



NEET Exam. 2019 (5th May 2019)

(Paper & Solution)

Code – S2

Q.1 From evolutionary point of view, retention of the female gametophyte with developing young embryo on the parent sporophyte for some time, is first observed in :

- (1) Pteridophytes (2) Gymnosperms (3) Liverworts (4) Mosses

Ans. [1]

Sol. The female gametophytes in these plants called pteridophytes are retained on the parent sporophytes for variable period. Development of the zygotes into young embryo take place on female gametophyte

Q.2 Extrusion of second polar body from egg nucleus occurs :

- (1) Before entry of sperm into ovum
(2) Simultaneously with first cleavage
(3) After entry of sperm but before fertilization
(4) After fertilization

Ans. [3]

Sol. Sperm enters into 2^o oocytes which breaks metaphase promoting factor and activates anaphase promoting complex which causes extrusion of second polar body by completing meiosis-II

Q.3 DNA precipitation out of a mixture of biomolecules can be achieved by treatment with :

- (1) Methanol at room temperature
(2) Chilled chloroform
(3) Isopropanol
(4) Chilled ethanol

Ans. [4]

Sol. Chilled ethanol is used for DNA precipitation out of a mixture of biomolecules. Process is called spooling

Q.4 Due to increasing air-borne allergens and pollutants, many people in urban areas are suffering from respiratory disorder causing wheezing due to :

- (1) Proliferation of fibrous tissues and damage of the alveolar walls
(2) Reduction in the secretion of surfactants by pneumocytes
(3) Benign growth on mucous lining of nasal cavity
(4) Inflammation of bronchi and bronchioles

Ans. [4]

Sol. Asthma is an allergic disorder in which wheezing sound is produced due to inflammation of bronchioles.

- Q.5** The Earth summit held in Rio de Janeiro in 1992 was called :
- (1) to assess threat posed to native species by invasive weed species
 - (2) for immediate steps to discontinue use of CFCs that were damaging the ozone layer
 - (3) to reduce CO₂ emissions and global warming
 - (4) for conservation of biodiversity and sustainable utilization of its benefits

Ans. [4]

Sol. The earth summit held in *Rio de Janerio* in 1992 was called for conservation of biodiversity and sustainable utilization of its benefits.

- Q.6** Match the hominids with their correct brain size :
- | | |
|----------------------------------|------------------|
| (a) <i>Homo habilis</i> | (i) 900 cc |
| (b) <i>Homo neanderthalensis</i> | (ii) 1350 cc |
| (c) <i>Homo erectus</i> | (iii) 650-800 cc |
| (d) <i>Homo sapiens</i> | (iv) 1400 cc |
- Select the correct option.

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

Ans. [1]

Sol. *Homo sapiens* → 1350 cc
Homo neanderthalensis → 1400 cc
Homo erectus → 900 cc
Homo habilis → 650-800 cc

- Q.7** How does steroid hormone influence the cellular activities ?
- (1) Activating cyclic AMP located on the cell membrane
 - (2) Using aquaporin channels as second messenger
 - (3) Changing the permeability of the cell membrane
 - (4) Binding to DNA and forming a gene-hormone complex

Ans. [4]

Sol. Hormones which interact with intracellular receptors mostly regulate gene expression or chromosome function by the interaction of hormone receptor complex with the genome.

- Q.8** Expressed Sequence Tags (ESTs) refers to :
- (1) DNA polymorphism
 - (2) Novel DNA sequences
 - (3) Genes expressed as RNA
 - (4) Polypeptide expression

Ans. [3]

Sol. Expressed sequence tags (ESTs) refers to genes expressed as RNA

Q.9 It takes very long time for pineapple plants to produce flowers. Which combination of hormones can be applied to artificially induce flowering in pineapple plants throughout the year to increase yield ?

- (1) Gibberellin and Abscisic acid
- (2) Cytokinin and Abscisic acid
- (3) Auxin and Ethylene
- (4) Gibberellin and Cytokinin

Ans. [3]

Sol. In Pineapple plants Auxins and Ethylene induce artificial flowering in pineapple plants throughout the year to increase yield.

Q.10 Which of the following ecological pyramids is generally inverted?

- (1) Pyramid of biomass in a forest
- (2) Pyramid of biomass in a sea
- (3) Pyramid of numbers in grassland
- (4) Pyramid of energy

Ans. [2]

Sol. Pyramid of biomass in a sea. It is always inverted.

Q.11 Which of the following pair of organelles does not contains DNA ?

- (1) Lysosomes and Vacuoles
- (2) Nuclear envelope and Mitochondria
- (3) Mitochondria and Lysosomes
- (4) Chloroplast and Vacuoles

Ans. [1]

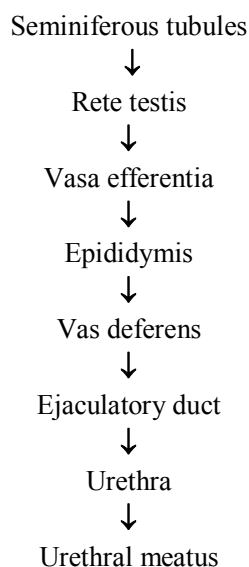
Sol. Lysosomes and vacuoles doesn't contain DNA

Q.12 Select the correct sequence for transport of sperm cells in male reproductive system :

- (1) Seminiferous tubules → Vasa efferentia → Epididymis → Inguinal canal → Urethra
- (2) Testis → Epididymis → Vasa efferentia → Vas deferens → Ejaculatory duct → Inguinal canal → Urethra → Urethral meatus
- (3) Testis → Epididymis → Vasa efferentia → Rete testis → Inguinal canal → Urethra
- (4) Seminiferous tubules → Rete testis → Vasa efferentia → Epididymis → Vas deferens → Ejaculatory duct → Urethra → Urethral meatus

Ans. [4]

Sol. Correct route map for sperm is



Q.13 Match the following hormones with the respective disease :

- | | |
|---------------------|-------------------------|
| (a) Insulin | (i) Addison’s disease |
| (b) Thyroxin | (ii) Diabetes insipidus |
| (c) Corticoids | (iii) Acromegaly |
| (d) Growth Hormones | (iv) Goitre |
| | (v) Diabetes mellitus |

Select the correct option.

- | | | | | |
|-----|------|------|-------|-------|
| | (a) | (b) | (c) | (d) |
| (1) | (v) | (iv) | (i) | (iii) |
| (2) | (ii) | (iv) | (i) | (iii) |
| (3) | (v) | (i) | (ii) | (iii) |
| (4) | (ii) | (iv) | (iii) | (i) |

Ans. [1]

Sol. → Diabetes mellitus is caused due to deficiency of insulin

→ Goitre is caused due to deficiency of Iodine which leads to less secretion of thyroxine

→ Addison’s disease is caused due to hyopsecretion of corticoids

→ Acromegaly is caused due to hypersecretion of growth hormones after puberty.

Q.14 Persistent nucellus in the seed is known as

- (1) Hilum (2) Tegmen (3) Chalaza (4) Perisperm

Ans. [4]

Sol. Perisperm is persistent in some seeds like castor, black pepper and beetroot.

Q.15 Pinus seed cannot germinate and establish without fungal association. This is because :

- (1) it has very hard seed coat
(2) Its seed contain inhibitors that prevent germination
(3) its embryo is immature
(4) it has obligate association with mycorrhizae

Ans. [4]

Sol. The pinus seeds have a very hard seed coat so without. Fungal association the seed cannot absorb water. The mycorrhizae penetrate deep inside the seeds to moisten them.

