1.

Which one of the following shows isogamy with non-flagellated gametes?

1. Sargassum
2. Ectocarpus
3. Ulothrix
4. Spirogyra

2.

Five kingdom system of classification suggested by R.H. Whittaker is based on:

1. Complexity of body organisation
2. Mode of reproduction
3. Mode of nutrition
4. All of the above

3.

Which one of the following fungi contains hallucinogens?

1. Morchella esculenta
2. Amanita muscaria
3. Neurospora sp.
4. Ustilago sp.

4.

Archaebacteria differ from eubacteria in:

1. Cell membrane stucture
2. Mode of nutrition
3. Cell shape
4. Mode of reproduction

5.

Which one of the following is wrong about *Chara*?

1. upper oogonium and lower round antheridium
2. Globule and nucule present on the same plant
3. Upper antheridium and lower oogonium
4. Globule is male reproductive structure

6.

Which of the following is responsible for peat formation?

1. Marchantia
2. Riccia
3. Funaria
4. Sphagnum

7.

Placenta and pericarp are both edible portions in :

1. Apple
2. Banana
3. Tomato
4. Potato

8.

When the margins of sepals or petals overlap one another without any particular direction, the condition is termed as:

1. Vexillary
2. Imbricate
3. Twisted
4. Valvate

9.

You are given a fairly old piece of dicot stem and a dicot root. Which of the following anatomical structures will your use to distinguish between the two?

1. Secondary xylem
2. Secondary phloem
3. Protoxylem
4. Cortical cells

10.

Which one of the following statements is correct?

1. The seed in grasses is not endospermic
2. Mango is a parthenocarpic fruit
3. A proteinaceous aleurone layer is present in maize gain.
4. A sterile pistil is called a staminode.

11.

Tracheids differ from the tracheary elements in :

1. Having casparian strips

2. Being imperforate

3. Lacking nucleus

4. Being lignified

12.

An example of edible underground stem is:

1. Carrot

2. Groundnut

3. Sweet potato

4. Potato

13.

Which structures perform the function of mitochondria in bacteria ?

1. Nucleoid

2. Ribosomes

3. Cell wall

4. Mesosomes

14.

The solid linear cytoskeletal elements having a diameter of 6 nm and made up of a single type of monomer are known as

1. Microtubules

2. Microfilaments

3. Intermediate filaments

4. Lamins

15.

The osmotic expansion of a cell kept in water is chiefly regulated by

1. Mitochondria

2. Vacuoles

3. Plastids

4. Ribosomes

16.

During which phase(s) of cell cycle, amount of DNA in a cell remains at 4 C level if the initial amount is denoted as 2C ?

1. G_0 and G_1

2. G_1 and S

3. Only G_2

4. G_2 and M

17.

Match the following and select the correct answer :
List - I
A) Centriole
B) Chlorophyll
C) Cristae
D) Ribozymes
List – II
(i) Infoldings in mitochondria
(ii) Thylakoids
(iii) Nucleic acids
(iv) Basal body cilia or flagella

1. A-iv B-ii C-i D-iii

2. A-i B-ii C-iv D-iii

3. A-i B-iii C-ii D-iv

4. A-iv B-iii C-i D-ii

18.

Dr F. Went noted that if coleoptile tips were removed and placed on agar for one hour, the agar would produce a bending when placed on one side of freshly - cut coleoptile stumps. Of what significance is this experiment?

1. It made possible the isolation and exact identification of auxin.

2. It is the basis for quantitative determination of small amounts og growth-promoting substances.

3. It supports the hypothesis that IAA is auxin.

4. It demonstated polar movements of auxins.

19.

Deficiency symptoms of nitrogen and potassium are visible first in :

1. Senescent leaves

2. Young leaves

3. Roots

4. Buds

20.

In which one of the following processes CO_2 is not released ?

1. Aerobic respiration in plants

2. Aerobic respiration in animals

3. Alcoholic fermentation

4. Lactate fermentation

21.

Anoxygenic photosynthesis is characteristic of:

1. Rhodospirillum

2. Spirogyra

3. Chlamydomonas

4. Ulva

22.

A few normal seedling of tomato were kept in a dark room. After few days they were found to have become white- coloured like albions, Which of the following terms will you use to describe them ?

1. Mutated

2. Embolised

3. Etiolated

4. Defoliated

23.

Which one of the following growth regulators is known as stress hormone ?

1. Abscissic acid

2. Ethylene

3. GA_3

4. Indole acetic acid

24.

Geitonogamy involves

1. Pollination of a flower by the pollen from another flower of the same plant

2. Pollination of a flower by the pollen from another same flower.

3. Pollination of a flower by the pollen from a flower of another plant in the same population

4.Pollination of a flower by the pollen from a flower of another plant belonging to a distant population

25.

Male gametophyte with least number of cells is present in :

1. Pteris

2. Funaria

3. Lilium

4. Pinus

26.

An aggregate fruit is one which devloped from

1. Multicarpellary syncarppous gynoecium

2. Multicarpellary apocarpous gynoecium

3. Complete inflorescence

4. Multicarpellary superior ovary

27.

Pollen tablets are available in the market for:

1. In vitro fertilization

2. Breeding programmes

3. Supplementing food

4. Ex situ conservation

28.

Function of filiform apparutus is to :

1. Recognize the suitable pollen at stigma

2. Stimulate division of genrative cell

3. Producer nector

4. Guide the entry of pollen tube

29.

Non- albuminous seed is produced in:

1. Maize

2. Castor

3. Wheat

4. Pea

30.

Which of the following shows coiled RNA strand and capsomeres ?

1. Polio virus

2. Tobacco mosaic virus

3. Measles virus

4. Retro virus

31.

Which one of the following is wrongly matched?

1. Transcription- Writing information from DNA to t-RNA

2. Translation- Using information in m-RNA to make protein

3. Repressor protein- Binds to a operator to stop enzyme synthesis

4. Operon- Structural genes, operator and promoter

32.

Transformation was discovered by :

1. Meseson and Stahl

2. Hershey and chase

3. Griffith

4. Waston and crick

33.

Fruit colour in squash is an example of :

1. Recessive epistasis

2. Dominant epistasis

3. Complementary genes

4. Inhibitory genes

34.

Viruses have :

1. DNA enclosed in a protein coat

2. Prokaryotic nucleus

3. Single chromosome

4. Both DNA and RNA

35.

The first human hormone produced by recombinant DNA technology is :

1. Insulin

2. Estrogen

3. Thyroxin

4. Progesterone

36.

An analysis of chromosomal DNA using the Southern hybridization technique does not use:

1. Electrophoresis

2. Blotting

3. Autoradiography

4. PCR

37.

