat{j} + (3xz - y^2)\hat{k}$
3. $\vec{E} = z^3\hat{i} + xyz\hat{j} + z^2\hat{k}$
4. $\vec{E} = (2xy - z^3)\hat{i} + xy^2\hat{j} + 3z^2x\hat{k}$

187.

A bar magnet having a magnetic moment of 2×10^4 JT^{-1} is free to rotate in a horizontal plane. A horizontal magnetic field $B = 6 \times 10^{-4}$T exists in the space. The work done in taking the magnet slowly from a direction parallel to the field to a direction 60 ° from the field is

1. 0.6 J
2. 12 J
3. 6 J
4. 2 J

188.

A galvanometer having a coil resistance of 60 Ω shows full-scale deflection when a current of. 1.0 A passes through it. It can be converted into an ammeter to read currents up to 5.0 A by:

1. Putting in parallel resistance of 24 Ω
2. Putting in series resistance of 15 Ω
3. Putting in series resistance of 240 Ω
4. Putting in parallel resistance of 15 Ω

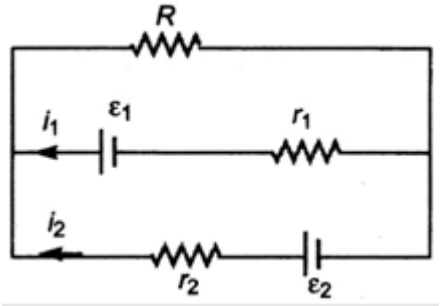
189.

The two ends of a rod of length L and a uniform cross-sectional area A are kept at two temperatures T_1 and T_2 ($T_1 > T_2$). The rate of heat transfer $\frac{dQ}{dt}$ through the rod in a steady state is given by:

1. $\frac{dQ}{dt} = \frac{KL(T_1 - T_2)}{A}$
2. $\frac{dQ}{dt} = \frac{K(T_1 - T_2)}{LA}$
3. $\frac{dQ}{dt} = KLA(T_1 - T_2)$
4. $\frac{dQ}{dt} = \frac{KA(T_1 - T_2)}{L}$

190.

See the electrical circuit shown in this figure. Which of the following equations is a correct equation for it?



1. $\varepsilon_1 - (i_1 + i_2)R - i_1r_1 = 0$
2. $\varepsilon_2 - i_2r_2 - \varepsilon_1 - i_1r_1 = 0$
3. $-\varepsilon_2 - (i_1 + i_2)R + i_2r_2 = 0$
4. $\varepsilon_1 - (i_1 + i_2)R + i_1r_1 = 0$

191.

The mean free path of electrons in a metal is 4×10^{-8} m. The electric field which can give on an average 2 eV energy to an electron in the metal will be in the unit of Vm^{-1}

1. 8×10^7
2. 5×10^{-11}
3. 8×10^{-11}
4. 5×10^7

192.

The number of photoelectrons emitted for the light of a frequency ν (higher than the threshold frequency ν_0) is proportional to

1. $\nu - \nu_0$
2. threshold frequency (ν_0)
3. intensity of light
4. frequency of light (ν)

193.

Each of the two strings of length 51.6 cm and 49.1 cm are tensioned separately by 20 N force. Mass per unit length of both the strings is the same and equal to 1 g/m. When both the strings vibrate simultaneously the number of beats is:

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

194.
The ionization energy of the electron in the hydrogen atom in its ground state is 13.6 eV. The atoms are excited to higher energy levels to emit radiations of 6 wavelengths. Maximum wavelength of emitted radiation corresponds to the transition between :

1. n = 3 to n = 2 states
2. n = 3 to n = 1 states
3. n = 2 to n = 1 states
4. n = 4 to n= 3 states

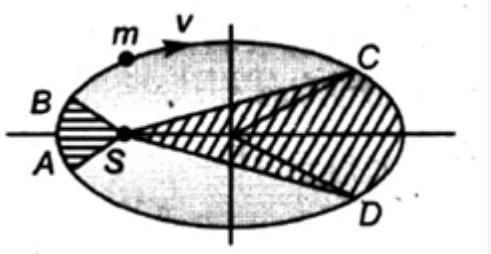
195.
Four identical thin rods each of mass M and length form a square frame. The moment of inertia of this frame about an axis through the centre of the square and perpendicular to its plane is:

1. $\frac{4}{3}Ml^2$
2. $\frac{2}{3}Ml^2$
3. $\frac{13}{3}Ml^2$
4. $\frac{1}{3}Ml^2$

196.
In thermodynamic processes which of the following statements is not true?

1. In an adiabatic process the system is insulated from the surroundings
2. In an isochoric process pressure remains constant
3. in an isothermal process the temperature remains constant
4. In an adiabatic process PV^{γ}= constant

197.
The figure shows the elliptical orbit of a planet m about the sun S. The shaded area SCD is twice the shaded area SAB. If t_1 is the time for the planet to move from C to D and t_2 is the time to move from A to B, then,



1. $t_1 > t_2$
2. $t_1 = 4t_2$
3. $t_1 = 2t_2$
4. $t_1 = t_2$

198.
Sodium has body centered packing. Distance between two nearest atoms is 3.7 A. The lattice parameter is

1. 6.8 Å
2. 4.3 Å
3. 3.0 Å
4. 8.5 Å

199.
A block of mass M is attached to the lower end of a vertical spring. The spring is hung from a ceiling and has force constant value k. The mass is released from rest with the spring initially upstretched. The maximum extension produced in the length of the spring will be:

1. Mg/k
2. 2Mg/k
3. 4Mg/k
4. Mg/2k

200.
A body, under the action of a force $\vec{F} = 6\hat{i} - 8\hat{j} + 10\hat{k}$, acquires an acceleration of 1 ms^{-2}. The mass of this body must be:

1. $2\sqrt{10}$ kg
2. 10 kg
3. 20 kg
4. $10\sqrt{2}$ kg