Q.16 Cells in G₀ phase :

- (1) suspend the cell cycle (2) terminate the cell cycle
(3) exit the cell cycle (4) enter the cell cycle

Ans. [1]

Sol. Cells suspend their cell cycle and enters G₀ phase in which they remain metabolically active but do not divide.

G₀ phase exits the usual cell cycle

Q.17 Match the following structures with their respective location in organs :

- | | |
|--------------------------|-----------------------|
| (a) Crypts of Lieberkuhn | (i) Pancreas |
| (b) Glisson's capsule | (ii) Duodenum |
| (c) Islets of Langerhans | (iii) Small intestine |
| (d) Brunner's Glands | (iv) Liver |

Select the correct option.

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

Ans. [1]

- Sol.**
- Crypts of Lieberkuhn are present in small intestine
 - Glisson's capsule is the covering of Hepatic tubule in liver
 - Islets of Langerhans are endocrine part of pancreas
 - Brunner's Glands are submucosal gland of duodenum of small Intestine

Q.18 Grass leaves curl inward during very dry weather. Select the most appropriate reason from the following :

- (1) Shrinkage of air spaces in spongy mesophyll
- (2) Tyloses in vessels
- (3) Closure of stomata
- (4) Flaccidity of bulliform cells

Ans. [4]

Sol. Flaccidity of bulliform cells grass leaves curl in words during dry weather due to the loss of water or flaccidity of bulliform cells.

Q.19 Consider the following statements :

(A) Coenzyme of metal ion that is tightly bound to enzyme protein is called prosthetic group.

(B) A complete catalytic active enzyme with its bound prosthetic group is called apoenzyme

Select the correct option

- | | |
|--------------------------------|----------------------------------|
| (1) Both (A) and (B) are false | (2) (A) is false but (B) is true |
| (3) Both (A) and (B) are true | (4) (A) is true but (B) is false |

Ans. [4]

Sol. Prosthetic groups can be coenzyme or metal ion which remains tightly bound to Apoenzyme.

Q.20 Respiratory Quotient (RQ) value of tripalmitin is :

- | | |
|----------|----------|
| (1) 0.07 | (2) 0.09 |
| (3) 0.9 | (4) 0.7 |

Ans. [4]

Sol. Respiratory quotient (R–Q) value of triplamitin is 0–7.

- Q.21** Which of the following statements is incorrect ?
- (1) Infective constituent in viruses is the protein coat
 - (2) Prions consist of abnormally folded proteins
 - (3) Viroids lack a protein coat
 - (4) Viruses are obligate parasites

Ans. [1]

Sol. The infective constituent in viruses is its genetic material (DNA/RNA) but not its protein coat.

- Q.22** Phloem in gymnosperms lacks :
- (1) Companion cells only
 - (2) Both sieve tubes and companion cells
 - (3) Albuminous cells and sieve cells
 - (4) Sieve tubes only

Ans. [2]

Sol. Both sieve tubes and companion cells

In gymnosperms only sieve cells and albuminous cells are present but they lack sieve tubes and companion cells ?

- Q.23** Under which of the following conditions will there be no change in the reading frame of following mRNA ?
5' AACAGCGGUGCUAAU 3'
- (1) Insertion of A and G at 4th and 5th positions respectively
 - (2) Deletion of GGU from 7th, 8th and 9th positions
 - (3) Insertion of G at 5th positions
 - (4) Deletion of G from 5th positions

Ans. [2]

Sol. Page No. 88 12th NCERT

- Q.24** Identify the cells whose secretion protects the lining of gastro-intestinal tract from various enzymes.
- (1) Oxyntic Cells (2) Duodenal Cells (3) Chief Cells (4) Goblet Cells

Ans. [4]

Sol. Goblet cells / mucocytes secrete mucous which protects the lining of gastro-intestinal tract from various enzymes.

- Q.25** What is the site of perception of photoperiod necessary for induction of flowering in plants ?
- (1) Shoot apex (2) Leaves (3) Lateral buds (4) Pulvinus

Ans. [2]

Sol. The site of perception of light / dark duration are leaves. It is hypothesized that there is a hormonal substance that migrates from leaves to shoot apices for inducing flowering when plants are exposed to the necessary inductive photoperiod.

- Q.26** What would be the heart rate of a person if the cardiac output is 5L, blood volume in the ventricles at the end of diastole is 100 mL and at the end of ventricular systole is 50 mL ?
- (1) 100 beats per minute (2) 125 beats per minute
(3) 50 beats per minute (4) 75 beats per minute

Ans. [1]

Sol. Cardiac output = Stroke volume \times Heart rate

$$\begin{aligned}\text{Where stroke volume} &= \text{End diastolic volume} - \text{End systolic volume} \\ &= 100 \text{ ml} - 50 \text{ ml} \\ &= 50 \text{ ml}\end{aligned}$$

- Q.27** Tidal Volume and Expiratory Reserve Volume of an athlete is 500 mL and 1000 mL respectively. What will be his Expiratory Capacity if the Residual Volume is 1200 mL ?
- (1) 2200 mL (2) 2700 mL (3) 1500 mL (4) 1700 mL

Ans. [3]

Sol. E.C. = T.V. + E.R.V. = 500 + 1000 = 1500 ml

- Q.28** Placentation, in which ovules develop on the inner wall of the ovary or in peripheral part, is :
- (1) Parietal (2) Free central (3) Basal (4) Axile

Ans. [1]

- Q.29** Which of these following methods is the most suitable for disposal of nuclear waste ?
- (1) Dump the waste within rocks under deep ocean
(2) Bury the waste within rocks deep below the Earth's surface
(3) Shoot the waste into space
(4) Bury the waste under Antarctic ice-cover

Ans. [2]

Sol. Page No. 280 12th NCERT

- Q.30** Which of the following statement is incorrect ?
- (1) Conidia are produced exogenously and ascospores endogenously.
(2) Yeasts have filamentous bodies with long thread-like hyphae.
(3) Morels and truffles are edible delicacies.
(4) Clauiceps is a source of many alkaloids and LSD.

Ans. [2]

Sol. Yeasts are not filamentous, they are usually oval in shape. They are not having hyphal structure.

- Q.31** Which one of the following equipments is essentially required for growing microbes on a large scale, for industrial production of enzymes?
- (1) Industrial oven (2) Bioreactor (3) BOD incubator (4) Sludge digester

Ans. [2]

Sol. Bioreactor are required for growing microbes on a large scale production of enzymes

Q.32 Match the following organisms with the products they produce:

(a)	Lactobacillus	(i)	Cheese
(b)	Saccharomyces cerevisiae	(ii)	Curd
(c)	Aspergillus niger	(iii)	Citric Acid
(d)	Acetobacter aceti	(iv)	Bread
		(v)	Acetic Acid

Select the correct option

- | | | | |
|-----------|------|-------|-------|
| (a) | (b) | (c) | (d) |
| (1) (iii) | (iv) | (v) | (i) |
| (2) (ii) | (i) | (iii) | (v) |
| (3) (ii) | (iv) | (v) | (iii) |
| (4) (ii) | (iv) | (iii) | (v) |

Ans. [4]

Sol. Lactobacillus — Curd formation

Q.33 Select the incorrect statement.