In vitro clonal propagation in plants in characterized by :

1. PCR and RAPD

2. Northern blotting

3. Electrophoresis and HPLC

4. Microscopy

38.

An alga which can be employed as food for human beings :

1. Ulothrix

2. Chlorella

3. Spirogyra

4. Polysiphonia

39.

Which vector can clone only a small fragment of DNA?

1. Bacterial artificial chromosome

2. Yeast artificial chromosome

3. plasmid

4. cosmid

40.

An example of ex situ conservation is :

1. National park

2. Seed bank

3. Wildlife sactuary

4. Sacred grove

41.

A location with luxuriant growth of lichens on the trees indicates that the :

1. Trees are very healthy

2. Trees are heavily infested

3. Location is highly polluted

4. Location is not polluted

42.

Match the following and select the correct option :
List - I
(a) Earthworm
(b) Succession
(c) Ecosystem service
(d) Population growth
List – II
(i) Pioneer species
(ii) Detrivore
(iii) Natality
(iv) Pollination

1. A-(i) B-(ii) C-(iii) D-(iv)

2. A-(i) B-(ii) C-(iii) D-(iv)

3. A-(iii) B-(ii) C-(iv) D-(i)

4. A-(ii) B-(i) C-(iv) D-(iii)

43.

A species facing extremely high risk of extinction in the immediate future is called

1. Vulnerable

2. Endemic

3. Critically Endangered

4. Extinct

44.

The zone of atmosphere in which the ozone layer is present is called

1. Ionosphere

2. Mesosphere

3. Stratosphere

4. Troposphere

45.

The organization which published the Red List of species is

1. ICFRE

2. IUCN

3. UNEP

4. WWF

46.

Select the Taxon mentioned that represents both marine and fresh water species :

1. Echionoderms

2. Ctenophroa

3. Cephalocarodata

4. Cnidaria

47.

Which one of the following living organisms completely lacks a cell wall?

1. Cyanobacteria

2. Sea- fan (Gorgonia)

3. Saccharomyces

4. Coelenterata algae

48.

Planaria possess high capacity of

1. metamorphosis

2. regeneration

3. alternation of generation

4. bioluminescene

49.

A marine cartilaginous fish that can produce electric current is:

1. Pristis

2. Torpedo

3. Trygon

4. Scoliodon

50.

Choose the correctly matched pair:

1. Tendon-Specialized connective tissue

2. Adipose tissue-Dense connective tissue

3. Areolar tissue- Loose connective tissue

4. Cartilage- Loose connective tissue

51.

Choose the correctly matched pair

1. Inner lining of salivary ducts- Ciliated epithelium

2. Moist surface of buccal cavity- Glandular epithelium

3. Tubular parts of nephrons- Cuboidal epithelium

4. Inner surface of bronchioles- Squamous epithelium

52.

In 'S' phase of the cell cycle

1. amount of DNA doubles in each cell.

2. amount of DNA remains same in each cell

3. chromosome number is increased

4. amount of DNA is reduced to half in each cell.

53.

The motile bacteria are able to move by

1. fimbriae

2. flagella

3. cilia

4. pili

54.

Select the option which is not correct with respect to enzyme action:

1. Substrate binds with enzyme at its active site.

2. Addition of lot of succinate does not reverse the inhibition of succinic dehydrogenase by malonate

3. A non-competitive inhibitor binds the enzyme at a site distinct from that which binds the substrate

4. malonate is a competitive inhibitor of succinic dehydrogenase

55.

Which one of the following is a non-reducing carbohydrate?

1. Maltose

2. Sucrose

3. Lactose

4. Ribose 5-phospohate

56.

The enzyme recombinase is required at which stage of meiosis

1. Pachytene

2. Zygotene

3. Dipotene

4. Diakenesis

57.

The initial step in the digestion of milk in infant is carried out by ?

1. Lipase

2. Trypsin

3. Rennin

4. Pepsin

58.

Fructose is absorbed into the blood through mucosa cells of intestine by the process called

1. Active transport

2. Facilitated transport

3. Simple diffusion

4. Co-transport machenism

59.

Approximately seventy percent of carbon-dioxide absorbed by the blood will be transported to the lungs

1. as bicarbonate ions

2. in the form of dissolved gas molecules

3. by binding to R.B.C

4. as carbamino-haemoglobin

60.

Person with blood group AB is considered as universal recipient because he has:

1. both A and B antigens on RBC but no antibodies in the plasma

2. both A and B antibodies in the plasma

3. no antigen on RBC and no antigens in the plasma

4. both A and B antigens in the plasma but no antibodies

61.

How do parasympathetic neural signals affect the working of the heart?

1. reduce both heart rate and cardiac output

2. Heart rate is increased without affecting the cardiac output

3. Both heart rate and cardiac output increased

4. Heart rate decreases but cardiac output increases

62.

Which of the following causes an increase in sodium reabsorption in distal convoluted tubule?

1. Increase in aldosterone levels

2. Increase in antidiuretic hormone levels

3. Decrease in aldosterone levels

4. Decrease in antidiuretic hormone levels

63.

Select the correct matching of the types of the joint with the example in human skeletal system:

	Types of joint	Examples
(1)	Cartilaginous joint	between frontal and pariental
(2)	Pivot joint	between third and fourth cervical vertebrae
(3)	Hinge joint	between humerus and pectoral girdle
(4)	Gliding joint	between carpals

1. 1

2. 2

3. 3

4. 4

64.

Stimulation of a muscle fiber by a motor neuron occurs at:

1. the neuromuscular junction

2. the transverse tubules

3. the myofibril

4. the sacroplasmic reticulum

65.

Injury localized to the hypothalamus would most likely disrupt

1. short-term memory

2. co-ordination during locomotion

3. executive functions, such as decision making

4. regulation of body temperature

66.

Which one of the following statements is not correct?

1. Retinal is the light absorbing portion of visual photo pigments

2. In retina the rods have the photopigments rhodospin while cones have three different photopigments.

3. Retinal is a derivative of Vitamin C

4. Rhodospin is the purplish protein present in rods only.

67.

Identify the hormone with its correct matching of source and function:

1. Oxytocin- posterior pituitary, growth and maintenance of mammary glands.

2. Melatonin- pineal gland, regulates the normal rhythm of sleepwake cycle.

3. Progesterone- corpus-luteum, stimulation of growth and activities of female secondary sex organs.

4. atrial natriuretic factor- ventricular wall increases the blood pressure.

68.

Fight - or - flight reaction cause activation of

1. the parathyroid glands, leading to increased metabolic rate.

2. the kidney, leading to suppression of rennin angiotensin-aldosterone pathway.

3. the adrenal medulla, leading to increased secretion of epinephrine and norepinephrene

4. the pancreas leading to a reduction in the blood sugar levels.

69.

The shared terminal duct of the reproductive and urinary system in the human male is:

1. Urethra

2. Ureter

3. Vas deferens

4. Vasa efferentia

70.

The main function of mammalian corpus luteum is to produce:

1. estrogen only

2. progesterone

3. human chorionic gonadotropin

4. relaxin only

71.

Select the correct option describing gonadotropin activity in a normal pregnant female:

1. High level of FSH and LH stimulates the thickening of endometrium.

2. High level of FSH and LH facilitate implantation of the embryo

3. High level of hCG stimulates the synthesis if estrogen and progesterone

4. High level of hCG stimulates the thickening of endometrium.

72.

Tubectomy is method of sterilization in which

1. small part of fallopian tube is removed or tied up.

2. ovaries are removed surgically

3. small part of vas deferens is removed or tied up

4. uretuis is removed surgically

73.

Which of the following is a hormone releasing intra Uterine Device (IUD) ?

1. Multiload 375

2. LNG - 20

3. Cervical cap

4. Vault

74.

Assisted reproductive technology, IVF involves transfer of

1. Ovum into the fallopian tube.

2. Zygote into the fallopian tube.

3. Zygote into the uterus

4. Embryo with 16 blastomeres into the fallopian tube.

75.

A man whose father was colour blind marries a woman who had a colour blind mother and a normal father. What percentage of male children of this couple will be colour blind?

1. 25%

2. 0%

3. 50%

4. 75%

76.

In a population of 1000 individuals 360 belong to genotype AA, 480 to Aa and the remaining 160 to aa, Based on this data, the frequency of allele A in the population is :

1. 0.4

2. 0.5

3. 0.6

4. 0.7

77.

A human female with Turner's syndrome:

1. has 45 chromosomes with XO

2. has one additional chromosome.

3. exhibit male character

4. is able to produce children with normal husband.

78.

Select the correct option:

	Directionof RNA synthesis	Direction of reading of the template DNA strand
(1)	5' - 3'	3' - 5'
(2)	3' - 5'	5' - 3'
(3)	5' - 3'	5' - 3'
(4)	3' - 5'	3' - 5'

1. 1

2. 2

3. 3

4. 4

79.

Commonly used vectors for human genome sequencing are:

1. T-DNA

2. BAC and YAC

3. Expression Vectors

4. T/A cloning Vectors

80.

Forelimbs of cat, lizard used in walking; forelimbs of whale used in swimming and forelimbs of bats used in flying are an example of :

1. Analogous organs

2. Adaptive radiation

3. Homologous organs

4. Convergent evolution

81.

Which one of the following are analogous structures?

1. Wing of Bat and Wings of Pigeon

2. Gills of Prawn and Lungs of Man

3. Thorns of Bougainvillea and Tendrils of Cucurbita

4. Flippers of Dolphin and Legs of Horse.

82.

Which is the particular type of drug that is obtained from the plants whose one flowering branch is shown below?

1. Hallucinogen

2. Depressant

3. Stimulant

4. Pain - Killer

83.

At which stage of HIV infection does one usually show symptoms of AIDS?

1. Within 15 days of sexual contact with an infected person

2. When the infected retro virus enters host cells

3. When HIV damage large number of helper T - Plymphocytes.

4. When the viral DNA is produced by reverse transcriptase.

84.

To obtain virus - free healthy plants from a diseased one by tissue culture technique, which part/parts of the diseased plant will be taken ?

1. Apical meristem only
2. Palisade parenchyma
3. Both apical and axillary meristems
4. Epidermis only

85.

What gases are produced in anaerobic sludge digesters?

1. Methane and CO_2
2. Methane, Hydrogen Sulphide and CO_2
3. Methane, Hydrogen Sulphide and CO
4. Hydrogen Sulphide and CO_2

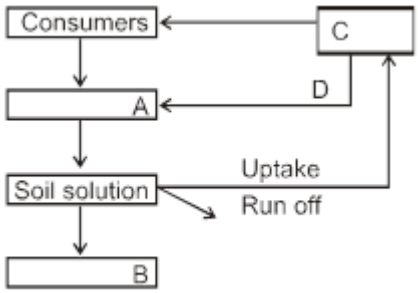
86.

Just as a person moving from Delhi to Shimla to escape the heat for the duration of hot summer, thousands of migratory birds from Siberia and other extremely cold northern regions move to:

1. Western Ghat
2. Meghalaya
3. Corbett National Park
4. Keolado National Park

87.

Given below is a simplified model of phosphorus cycling in a terrestrial ecosystem with four blanks (A-D). Identify the blanks.

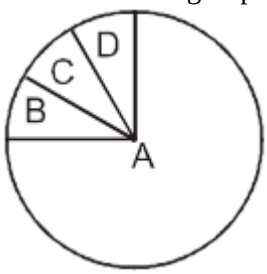


	A	B	C	D
(1)	Rock minerals	Detritus	Litter fall	Producers
(2)	Litter	Producers	Rock minerals	Detritus
(3)	Detritus	Rock minerals	Producer	Litter fall
(4)	Producers	Litter fall	Rock minerals	Detritus

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

88.

The extent of global diversity of *invertebrates* is represented in the image below. Choose the correct combination of groups (A-D) respectively?



	A	B	C	D
(1)	Insects	Crustaceans	Other animal groups	Molluscs
(2)	Crustaceans	Insects	Molluscs	Other animal groups
(3)	Molluscs	Other animals groups	Crustaceans	Insects
(4)	Insects	Molluscs	Crustaceans	Other animal groups

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

89.

A scrubber in the exhaust of a chemical industrial plant removes:

1. Gases like sulphue dioxide

2. Particulate matter of the size 5 micrometer or above

3. Gases like ozone and methane

4. Particulate matter of the size 2.5 micrometer or less

90.

If 20 J of energy is trapped at producer level, then how much energy will be available to peacock as food in the following chain?
Plant → mice →snake→ peacock\

1. 0.02 J

2. 0.002 J

3. 0.2 J

4. 0.0002 J

91.

What is the maximum number of orbitals that can be identified with the following quantum number
n = 3, l = 1, m = 0

1. 1

2. 2

3. 3

4. 4

92.

Calculate the energy in corresponding to light of wavelength 45 nm :

(Planck's constant h = 6.63×10^{-34} Js: speed of light c = 3×10^{8} ms^{-1})

1. 6.67×10^{15}

2. 6.67×10^{11}

3. 4.42×10^{-15}

4. 4.42×10^{-18}

93.

Equal masses of H_2, O_2 and methane have been taken in a container of volume V at temperature 27 ºC in identical conditions. The ratio of the volumes of gases H_2:O_2 : methane would be -

1. 8:16:1

2. 16:8:1

3. 16:1:2

4. 8:1:2

94.