- (1) Inbreeding selects harmful recessive genes that reduce fertility and productivity.
- (2) Inbreeding helps in accumulation of superior genes and elimination of undesirable genes.
- (3) Inbreeding increases homozygosity.
- (4) Inbreeding is essential to evolve purelines in any animal.

Ans. [1]

Sol. Inbreeding selects superior traits leading to higher fertility and productivity but due to continuous inbreeding can lead to inbreeding depression

Q.34 Which of the following immune responses is responsible for rejection of kidney graft?

- | | |
|----------------------------------|-----------------------------------|
| (1) Inflammatory immune response | (2) Cell-mediated immune response |
| (3) Auto-immune response | (4) Humoral immune response |

Ans. [2]

Sol. Cytotoxic /killer t-lymphocytes which are part of cell mediated immunity are responsible for graft rejection.

Q.35 Which of the statements given below is not true about formation of Annual Rings in trees?

- (1) Activity of cambium depends upon variation in climate.
- (2) Annula ring are not prominent in trees of temperate region.
- (3) Annula ring is a combination of spring wood and autumn wood produced in a year.
- (4) Differential activity of cambium causes light and dark bands of tissue-early and late wood respectively

Ans. [2]

Sol. Annual ring are not prominent trees of temperate region

Explanation : - Annual rings are prominent only in tress of temperate region. In tropical and coastac regions there is no clear temperature variations in the seasons. So there is no differential activity of cambium.

Q.36 Which of the following is true for Golden rice?

- (1) It is drought tolerant, developed using Agrobacterium vector.
- (2) It has yellow grains, because of a gene introduced from a primitive variety of rice.
- (3) It is Vitamin A enriched, with a gene from daffodil.
- (4) It is pest resistant, with a gene from Bacillus thuringiensis.

Ans. [3]

Sol. Golden rice are enriched with vitamin A, the gene is taken from daffodils

- Q.37** What is the genetic disorder in which an individual has an overall masculine development, gynaecomastia, and is sterile?
- (1) Edward syndrome (2) Down's syndrome
(3) Turner's syndrome (4) Klinefelter's syndrome

Ans. [4]

Sol. Page No. 92 12th NCERT

- Q.38** Which one of the following statements regarding post-fertilization development in flowering plants is incorrect?
- (1) Central cell develop into endosperm
(2) Ovules develop into embryo sac
(3) Ovary develops into fruit
(4) Zygote develops into embryo

Ans. [2]

Sol. Central cell develops into Endosperm. Endosperm develops from the fusion of secondary diploid nucleus with one male nucleus forming primary endosperm nucleus (PEN).

- Q.39** Which of the following is the most important cause for animals and plants being driven to extinction?
- (1) Economic exploitation (2) Alien species invasion
(3) Habitat loss and fragmentation (4) Drought and floods

Ans. [3]

Sol. Page No. 264 12th NCERT

- Q.40** Which of the following contraceptive methods do involve a role of hormone?
- (1) CuT, Pills, Emergency contraceptives
(2) Pills, Emergency contraceptives, Barrier methods
(3) Lactational amenorrhoea, Pills, Emergency contraceptives
(4) Barrier method, Lactational amenorrhoea, Pills

Ans. [3]

Sol. Lactational amenorrhoea is a period of intense lactation during which ovulation does not occur. Pills and emergency contraceptives contain hormones.

- Q.41** Consider following features:
- (a) Organ system level of organisation
(b) Bilateral symmetry
(c) True coelomates with segmentation of body

Select the correct option of animal groups which possess all the above characteristics.

- (1) Arthropoda, Mollusca and chordata (2) Annelida, Mollusca and chordata
(3) Annelida, Arthropoda and chordate (4) Annelida, Arthropoda and Mollusca

Ans. [3]

Sol. Annelida, Arthropoda and chordata shown organ system level of organization, bilateral symmetry, eucoelomates and are segmented

Q.42 Which of the following factors is responsible for the formation of concentrated urine?

- (1) Secretion of erythropoietin by Juxtaglomerular complex.
- (2) Hydrostatic pressure during glomerular filtration.
- (3) Low levels of antidiuretic hormone.
- (4) Maintaining hyperosmolarity towards inner medullary interstitium in the kidneys

Ans. [4]

Sol. Maintaining hyperosmolarity towards inner medullary interstitium in the kidneys for the formation of concentrated urine.

Q.43 Match the following organisms with their respective characteristics:

(a)	Pila	(i)	Flame cells
(b)	Bombyx	(ii)	Comb plates
(c)	Pleurobrachia	(iii)	Radula
(d)	Taenia	(iv)	Malpighian Tubules

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

Ans. [4]

Sol. → Pila (mollusca) have radula
→ Bombyx (arthropoda) have malpighian tubules
→ Pleurobrachia (ctenophora) have comb plates
→ Taenia (platyhelminthes) have flame cells for excretion

Q.44 Xylem translocates:

- (1) Water, mineral salts and some organic nitrogen only
- (2) Water, mineral salts, some organic nitrogen and hormones
- (3) Water only
- (4) Water and mineral salts only

Ans. [2]

Sol. Xylem trans locates water and mineral salts only.

Q.45 What is the direction of movement of sugars in phloem?

- | | |
|--------------------------|--------------------|
| (1) Downward | (2) Bi-directional |
| (3) Non-multidirectional | (4) Upward |

Ans. [2]

Sol. The correct sequence of phases in cell cycle starts from G₁ phase & ends in the 'M' – phase or mitotic phase

Q.46 The correct sequence of phases of cell cycle is:

- (1) $S \rightarrow G_1 \rightarrow G_2 \rightarrow M$ (2) $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$
(3) $M \rightarrow G_1 \rightarrow G_2 \rightarrow S$ (4) $G_1 \rightarrow G_2 \rightarrow S \rightarrow M$

Ans. [2]

Sol. The correct sequence of phases in cell cycle starts from G_1 phase & ends in the 'M' – phase or mitotic phase

Q.47 The shorter and longer arms of a submetacentric chromosome are referred to as:

- (1) q-arm and p-arm respectively (2) m-arm and n-arm respectively
(3) s-arm and l-arm respectively (4) p-arm and q-arm respectively

Ans. [4]

Sol. The shorter arm of a sub-metacentric chromosome is called as the 'P' arm and the longer arm is called as a 'q' - arm

Q.48 Which of the following can be used as a biocontrol agent in the treatment of plant disease?

- (1) Anabaena (2) Lactobacillus (3) Trichoderma (4) Chlorella

Ans. [3]

Sol. A biological control being developed for use in the treatment of plant disease is the fungus is trichoderma trichoderma species are free living fungi that are very common in the root ecosystems. They are effective biocontrol agents of several plant pathogens.

Q.49 Which of the following glucose transporters is insulin-dependent?

- (1) GLUT III (2) GLUT IV (3) GLUT I (4) GLUT II

Ans. [2]

Sol. GLUT IV is insulin dependent glucose transporter which increases uptake of glucose.

Q.50 Purines found both in DNA and RNA are:

- (1) Guanine and cytosine (2) Cytosine and thymine
(3) Adenine and thymine (4) Adenine and guanine

Ans. [4]

Sol. Adenine & guanine are purines which are common to both DNA & RNA

Q.51 Drug called 'Heroin' is synthesized by:

- (1) glycosylation of morphine
(2) nitration of morphine
(3) methylation of morphine
(4) acetylation of morphine

Ans. [4]

Sol. Heroin is formed by acetylation of morphine

Q.52 Select the correct option.