If a is the length of the side of a cube, the distance between the body centered atom and one corner atom in the cube will be:

1. $\frac{2}{\sqrt{3}}$a

2. $\frac{4}{\sqrt{3}}$a

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

4. $\frac{\sqrt{3}}{2}$a

95.

Which property of colloids is not dependent on the charge on colloidal particles ?

1. Coagulation

2. Electrophoresis

3. Electro-osmosis

4. Tyndall effect

96.

Which of the following salts will give highest pH in water ?

1. KCl

2. NaCl

3. Na_2CO_3

4. $CuSO_4$

97.

Of the following 0.10m aqueous solutions, which one will exhibit the largest freezing point depression?

1. KCl

2. $C_6H_{12}O_6$

3. $Al_2(SO_4)_3$

4. K_2SO_4

98.

When 22.4 litres of $H_2(g)$ is mixed with 11.2 litres of $Cl_2(g)$, each at STP, the moles of HCl(g) formed is equal to :

1. 1 mol of HCl(g)

2. 2 mol of HCl(g)

3. 0.5 mol of HCl(g)

4. 1.5 mol of HCl(g)

99.

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

1. 96500 C

2. 2 x 96500 C

3. 9650 C

4. 96.50 C

100.

Using the Gibbs change, $\Delta G^\circ = +63.3$ kJ, for the following reaction,

$Ag_2CO_3(g) \rightleftharpoons 2Ag^+(aq) + (aq)$ the K_{sp} of $Ag_2CO_3(s)$ in water at 25 °C is ($R = 8.314\ JK^{-1}\ mol^{-1}$)

1. 3.2×10^{26}

2. 8.0×10^{-12}

3. 2.9×10^{-3}

4. 7.9×10^{-2}

101.

The weight of silver (at.wt. = 108) displaced by a quantity of electricity which displaces 5600 mL of O_2 at STP will be :

1. 5.4 g

2. 10.8 g

3. 54.0 g

4. 108.0 g

102.

Which of the following statements is correct for the spontaneous adsorption of a gas ?

1. ΔS is negative and therefore, ΔH should be highly positive

2. ΔS is negative and therefore, ΔH should be highly negative

3. ΔS is positive and therefore, ΔH should be negative

4. ΔS is positive and therefore, ΔH should also be highly positive

103.

For the reversible reaction :
$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) + \text{heat}$
The equilibrium shifts in forward direction -

1. by increasing the concentration of $NH_3(g)$

2. by decreasing the pressure

3. by decreasing the concentration of $N_2(g)$ and $H_2(g)$

4. by increasing pressure and decreasing temperature

104.

For the reaction :
$X_2O_4(l) \rightarrow 2XO_2(g)$
$\Delta U = 2.1$ kcal, $\Delta S = 20$ cal K^{-1} at 300 K
The value of ΔG is

1. 2.7 k cal

2. -2.7 k cal

3. 9.3 k cal

4. -9.3 k cal

105.

for a given exothermic reaction, K_p and K_p' are the equilibrium constants at temperatures T_1 and T_2respectively. Assuming that heat of reaction is constant in temperatures range between T_1 and T_2, it is readily observation that:

1. $K_p > K_p'$
2. $K_p < K_p'$
3. $K_p = K_p'$
4. $K_p = \frac{1}{K_p'}$

106.

Which of the following orders of ionic radii is correctly represented?

1. $H^- > H^+ > H$
2. $Na^+ > F^- > O^{2-}$
3. $F^- > O^{2-} > Na^+$
4. $N^{3-} > Mg^{2+} > Al^{3+}$

107.

1.0 g of magnesium is burnt with 0.56 g O_2 in a closed vessel. Which reaction is left in excess and how much? (At, wt.Mg = 24; O = 16)

1. Mg, 0.16 g
2. O_2, 0.16 g
3. Mg, 0.44 g
4. O_2, 0.28 g

108.

The pair of compounds that can exist together is:

1. $FeCl_3$,$SnCl_2$
2. HgCl,$SnCl_2$
3. $FeCl_2$,$SnCl_2$
4. $FeCl_3$,Kl

109.

Be^{2+} is isoelectronic with which of the following ions?

1. H^+
2. Li^+
3. Na^+
4. Mg^{2+}

110.

Which of the following molecules has the maximum dipole moment ?

1. CO_2
2. CH_4
3. NH_3
4. NF_3

111.

Which one of the following species has plane triangular shape ?

1. N_3^-
2. NO_3^-
3. NO_2^-
4. CO_2

112.

Acidity of diprotic acids in aqueous solutions increases in the order:

1. $H_2S<H_2Se<H_2Te$
2. $H_2Se<H_2S<H_2Te$
3. $H_2Te<H_2S<H_2Se$
4. $H_2Se<H_2Te<H_2S$

113.

(a) $H_2O_2 + O_3 \rightarrow H_2O + 2O_2$

(b) $H_2O_2 + Ag_2O \rightarrow 2Ag + H_2O + O_2$

Role of hydrogen peroxide in the above reactions is respectively:

1. oxidizing in (a) and reducing in (b)
2. reducing in (a) and oxidizing in (b)
3. reducing in (a) and (b)
4. oxidizing in (a) and (b)

114.

Artificial sweetner which is stable under cold conditions only is:

1. Saccharine

2. Sucralose

3. Aspartame

4. Alitame

115.

In acidic medium, H_2O_2 changes $Cr_2O_7^{-2}$ to CrO_5 which has two (–O – O–) bonds Oxidation state of Cr in CrO_5 is :

1. +5

2. +3

3. +6

4. -10

116.

The reaction of aqueous $KMnO_4$ with H_2O_2 in acidic conditions gives:

1. Mn^{4+} and O_2

2. Mn^{2+} and O_2

3. Mn^{2+} and O_3

4. Mn^{4+} and MnO_2

117.

Among the following complexes the one which shows zero crystal field stabilization energy (CFSE) is

1. $[Ni(H_2O)_6]^{3+}$

2. $[Fe(H_2O)_6]^{3+}$

3. $[Co(H_2O)_6]^{2+}$

4. $[Co(H_2O)_6]^{3+}$

118.

Magnetic moment 2.83 BM is given by which of the following ions?
(Atomic Number: Ti=22, Cr=24, Mn=25, Ni=28)

1. Ti^{3+}

2. Ni^{2+}

3. Cr^{3+}

4. Mn^{2+}

119.

Which of the following complexes is used as an anticancer agent ?

1. mer − $[Co(NH_3)_3Cl]$

2. Cis − $[PtCl_2(NH_3)_2]$

3. Cis − $K_2[Pt\,Cl_2Br_2]$

4. NH_2CoCl_4

120.