- (1) Each rib is a flat thin bone and all the ribs are connected dorsally to the thoracic vertebrae and ventrally to the sternum
- (2) There are seven pairs of vertebrosteral, three pairs of vertebrochondral and two pairs of vertebral ribs
- (3) 8th, 9th and 10th pairs of ribs articulate directly with the sternum
- (4) 11th and 12th pairs of ribs are connected to the sternum with the help of hyaline cartilage.

Ans. [2]

Sol. Seven pairs of Ribs are vertebrosteral while 8, 9 and 10th pair of ribs are vertebrochondral and the last 11th, 12th pair are vertebral ribs.

Q.53 A gene locus has two alleles A, a. If the frequency of dominant allele A is 0.4, then what will be the frequency of homozygous dominant, heterozygous and homozygous recessive individuals in the population?

- | | |
|-------------------------------------|-------------------------------------|
| (1) 0.16(AA); 0.48 (Aa); 0.36(aa) | (2) 0.16 (AA); 0.36(Aa); 0.48(aa) |
| (3) 0.36 (AA); 0.48 (Aa); 0.16 (aa) | (4) 0.16 (AA); 0.24 (Aa); 0.36 (aa) |

Ans. [1]

Sol. If A = 0.4, then a = 0.6

$$\text{So, } AA = 0.4 \times 0.4 = 0.16$$

$$Aa = 0.4 \times 0.6 = 0.24$$

$$Aa = 0.6 \times 0.6 = 0.36$$

Q.54 Which of the following statements regarding mitochondria is **incorrect** ?

- (1) Inner membrane is convoluted with infoldings
- (2) Mitochondrial matrix contains single circular DNA molecule and ribosomes
- (3) Outer membrane is permeable to monomers of carbohydrates, fats and proteins
- (4) Enzymes of electron transport are embedded in outer membrane.

Ans. [4]

Sol. The enzymes required for the ETS are present in the inner matrix only as the elementary particles are embedded in the inner membrane of the mitochondrial matrix.

Q.55 Variations caused by mutation, as proposed by Hugo de Vries, are :

- | | |
|----------------------------|------------------------------|
| (1) small and directional | (2) small and directionless |
| (3) random and directional | (4) random and directionless |

Ans. [4]

Sol. According to De Vries, Variations are large, random and directionless

Q.56 Following statements describe the characteristics of the enzyme Restriction Endonuclease. Identify the **incorrect** statement.

- (1) The enzyme cuts the sugar-phosphate backbone at specific sites on each strand
- (2) The enzyme recognizes a specific palindromic nucleotide sequence in the DNA
- (3) The enzyme cuts DNA molecule at identified position within the DNA
- (4) The enzyme binds DNA at specific sites and cuts only one of the two strands

Ans. [4]

Sol. Enzyme binds DNA at specific sites and cut both the strands by breaking phosphodiester linkage.

Q.57 Which part of the brain is responsible for thermoregulation ?
(1) Corpus callosum (2) Medulla oblongata (3) Cerebrum (4) Hypothalamus

Ans. [4]

Sol. Hypothalamus is responsible for thermoregulation

Q.58 Use of an artificial kidney during hemodialysis may result in :
(a) Nitrogenous waste build-up in the body
(b) Non –elimination of excess potassium ions
(c) Reduced absorption of calcium ions from gastro-intestinal tract
(d) Reduced RBC production

Which of the following options is the most **appropriate** ?

- (1) (c) and (d) are correct (2) (a) and (d) are correct
(3) (a) and (b) are correct (4) (b) and (c) are correct

Ans. [1]

Sol. Kidney produces erythropoietin which helps in RBC production

Kidney also secretes calcitriol which allows absorption of calcium ion from gastro intestinal tract.

Q.59 What triggers activation of protoxin to active Bt toxin of *Bacillus thuringiensis* in boll worm ?
(1) Alkaline pH of gut (2) Acidic pH of stomach
(3) Body temperature (4) Moist surface of midgut

Ans. [1]

Sol. Protoxin are converted into active toxins in the alkaline pH of gut

Q.60 Which of the following protocols did aim for reducing emission of chlorofluorocarbons into the atmosphere?
(1) Gothenburg Protocol (2) Geneva Protocol
(3) Montreal Protocol (4) Kyoto Protocol

Ans. [3]

Sol. Page No. 283 12th NCERT

Q.61 Which of the following sexually transmitted diseases is **not** completely curable ?
(1) Genital herpes (2) Chlamydia (3) Gonorrhoea (4) Genital warts

Ans. [1]

Sol. HIV and Genital Herpes is not completely curable.

Q.62 Thiobacillus is a group of bacteria helpful in carrying out :
(1) Nitrification (2) Denitrification
(3) Nitrogen fixation (4) Chemoautotrophic fixation

Ans. [2]

Sol. Page No. 201 12th NCERT

Q.63 In *Antirrhinum* (Snapdragon), a red flower was crossed with a white flower and in F_1 generation, pink flowers were obtained. When pink flowers were selfed, the F_2 generation showed white, red and pink flowers. Choose the incorrect statement from the following :

- (1) Ratio of F_2 is $\frac{1}{4}$ (Red) : $\frac{2}{4}$ (Pink) : $\frac{1}{4}$ (White)
 (2) Law of Segregation does not apply in this experiment
 (3) This experiment does not follow the Principle of Dominance
 (4) Pink colour in F_1 is due to incomplete dominance

Ans. [2]

Sol. Page No. 76 12th NCERT

Q.64 In a species, the weight of newborn ranges from 2 to 5 kg. 97% of the newborn with an average weight between 3 to 3.3 kg survive whereas 99% of the infants born with weights from 2 to 2.5 kg or 4.5 to 5kg die. Which type of selection process is taking place ?

- (1) Disruptive Selection (2) Cyclical Selection
 (3) Directional Selection (4) Stabilizing Selection

Ans. [4]

Sol. 3 to 3.3 kg weight of Newborn are mostly selected by nature which is an intermediate character \therefore this is an example of stabilizing selection.

Q.65 Concanavalin A is :

- (1) a lectin (2) a pigment (3) an alkaloid (4) an essential oil

Ans. [1]

Sol. Concanavalin A is an example of lectin

Q.66 Match the Column-I with Column-II :

Column-I	Column-II
(a) P-wave	(i) Depolarisation of ventricles
(b) QRS complex	(ii) Repolarisation of ventricles
(c) T-wave	(iii) Coronary ischemia
(d) Reduction in the size of T-wave	(iv) Depolarisation of atria
	(v) Repolarisation of atria

Select the correct option.

- | (a) | (b) | (c) | (d) |
|----------|-------|------|-------|
| (1) (ii) | (i) | (v) | (iii) |
| (2) (ii) | (iii) | (v) | (iv) |
| (3) (iv) | (i) | (ii) | (iii) |
| (4) (iv) | (i) | (ii) | (v) |

Ans. [3]

Sol. \rightarrow P wave represent atrial depolarization

\rightarrow QRS complex " ventricular "

T - wave " depolarisation of ventricles

\rightarrow Reduction in the size of T-wave indicates coronary ischemia

Q.67 Match the following genes of the Lac operon with their respective products :

- | | |
|------------|----------------------------|
| (a) i gene | (i) β -galactosidase |
| (b) z gene | (ii) Permease |
| (c) a gene | (iii) Repressor |
| (d) y gene | (iv) Transacetylase |

Select the correct option.

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

Ans. [1]

Sol. Page No. 117 12th NCERT

Q.68 Which of the following statements is not correct ?

- (1) Lysosomes are membrane bound structures.
- (2) Lysosomes are formed by the process of packaging in the endoplasmic reticulum.
- (3) Lysosomes have numerous hydrolytic enzymes.
- (4) The hydrolytic enzymes of lysosomes are active under acidic pH.

Ans. [2]

Sol. Page No. 134 11th NCERT

Q.69 In some plants, the female gamete develops into embryo without fertilization. This phenomenon is known as :

- (1) Syngamy (2) Parthenogenesis (3) Autogamy (4) Parthenocarp

Ans. [2]

Sol. Page No. 14 12th NCERT

Q.70 Match Column-I with Column –II.

- | Column-I | Column-II |
|----------------|---|
| (a) Saprophyte | (i) Symbiotic association of fungi with plant roots |
| (b) Parasite | (ii) Decomposition of dead organic materials |
| (c) Lichens | (iii) Living on living plants of animals |
| (d) Mycorrhiza | (iv) Symbiotic association of algae and fungi |

Choose the **correct** answer from the options given below :

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

Ans. [2]

Sol. A saprophyte is an organism that survives on dead and decaying organisms like fungi and decomposition bacteria.

A parasite is an organism that survives on living plants and animals.

A lichen is symbiotic association of algae & fungi.

Mycorrhiza is a symbiotic association of fungi and roots of higher plants like *pinus*

- Q.71** Which of the following is a commercial blood cholesterol lowering agent ?
(1) Streptokinase (2) Lipases (3) Cyclosporin A (4) Statin
- Ans.** [4]
- Sol.** Page No. 183 12th NCERT
- Q.72** Which of the following features of genetic code does allow bacteria to produce human insulin by recombinant DNA technology ?
(1) Genetic code is nearly universal (2) Genetic code is specific
(3) Genetic code is not ambiguous (4) Genetic code is redundant
- Ans.** [1]
- Sol.** Page No. 112 12th NCERT
- Q.73** The ciliated epithelial cells are required to move particles or mucus in a specific direction. In humans, these cells are mainly present in :
(1) Eustachian tube and Salivary duct (2) Bronchioles and Fallopian tubes
(3) Bile duct and Bronchioles (4) Fallopian tubes and Pancreatic duct
- Ans.** [2]
- Sol.** Bronchioles are lined by ciliated epithelium and fallopian tube
- Q.74** Conversion of glucose to glucose-6phosphate, the first irreversible reaction of glycolysis, is catalyzed by
(1) Enolase (2) Phosphofructokinase (3) Aldolase (4) Hexokinase
- Ans.** [4]
- Sol.** Page No. 229 11th NCERT
- Q.75** Which one of the following is not a method of in situ conservation of biodiversity?
(1) Botanical Garden (2) Sacred Grove
(3) Biosphere Reserve (4) Wildlife Sanctuary
- Ans.** [1]
- Sol.** Page No. 266 12th NCERT
- Q.76** The concept of "Omnis cellula-e cellula" regarding cell division was first proposed by :
(1) Schleiden (2) Aristotle
(3) Rudolf Virchow (4) Theodore Schwann
- Ans.** [3]
- Sol.** Page No. 126 11th NCERT
- Q.77** Select the correct group of biocontrol agents
(1) Oscillatoria, Rhizobium, Trichoderma
(2) Nostoc, Azospirillum, Nucleopolyhedrovirus
(3) Bacillus thuringiensis, Tobacco mosaic virus, Aphids
(4) Trichoderma, Baculovirus, Bacillus thuringiensis
- Ans.** [4]
- Sol.** Page No. 187 12th NCERT

Q.78 Identify the correct pair representing the causative agent of typhoid fever and the confirmatory test for typhoid.

- (1) Salmonella typhi/ Anthonone test (2) Salmonella typhi/ Widal test
(3) Plasmodium vivax/ UTI test (4) Streptococcus pneumoniae/ Widal test

Ans. [2]

Sol. Typhoid fever is caused by salmonella typhi which is diagnosed through WIDAL TEST

Q.79 Select the incorrect statement.

- (1) In domesticated fowls, sex of progeny depends on the type of sperm rather than egg.
(2) Human males have one of their sex-chromosome much shorter than the other.
(3) Male fruit fly is heterogametic
(4) In male grasshoppers, 50% of sperms have no sex-chromosome.

Ans. [1]

Sol. Page No. 186 12th NCERT

Q.80 Select the correct sequence of organs in the alimentary canal of cockroach starting from mouth :

- (1) Pharynx → Oesophagus → Gizzard → Ileum → Crop → Colon → Rectum
(2) Pharynx → Oesophagus → Ileum → Crop → Gizzard → Colon → Rectum
(3) Pharynx → Oesophagus → Crop → Gizzard → Ileum → Colon → Rectum
(4) Pharynx → Oesophagus → Gizzard → Crop → Ileum → Colon → Rectum

Ans. [3]

Sol. In cockroach the food goes into

mouth → pharynx → oesophagus → crop → gizzard → Ileum

Anus ← Rectum ← Colon ←

Q.81 Colostrum, the yellowish fluid, secreted by mother during the initial days of lactation is very essential to impart immunity to the newborn infants because it contains :

- (1) Macrophages (2) Immunoglobulin A (3) Natural killer cells (4) Monocytes

Ans. [2]

Sol. Colostrum is enriched with IgA which is a form of Natural passive immunity

Q.82 What is the fate of the male gametes discharged in the synergid ?

- (1) One fuses with the egg, other (s) fuse (s) with synergid nucleus.
(2) One fuses with the egg and other fuses with central cell nuclei.
(3) One fuses with the egg, other (s) degenerate (s) in the synergid.
(4) All fuse with the egg.

Ans. [2]

Sol. Page No. 26 12th NCERT

- Q.83** What map unit (Centimorgan) is adopted in the construction of genetic maps ?
- (1) A unit of distance between genes on chromosomes, representing 1% cross over.
 - (2) A unit of distance between genes on chromosomes, representing 50% cross over.
 - (3) A unit of distance between two expressed genes, representing 10% cross over.
 - (4) A unit of distance between two expressed genes, representing 100% cross over.

Ans. [1]

Sol. Page No. 83 12th NCERT

- Q.84** Select the hormone-releasing Intra-Uterine Devices.
- | | |
|--------------------------|---------------------------------|
| (1) Progestasert, LNG-20 | (2) Lippes Loop, Multiload 375 |
| (3) Vaults, LNG-20 | (4) Multiload 375, Progestasert |

Ans. [1]

Sol. Progestasert, LNG – 20 both are hormonal containing IUD's

- Q.85** Select the correctly written scientific name of Mango which was first described by Carolus Linnaeus.
- | | |
|--|----------------------------------|
| (1) <i>Mangifera indica</i> | (2) <i>Mangifera Indica</i> |
| (3) <i>Mangifera indica</i> Car. Linn. | (4) <i>Mangifera Indica</i> Linn |

Ans. [4]

Sol. Page No. 7 11th NCERT

- Q.86** Which of the following pairs of gases is mainly responsible for green house effect ?
- | | |
|----------------------------------|--------------------------------|
| (1) Nitrogen and Sulphur dioxide | (2) Carbon dioxide and Methane |
| (3) Ozone and Ammonia | (4) Oxygen and Nitrogen |

Ans. [2]

Sol. Page No. 281 12th NCERT

- Q.87** The frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes was explained by :
- | | |
|-----------------------|----------------------|
| (1) Alfred Sturtevant | (2) Sutton Boveri |
| (3) T.H. Morgan | (4) Gregor J. Mendel |

Ans. [1]

Sol. Page No. 83 12th NCERT

- Q.88** Which of the following statements is correct ?
- (1) Cornea is convex, transparent layer which is highly vascularised
 - (2) Cornea consists of dense matrix of collagen and is the most sensitive portion of the eye.
 - (3) Cornea is an external, Transparent and protective proteinaceous covering of the eye-ball
 - (4) Cornea consists of dense connective tissue of elastin and can repair itself.