Reason of lanthanoid contraction is:

1. Negligible screening effect of 'f' orbitals

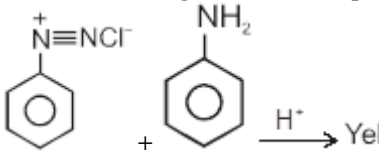
2. Increasing nuclear charge

3. Decreasing nuclear charge

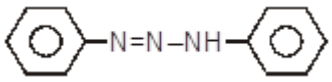
4. Decreasing screening effect

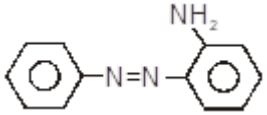
121.

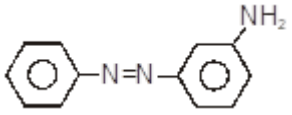
In the following reaction, the product (A)

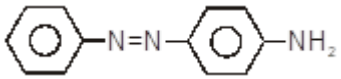


is :

1. 

2. 

3. 

4. 

122.

Which of the following will be most stable diazonium salt ?

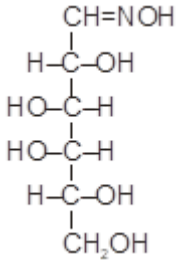
1. $CH_3N_2^+X^-$

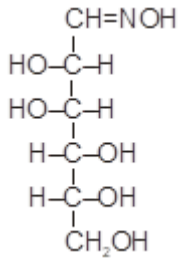
2. $C_6H_5N_2^+X^-$

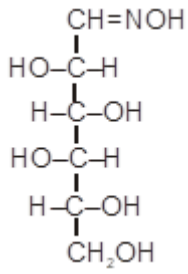
3. $CH_3CH_2N_2^+X^-$

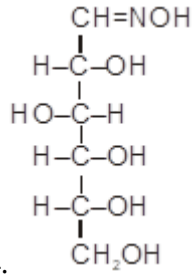
4. $C_6H_5CH_2N_2^+X^-$

123.
D(+) glucose reacts with hydroxyl amine and yield an oxime. The structure of the oxime would be:

1. 

2. 

3. 

4. 

124.

Which of the following hormones is produced under the condition of stress which stimulates glycogenolysis in the liver of human being ?

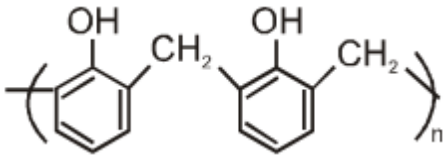
1. Thyroxin
2. Insulin
3. Adrenaline
4. Estradiol

125.
Which one of the following is an example of a thermosetting polymer?

1. $\left(-CH_2 - \underset{\underset{Cl}{|}}{C} = CH - CH_2 - \right)_n$

2. $\left(CH_2 - \underset{\underset{Cl}{|}}{CH} - \right)_n$

3. $\left(\overset{H}{\underset{|}{-N}} - (CH_2)_6 - \overset{H}{\underset{|}{N}} - \overset{O}{\overset{\|}{C}}(CH_2)_4 - \overset{O}{\overset{\|}{C}} - \right)_n$

4. 

126.

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

1. Propylene and para $HO - (C_6H_4) - OH$
2. Benzolic acid and ethanol
3. Terepthalic acid and ethylene glycol
4. Benzoic acid and para $HO - (C_6H_4) - OH$

127.

Which one of the following is not a common component of Photochemical Smog?

1. Ozone
2. Acrolein
3. Peroxyacetyl nitrate
4. Chlorofluorocarbons

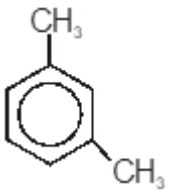
128.

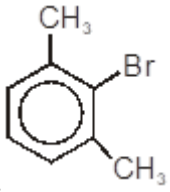
In Kjeldahl's method for estimation of nitrogen present in the soil sample, ammonia evolved from 0.75g of sample neutralized 10ml. of 1M H_2SO_4 The percentage of nitrogen in the soil is:

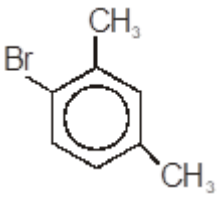
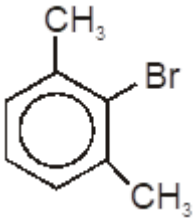
1. 37.33
2. 45.85
3. 25.75
4. 43.13

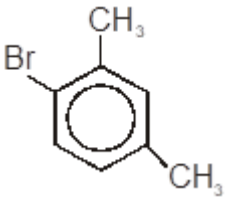
129.

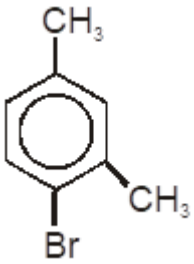
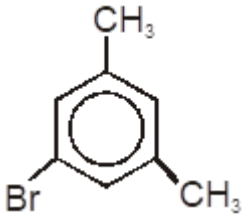
What products are formed when the following compound is treated with Br_2 in the presence of $FeBr_3$?



1.  only

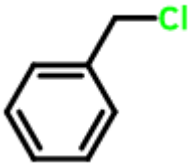
2.  and 

3.  only

4.  and 

130.

Which of the following compounds will undergo racemisation when solution of KOH hydrolysis?

(i) 

(ii) $CH_3CH_2CH_2Cl$

(iii) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2\,Cl$

(iv) $CH_3 - \underset{\displaystyle Cl}{\underset{|}{CH}} - C_2H_5$

1. (i) and (ii)

2. (ii) and (iv)

3. (iv) only

4. (i) and (iv)

131.

Among the following sets of reaction which one produces anisole?

1. CH_3CHO ; RMgX

2. C_6H_5OH ; NaOH ; CH_3l

3. C_6H_5OH ; neutral $FeCl_3$

4. C_6H_5 - CH_3 ; CH_3COCl ; $AlCl_3$

132.

Which of the following will not be soluble in sodium hydrogen carbonate?

1. 2, 4, 6-trinitrophenol

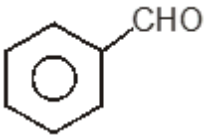
2. Benzoic acid

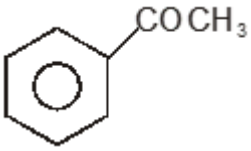
3. o-Nitrophenol

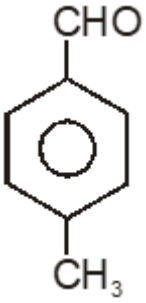
4. Benezenesulphonic acid

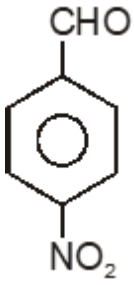
133.

Which one is most reactive towards Nucleophilic addition reaction ?

1. 

2. 

3. 

4. 

134.