Ans. [2]

Sol. Cornea is the most sensitive part of eye, made up of dense matrix of collagen fibre.



Q.89 Which of the following muscular disorders is inherited ?

- | | |
|-----------------------|------------------------|
| (1) Myasthenia gravis | (2) Botulism |
| (3) Tetany | (4) Muscular dystrophy |

Ans. [4]

Sol. Muscular dystrophy is autosomal recessive disorder.

Q.90 Polyblend, a fine powder of recycled modified plastic, has proved to be a good material for :

- | | |
|---------------------------|----------------------------|
| (1) Construction of roads | (2) Making tubes and pipes |
| (3) Making plastic sacks | (4) use as a fertilizer |

Ans. [1]

Sol. Page No. 279 12th NCERT



NEET Exam. 2019 (5th May 2019)

(Paper & Solution)

Code – S2

Q.91 Average velocity of a particle executing SHM in one complete vibration is :

- (1) $\frac{A\omega^2}{2}$ (2) zero (3) $\frac{A\omega}{2}$ (4) $A\omega$

Ans. [2]

Sol. Average velocity = $\frac{\text{Total displacement}}{\text{time}} = \frac{0}{T} = 0$

Q.92 Two similar thin equi-convex lenses, of focal length f each, are kept coaxially in contact with each other such that the focal length of the combination is F_1 . When the space between the two lenses is filled with glycerin (which has the same refractive index ($\mu = 1.5$) as that of glass) then the equivalent focal length is F_2 . The ratio $F_1 : F_2$ will be :

- (1) 2 : 3 (2) 3 : 4 (3) 2 : 1 (4) 1 : 2

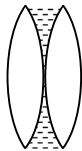
Ans. [4]

Sol.



$$\frac{1}{F_1} = \frac{1}{f} + \frac{1}{f}$$

$$F_1 = f/2$$



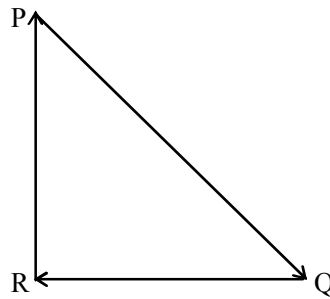
$$\frac{1}{F_1} = \frac{1}{f} + \left(-\frac{1}{f}\right) + \frac{1}{f}$$

$$\frac{1}{F_2} = \frac{1}{f}$$

$$F_2 = f$$

$$F_1 : F_2 = \frac{f}{2} : f = \frac{1}{2} : 1 = 1 : 2$$

Q.93 A particle moving with velocity \vec{V} is acted by three forces shown by the vector triangle PQR. The velocity of the particle will :



(1) remain constant

(2) change according to the smallest force \vec{QR}

(3) increase

(4) decrease

Ans. [1]

Sol. Vector sum of all force is zero

$\vec{V} \rightarrow$ remain same

Q.94 Ionized hydrogen atoms and α -particles with same momenta enters perpendicular to a constant magnetic field, B. The ratio of their radii of their paths $r_H : r_\alpha$ will be :

(1) 4 : 1

(2) 1 : 4

(3) 2 : 1

(4) 1 : 2

Ans. [3]

Sol. $r = \frac{mv}{qB} = \frac{p}{qB}$

$$r \propto \frac{1}{q}$$

$$\frac{r_H}{r_\alpha} = \frac{q_\alpha}{q_H} = \frac{2e}{e}$$

$$r_H : r_\alpha = 2 : 1$$

Q.95 Body A of mass 4m moving with speed u collides with another body B of mass 2m, at rest. The collision is head on and elastic in nature. After the collision the fraction of energy lost by the colliding body A is :

(1) $\frac{4}{9}$

(2) $\frac{5}{9}$

(3) $\frac{1}{9}$

(4) $\frac{8}{9}$

Ans. [4]

Sol. $v_2 = \frac{2m_1u_1 + u_2(m_2 - m_1)}{m_1 + m_2}$

$$v_2 = \frac{2(4m)u + 0}{6m}$$

$$v_2 = \frac{4}{3}u$$

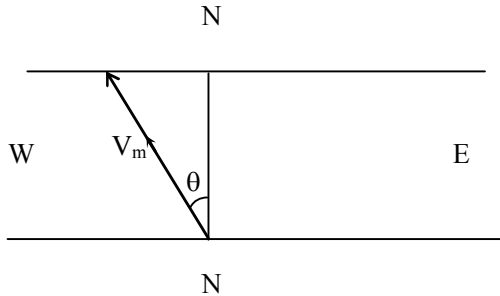
$$\frac{\Delta E}{E} = \frac{\frac{1}{2}2mv_2^2}{\frac{1}{2}4mu^2} = \frac{\left(\frac{4}{3}u\right)^2}{2u^2} = \frac{8}{9}$$

Q.96 The speed of a swimmer in still water is 20 m/s. The speed of river water is 10 m/s and is flowing due east. If he is standing on the south bank and wishes to cross the river along the shortest path, the angle at which he should make his strokes w.r.t. north is given by :

- (1) 60° west (2) 45° west (3) 30° west (4) 0°

Ans. [3]

Sol.



$$V_m \sin \theta = V_r$$

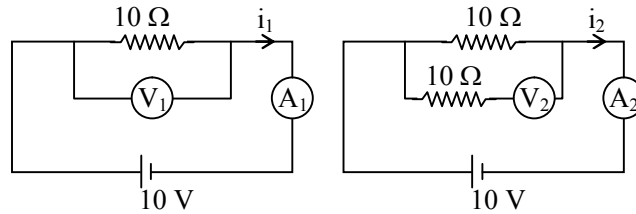
$$20 \sin \theta = 10$$

$$\sin \theta = 1/2$$

$$\theta = 30^\circ$$

So 30° west with respect to north

Q.97 In the circuits shown below, the readings of the voltmeters and the ammeters will be :



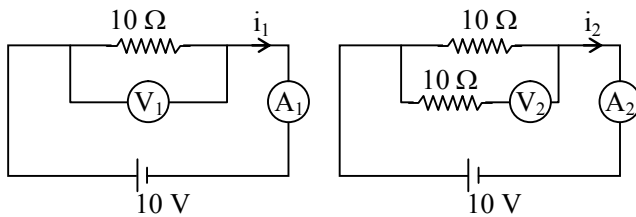
Circuit 1

Circuit 2

- (1) $V_1 = V_2$ and $i_1 = i_2$ (2) $V_2 > V_1$ and $i_1 > i_2$ (3) $V_2 > V_1$ and $i_1 = i_2$ (4) $V_1 = V_2$ and $i_1 > i_2$

Ans. [1]

Sol.



Circuit 1

Circuit 2

$$i_1 = \frac{10V}{10\Omega} = 1A$$

$$V_1 = 10V$$

$$V_1 = V_2$$

$$i_1 = i_2$$

$$R_{V_2} = \infty$$

$$i_{\text{through voltmeter}} = 0$$

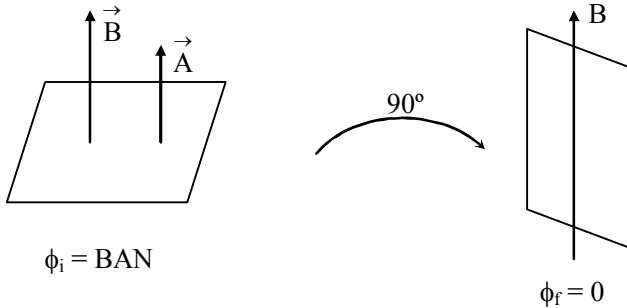
$$V_2 = 10V$$

$$i_2 = 1A$$

- Q.98** A 800 turn coil of effective area 0.05 m^2 is kept perpendicular to a magnetic field $5 \times 10^{-5} \text{ T}$. When the plane of the coil is rotated by 90° around any of its coplanar axis in 0.1 s , the emf induced in the coil will be :
- (1) $2 \times 10^{-3} \text{ V}$ (2) 0.02 V (3) 2 V (4) 0.2 V

Ans. [2]

Sol.



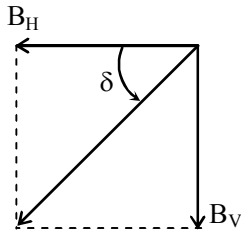
$$\begin{aligned} \text{emf} &= \frac{\Delta\phi}{\Delta t} = \frac{BAN}{\Delta t} \\ &= \frac{(5 \times 10^{-5})(0.05)(800)}{0.1} = \frac{200 \times 10^{-5} \times 10^{-2} \times 10^2}{10^{-1}} = 0.02 \text{ volt} \end{aligned}$$

- Q.99** At a point A on the earth's surface the angle of dip, $\delta = +25^\circ$. At a point B on the earth's surface the angle of dip, $\delta = -25^\circ$. We can interpret that :

- (1) A is located in the northern hemisphere and B is located in the southern hemisphere
 (2) A and B are both located in the southern hemisphere
 (3) A and B are both located in the northern hemisphere
 (4) A is located in the southern hemisphere and B is located in the northern hemisphere

Ans. [1]

Sol.



$$\delta = +25$$

$B_v \rightarrow$ vertical downward \rightarrow Northern hemisphere

A \rightarrow Northern hemisphere

B \rightarrow Southern hemisphere

- Q.100** An electron is accelerated through a potential difference of $10,000 \text{ V}$. Its de Broglie wavelength is, (nearly) :
- (1) $12.2 \times 10^{-14} \text{ m}$ (2) 12.2 nm (3) $12.2 \times 10^{-13} \text{ m}$ (4) $12.2 \times 10^{-12} \text{ m}$

Ans. [4]

Sol.

$$\begin{aligned} \lambda &= \frac{12.27}{\sqrt{V}} \text{ \AA} = \frac{12.27}{\sqrt{10,000}} \text{ \AA} \\ &= 12.27 \times 10^{-2} \text{ \AA} \\ &= 12.27 \times 10^{-12} \text{ m} \end{aligned}$$

Q.101 The displacement of a particle executing simple harmonic motion is given by $y = A_0 + A \sin \omega t + B \cos \omega t$. Then the amplitude of its oscillation is given by :

- (1) $\sqrt{A_0^2 + (A+B)^2}$ (2) $A + B$ (3) $A_0 + \sqrt{A^2 + B^2}$ (4) $\sqrt{A^2 + B^2}$

Ans. [4]

Sol. $y = A_0 + A \sin \omega t + B \cos \omega t$

amplitude of $A \sin \omega t + B \cos \omega t = \sqrt{A^2 + B^2}$

Q.102 α -particle consists of :

- (1) 2 electrons and 4 protons only (2) 2 protons only
 (3) 2 protons and 2 neutrons only (4) 2 electrons, 2 protons and 2 neutrons

Ans. [3]

Sol. α particle = He nucleus

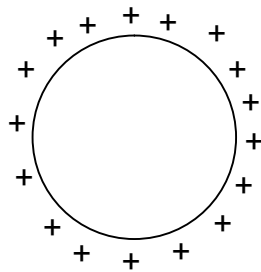
- 2 protons
 2 neutrons

Q.103 A hollow metal sphere of radius R is uniformly charged. The electric field due to the sphere at a distance r from the centre :

- (1) zero as r increases for $r < R$, increases as r increases for $r > R$
 (2) decreases as r increases for $r < R$ and for $r > R$
 (3) increases as r increases for $r < R$ and for $r > R$
 (4) zero as r increases for $r < R$, decreases as r increases for $r > R$

Ans. [4]

Sol.



$$E_{\text{inside}} = 0$$

$$E_{\text{surface}} = \frac{kQ}{R^2} = \text{max.}$$

$$E_{\text{outside}} = \frac{kQ}{r^2}$$

$$E \propto \frac{1}{r^2}$$

Q.104 In an experiment, the percentage of error occurred in the measurement of physical quantities A , B , C and D are 1%, 2%, 3% and 4% respectively. Then the maximum percentage of error in the measurement X , where

$$X = \frac{A^2 B^{1/2}}{C^{1/3} D^3}, \text{ will be :}$$

- (1) -10% (2) 10% (3) $\left(\frac{3}{13}\right)\%$ (4) 16%

Ans. [4]

Sol. $X = \frac{A^2 B^{1/2}}{C^{1/3} D^3}$

$$\begin{aligned}\frac{\Delta X}{X} &= \frac{2\Delta A}{A} + \frac{1}{2} \frac{\Delta B}{B} + \frac{1}{3} \frac{\Delta C}{C} + \frac{3\Delta D}{D} \\ &= 2 \times 1\% + \frac{1}{2} \times 2\% + \frac{1}{3} \times 3\% + 3 \times 4\% \\ &= 2 + 1 + 1 + 12 \\ &= 16\%\end{aligned}$$

Q.105 A force $F = 20 + 10y$ acts on a particle in y -direction where F is in newton and y in meter. Work done by this force to move the particle from $y = 0$ to $y = 1$ m is :

- (1) 25 J (2) 20 J (3) 30 J (4) 5 J

Ans. [1]

Sol. $F = 20 + 10y$

$$\begin{aligned}W &= \int_0^1 (20 + 10y) dy \\ &= 20[y]_0^1 + \left[\frac{10y^2}{2} \right]_0^1 \\ &= 20 + 5 \\ &= 25\end{aligned}$$

Q.106 In which of the following processes, heat is neither absorbed nor released by a system ?

- (1) isobaric (2) isochoric (3) isothermal (4) adiabatic

Ans. [4]

Sol. Adiabatic process

$$\Delta Q = 0$$

Q.107 In which of the following devices, the eddy current effect is **not** used ?

- (1) electromagnet (2) electric heater
(3) induction furnace (4) magnetic braking in train

Ans. [1,2]

Sol. Electromagnets are made by soft ferromagnetic materials, eddy currents are not used. So answer will be 1 and 2 both.