Identify Z in the sequence of reactions:

$CH_3\,CH_2\,CH = CH_2 \xrightarrow[H_2O_2]{HBr} Y \xrightarrow{C_2H_5\,ONa} Z$

1. $CH_3 - (CH_2)_3 - O - CH_2CH_3$

2. $(CH_3)_2CH_2 - O - CH_2CH_3$

3. $CH_3(CH_2)_4 - O - CH_3$

4. $CH_3CH_2 - CH(CH_3) - O - CH_2CH_3$

135.

Which of the following organic compounds has same hybridization as its combustion product –(CO_2) ?

1. Ethane

2. Ethyne

3. Ethene

4. Ethanol

136.

If force (F), velocity (v) and time (T) are taken as fundamental units, the dimensions of mass are:

1. $[FvT^{-1}]$

2. $[FvT^{-2}]$

3. $[Fv^{-1}T^{-1}]$

4. $[Fv^{-1}T]$

137.

A projectile is fired from the surface of the earth with a velocity of 5ms^{-1} and at an angle θ with the horizontal. Another projectile fired from another planet with a velocity of 3ms^{-1} at the same angle follows a trajectory which is identical with the trajectory of the projectile fired from the earth. The value of the acceleration due to gravity on the planet is: (given = 9.8 ms^{-2})

1. 3.5

2. 5.9

3. 16.3

4. 110.8

138.

A particle is moving such that its position coordinates (x, y) are (2m, 3m) at time t = 0, (6m,7m) at time t = 2s and (13m, 14m) at time t = 5 s,

Average velocity vector ($\vec{v}_{avg}$)from t = 0 to t = 5 s is :

1. $\frac{1}{5}(13\hat{i} + 14\vec{j})$

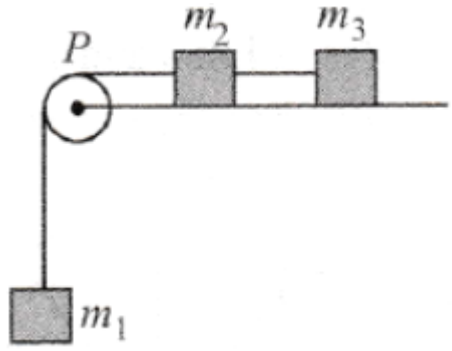
2. $\frac{7}{3}(\hat{i} + \vec{j})$

3. $2(\hat{i} + \vec{j})$

4. $\frac{11}{5}(\hat{i} + \vec{j})$

139.

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



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

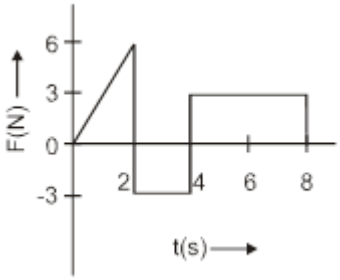
2. $\frac{2g\mu}{3}$

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

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

140.

The force 'F' acting on a particle of mass 'm' is indicated by the force-time graph shown below. The change in momentum of the particle over the time interval from 0 to 8 s is :



1. 24 Ns

2. 20 Ns

3. 12Ns

4. 6 Ns

141.

A balloon with mass 'm' is descending down with an acceleration 'a' (where a < g). How much mass should be removed from it so that it starts moving up with an acceleration 'a'?

1. $\frac{2ma}{g+a}$
2. $\frac{2ma}{g-a}$
3. $\frac{ma}{g+a}$
4. $\frac{ma}{g-a}$

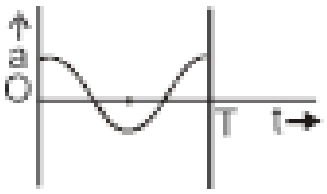
142.

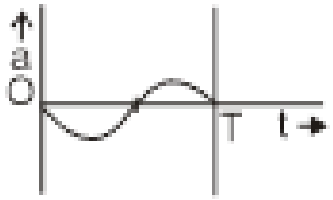
A body of mass (4m) is lying in the x-y plane at rest. It suddenly explodes into three pieces. Two pieces, each of mass (m) move perpendicular to each other with equal speeds (u). The total kinetic energy generated due to explosion is:

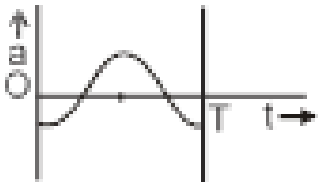
1. mu^2
2. $1.5mu^2$
3. $2mu^2$
4. $3mu^2$

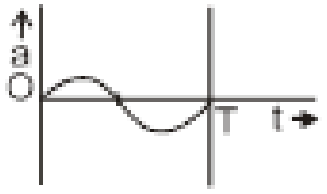
143.

The oscillation of a body on a smooth horizontal surface is represented by the equation, X = A cos (ωt)
where X = displacement at time t
ω = frequency of oscillation
Which one of the following graphs shows correctly the variation 'a' with 't'?
Here a = acceleration at time t
T = time period

1. 

2. 

3. 

4. 

144.

A solid cylinder of mass 50 kg and radius 0.5 m is free to rotate about the horizontal axis. A massless string is wound around the cylinder with one end attached to it and the other hanging freely. Tension in the string required to produce an angular acceleration of 2 revolutions s^{-2} is:

1. 25 N
2. 50 N
3. 78.5 N
4. 157 N

145.

The ratio of the acceleration for a solid sphere (mass 'm' and radius 'R') rolling down an incline of angle 'θ' without slipping and slipping down the incline without rolling is:

1. 5:7

2. 2:3

3. 2:5

4. 7:5

146.

A black hole is an object whose gravitational field is so strong that even light cannot escape from it. To what approximate radius would earth (mass = 5.98×10^{24} kg) have to be compressed to be a black hole?

1. 10^{-9}m

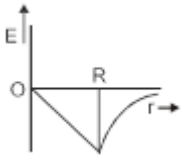
2. 10^{-6}m

3. 10^{-2}m

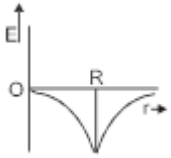
4. 100m

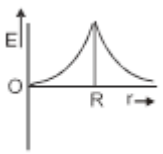
147.

Dependence of intensity of gravitational field (E) of the earth with distance (r) from the centre of the earth is correctly represented by:

1. 

2. 

3. 

4. 

148.

Copper of fixed volume 'V' is drawn into a wire of length 'l'. When this wire is subjected to a constant force 'F', the extension produced in the wire is 'Δl'. Which of the following graph is a straight line?

1. Δl vs $\frac{1}{l}$

2. Δl vs l^2

3. Δl vs $\frac{1}{l^2}$

4. Δl vs l

149.

A certain number of spherical drops of a liquid of radius 'r' coalesce to form a single drop of radius 'R' and volume 'V'. If 'T' is the surface tension of the liquid, then:

1. Energy=4VT $(\frac{1}{r}-\frac{1}{R})$ is released.

2. Energy=3VT $(\frac{1}{r}+\frac{1}{R})$ is released.

3. Energy=3VT $(\frac{1}{r}-\frac{1}{R})$ is released.

4. Energy is neither released nor absorbed.

150.

Steam at 100 ^{0}C is passed into 20g of water at 10 ^{0}C. When water acquires a temperature of 80 ^{0}C, the mass of water present will be:

[Take specific heat of water = 1 cal g^{-1} $^0C^{-1}$ and latent heat of steam = 540 cal g^{-1}]

1. 24 g

2. 31.5 g

3. 42.5 g

4. 22.5 g

151.

A certain quantity of water cools from 70 ^{0}C to 60 ^{0}C in the first 5 minutes and to 54 ^{0}C in the next 5 minutes. The temperature of the surroundings is:

1. 45^{o}C

2. 20^{o}C

3. 42^{o}C

4. 10^{o}C

152.

A monoatomic gas at a pressure P, having a volume V expands isothermally to a volume 2V and then adiabatically to a volume 16V. The final pressure of the gas is : (take γ= 5/3)

1. 64 P

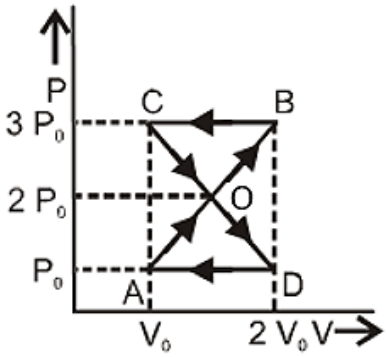
2. 32 P

3. P/64

4. 16 P

153.

A thermodynamics system undergoes cyclic process ABCDA as shown in Fig. The work done by the system in the cycle is:



1. P_0V_0

2. $2P_0V_0$

3. $\frac{P_0V_0}{2}$

4. Zero

154.

The mean free path of molecules of a gas (radius 'r') is inversely proportional to:

1. r^3

2. r^2

3. r

4. $\sqrt{r}$

155.

If n_1, n_2, and n_3 are the fundamental frequencies of three segments into which a string is divided, then the original fundamental frequency n of the string is given by:

1. $\frac{1}{n} = \frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3}$

2. $\frac{1}{\sqrt{n}} = \frac{1}{\sqrt{n_1}} + \frac{1}{\sqrt{n_2}} + \frac{1}{\sqrt{n_3}}$

3. $\sqrt{n} = \sqrt{n_1} + \sqrt{n_2} + \sqrt{n_3}$

4. $n = n_1 + n_2 + n_3$

156.

The number of possible natural oscillations of the air column in a pipe closed at one end of length 85 cm whose frequencies lies below 1250 Hz are:(Velocity of sound=340 m/s)

1. 4

2. 5

3. 7

4. 6

157.

A speeding motorcyclist sees a traffic jam ahead of him. He slows down to 36 km/hour. He finds that traffic has eased and a car moving ahead of him at 18 km/hour is honking at a frequency of 1392 Hz. If the speed of sound is 343 m/s, the frequency of the honk as heard by him will be:

1. 1332 Hz

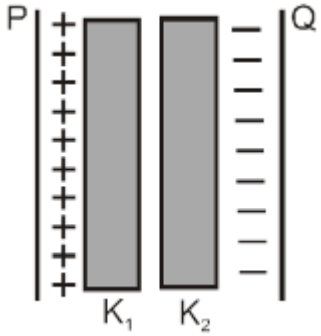
2. 1372 Hz

3. 1412 Hz

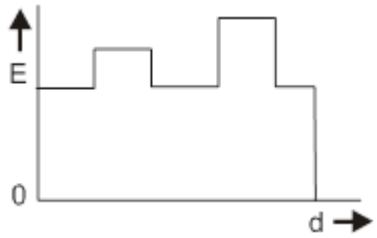
4. 1454 Hz

158.

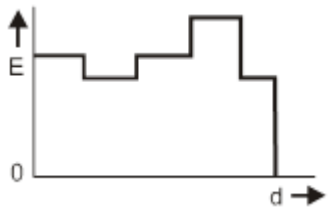
Two thin dielectric slabs of dielectric constants K_1 and K_2 ($K_1 < K_2$) are inserted between plates of a parallel plate capacitor, as shown in the figure. The variation of electric field 'E' between the plates with distance 'd' as measured from plate P is correctly shown by:



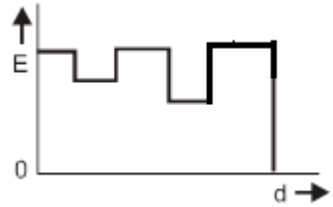
1.



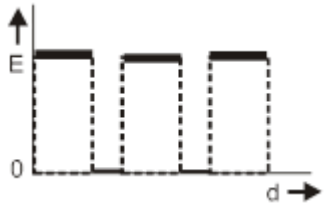
2.



3.



4.



159.

A conducting sphere of radius R is given a charge Q. The electric potential and the electric field at the centre of the sphere respectively are:

1. Zero and $\frac{Q}{4\pi\varepsilon_0 R^2}$

2. $\frac{Q}{4\pi\varepsilon_0 R}$ and zero

3. $\frac{Q}{4\pi\varepsilon_0 R}$ and $\frac{Q}{4\pi\varepsilon_0 R^2}$

4. Both are zero.

160.

In a region the potential is represented by V(x, y, z) = 6x – 8xy –8y + 6yz, where V is in volts and x, y, z, are in meters. The electric force experienced by a charge of 2 coulomb situated at point (1, 1,1) is :

1. $6\sqrt{5}$ N

2. 30 N

3. 24 N

4. $4\sqrt{35}$ N

161.

Two cities are 150 km apart. Electric power is sent from one city to another city through copper wires. The fall of potential per km is 8 volt and the average resistance per km is 0.5 The power loss in the wire is:

1. 19.2 W

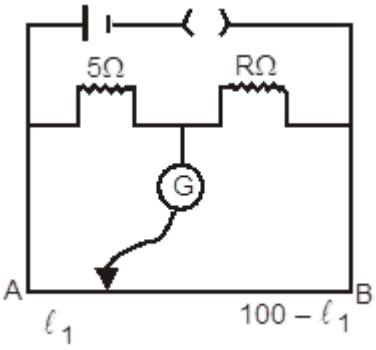
2. 19.2 kW

3. 19.2 J

4. 12.2 kW

162.

The figure shows a circuit when resistance in the two arms of the meter bridge are 5 and R, respectively. When the resistance R is shunted with an equal resistance, the new balance point is at 1.6 l_1. The resistance 'R' is :



1. 10

2. 15

3. 20

4. 25

163.

A potentiometer circuit has been set up for finding the internal resistance of a given cell. The main battery, used across the potentiometer wire, has an emf of 2.0 V and a negligible internal resistance. The potentiometer wire itself is 4 m long. When the resistance, R, connected across the given cell, has values of (i) infinity (ii) 9.5, the 'balancing lengths, on the potentiometer wire, are found to be 3m and 2.85 m, respectively.
The value of internal resistance of the cell is (in ohm) :

1. 0.25

2. 0.95

3. 0.5

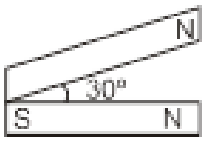
4. 0.75

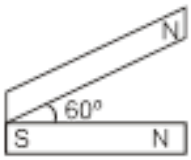
164.

Following figures show the arrangement of bar magnets in different configurations. Each magnet has magnetic dipole. Which configuration has highest net magnetic dipole moment ?

(a) 

(b) 

(c) 

(d) 

1. a

2. b

3. c

4. d

165.

In an ammeter 0.2% of main current passes through the galvanometer. If resistance of galvanometer is G, the resistance of ammeter will be:

1. $\frac{1}{499}$G

2. $\frac{499}{500}$G

3. $\frac{1}{500}$G

4. $\frac{500}{499}$G

166.

Two identical long conducting wires AOB and COD are placed at the right angle to each other, with one above other such that 'O' is their common point for the two. The wires carry I_1 and I_2 currents, respectively. Point 'P' is lying at distance 'd' from 'O' along a direction perpendicular to the plane containing the wires. The magnetic field at the point 'P' will be :

1. $\frac{\mu_0}{2\pi d}\left(\frac{I_1}{I_2}\right)$

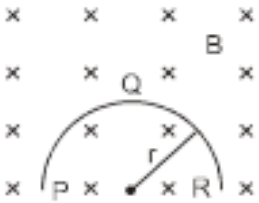
2. $\frac{\mu_0}{2\pi d}(I_1 + I_2)$

3. $\frac{\mu_0}{2\pi d}(I_1^2 + I_2^2)$

4. $\frac{\mu_0}{2\pi d}(I_1^2 + I_2^2)^{1/2}$

167.

A thin semicircular conducting the ring (PQR) of radius 'r' is falling with its plane vertical in a horizontal magnetic field B, as shown in figure. The potential difference developed across the ring when its speed is v is:



1. Zero

2. $Bv\pi r^2/2$ and P is at the higher potential

3. πrBv and R is at the higher potential

4. 2BvR and R is at the higher potential

168.

A transformer has an efficiency of 90% is working on 200 V and 3 kW power supply. If the current in the secondary coil is 6 A the voltage across the secondary coil and the current in the primary coil respectively are:

1. 300 V, 15 A

2. 450 V, 15 A

3. 450 V, 13.5 A

4. 600 V, 15 A

169.

Light with an energy flux of 25×10^4 Wm^{-2} falls on a perfectly reflecting surface at normal incidence. If the surface area is 15 cm^2, the average force exerted on the surface is :

1. 1.25×10^{-6}N

2. 2.50×10^{-6}N

3. 1.20×10^{-6}N

4. 3.0×10^{-6}N

170.

A beam of light of λ = 600 nm from a distant source falls on a single slit 1 mm wide and the resulting diffraction pattern is observed on a screen 2 m away. The distance between the first dark fringes on either side of the central bright fringe is :

1. 1.2 cm

2. 1.2 mm

3. 2.4 cm

4. 2.4 mm

171.

In Young's double-slit experiment, the intensity of light at a point on the screen where the path difference is λ is K, (λ being the wavelength of light used). The intensity at a point where the path difference is $\lambda/4$ will be :

1. K

2. K/4

3. K/2

4. zero

172.

If the focal length of the objective lens is increased then magnifying power of :

1. microscope will increase but that of telescope decrease

2. microscope and telescope both will increase

3. microscope and telescope both will decrease

4. microscope will decrease but that of the telescope will increase

173.

The angle of a prism is 'A'. One of its refracting surfaces is silvered. Light rays falling at an angle of incidence 2A on the first surface returns back through the same path after suffering reflection at the silvered surface. The refractive index μ, of the prism, is :

1. 2sin A

2. 2cosA

3. $\frac{1}{2}$cos A

4. tan A

174.

When the energy of the incident radiation is increased by 20%, the kinetic energy of the photoelectrons emitted from a metal surface increased from emitted 0.5 eV to 0.8eV. The work function of the metal is :

1. 0.65 eV

2. 1.0 eV

3. 1.3 eV

4. 1.5 eV

175.

If the kinetic energy of the particle is increased to 16 times its previous value, the percentage change in the de-Broglie wavelength of the particle is :

1. 25

2. 75

3. 60

4. 50

176.

The hydrogen gas with its atoms in the ground state is excited by monochromatic radiation of λ = 975 Å. The number of spectral lines in the resulting spectrum emitted will be :

1. 3

2. 2

3. 6

4. 10

177.

The Binding energy per nucleon of $_3Li^7$ and $_2He^4$ nucleon are 5.60 MeV and 7.06 MeV, respectively. In the nuclear reaction $_3Li^7 + _1H^1 \rightarrow _2He^4 + _2He^4 + Q$, the value of energy Q released is:

1. 19.6 MeV

2. -2.4 MeV

3. 8.4 MeV

4. 17.3 MeV

178.

A radioisotope 'X' with a half-life 1.4×10^9 years decays to 'Y' which is stable. A sample of the rock from a cave was found to contain 'X' and 'Y' in the ratio 1:7. The age of the rock is :

1. 1.96×10^9 years

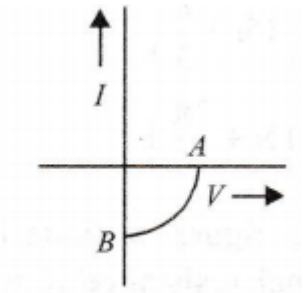
2. 3.92×10^9 years

3. 4.20×10^9 years

4. 8.40×10^9 years

179.

The given graph represents V-I characteristic for a semiconductor device



Which of the following statement is correct?

1. It is V -I characteristic for solar cell where, point A represents open circuit voltage and point B short circuit current.

2. It is for a solar cell and points A and B represent open circuit voltage and current, respectively.

3. It is for a photodiode and points A and B represent open circuit voltage and current respectively.

4. It is for a LED and points A and B represent open circuit voltage and short circuit current, respectively.

180.

The barrier potential of a p-n junction depends on:

(a) type of semiconductor material
(b) amount of doping
(c) temperature

Which one of the following is correct?

1. (a) and (b) only
2. (b) only
3. (b) and (c) only
4. (a),(b) and (c)