Q.108 The unit of thermal conductivity is :

- (1) $W m K^{-1}$ (2) $W m^{-1} K^{-1}$ (3) $J m K^b$ (4) $J m^{-1} K^{-1}$

Ans. [2]

Sol. $H = \frac{kA}{\ell}(\theta_1 - \theta_2)$

$$k = \frac{H\ell}{A\theta}$$

$$= \frac{W.m}{m^2K}$$

$$= Wm^{-1}K^{-1}$$

Q.109 A body weighs 200 N on the surface of the earth. How much will it weigh half way down to the centre of the earth?

- (1) 250 N (2) 100 N (3) 150 N (4) 200 N

Ans. [2]

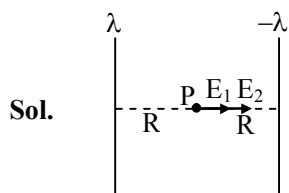
Sol. $g' = \frac{gr}{R} = \frac{gR}{2R} = \frac{g}{2}$

So weight will be 100 N.

Q.110 Two parallel infinite line charges with linear charge densities $+\lambda C/m$ and $-\lambda C/m$ are placed at a distance of $2R$ in free space. What is the electric field mid-way between the two line charges?

- (1) $\frac{\lambda}{\pi \epsilon_0 R} N/C$ (2) $\frac{\lambda}{2\pi \epsilon_0 R} N/C$ (3) zero (4) $\frac{2\lambda}{\pi \epsilon_0 R} N/C$

Ans. [1]



At P, $E = E_1 + E_2 = \frac{2k\lambda_1}{R} + \frac{2k\lambda_2}{R} \quad \therefore \lambda_1 = \lambda_2$

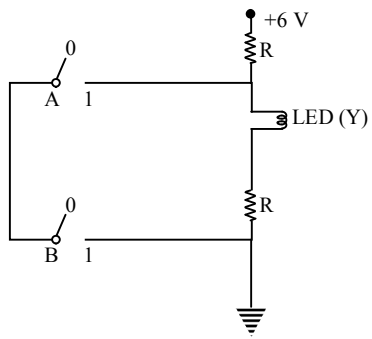
$$= \frac{4k\lambda}{R} = \frac{\lambda}{\pi \epsilon_0 R}$$

Q.111 A mass m is attached to a thin wire and whirled in a vertical circle. The wire is most likely to break when :

- (1) the mass is at the lowest point (2) inclined at an angle of 60° from vertical
 (3) the mass is at the highest point (4) the wire is horizontal

Ans. [1]

Sol. Tension at lowest point is maximum so will break at that point

Q.112


The correct Boolean operation represented by the circuit diagram drawn is :

- (1) NAND (2) NOR (3) AND (4) OR

Ans. [1]

Sol. LED glows when Both switches are OFF if are one is ON or both ON, LED will be short and becomes OFF

A	B	Y(LED)
0 OFF	0 (OFF)	1 (ON)
0 (OFF)	1 (ON)	1(ON)
1 (ON)	0 (OFF)	1 (ON)
1 (ON)	1 (ON)	0 (OFF)

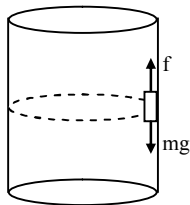
$$y = (\overline{AB}) = \text{NAND}$$

Q.113 A block of mass 10 kg is in contact against the inner wall of a hollow cylindrical drum of radius 1 m. The coefficient of friction between the block and the inner wall of the cylinder is 0.1. The minimum angular velocity needed for the cylinder to keep the block stationary when the cylinder is vertical and rotating about its axis, will be : ($g = 10 \text{ m/s}^2$)

- (1) 10 rad/s (2) 10π rad/s (3) $\sqrt{10}$ rad/s (4) $\frac{10}{2\pi}$ rad/s

Ans. [1]

Sol.



$$f = mg$$

$$\mu r \omega^2 = mg$$

$$\omega^2 = \frac{g}{r\mu}$$

$$= \frac{10}{1 \times 0.1}$$

$$\omega = 10$$

Q.114 A small hole of area of cross-section 2 mm^2 is present near the bottom of a fully filled open tank of height 2 m. Taking $g = 10 \text{ m/s}^2$, the rate of flow of water through the open hole would be nearly :

- (1) $2.23 \times 10^{-6} \text{ m}^3/\text{s}$ (2) $6.4 \times 10^{-6} \text{ m}^3/\text{s}$ (3) $12.6 \times 10^{-6} \text{ m}^3/\text{s}$ (4) $8.9 \times 10^{-6} \text{ m}^3/\text{s}$

Ans. [3]

Sol. $Q = AV$

$$= A\sqrt{2gh}$$

$$= 2 \times 10^{-6} \sqrt{2 \times 10 \times 2}$$

$$= 2 \times 10^{-6} \sqrt{40}$$

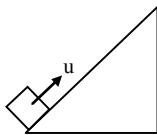
$$= 12.6 \times 10^{-6}$$

Q.115 When an object is shot from the bottom of a long smooth inclined plane kept at an angle 60° with horizontal, it can travel a distance x_1 along the plane. But when the inclination is decreased to 30° and the same object is shot with the same velocity, it can travel x_2 distance. Then $x_1 : x_2$ will be :

- (1) $1 : \sqrt{3}$ (2) $1 : 2\sqrt{3}$ (3) $1 : \sqrt{2}$ (4) $\sqrt{2} : 1$

Ans. [1]

Sol.



$$v^2 = u^2 + 2as$$

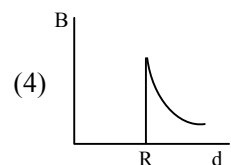
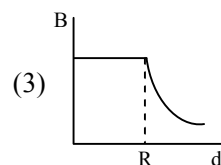
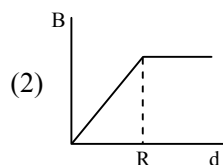
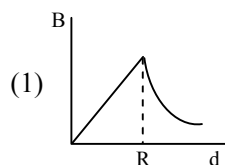
$$0 = u^2 - 2g \sin \theta S$$

$$S = \frac{u^2}{2g \sin \theta}$$

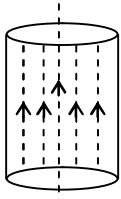
$$S \propto \frac{1}{\sin \theta}$$

$$\frac{x_1}{x_2} = \frac{\sin \theta_2}{\sin \theta_1} = \frac{\sin 30^\circ}{\sin 60^\circ} = \frac{1}{\sqrt{3}}$$

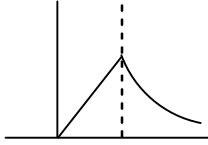
Q.116 A cylindrical conductor of radius R is carrying a constant current. The plot of the magnitude of the magnetic field, B with the distance, d , from the centre of the conductor, is correctly represented by the figure :



Ans. [1]



Sol.



$$B_{\text{inside}} = \frac{\mu_0 i d}{2\pi R^2}$$

$$B_{\text{in}} \propto d$$

$$B_{\text{out}} = \frac{\mu_0 i}{2\pi d}$$

$$B_{\text{out}} \propto \frac{1}{d}$$

Q.117 A soap bubble, having radius of 1 mm, is blown from a detergent solution having a surface tension of 2.5×10^{-2} N/m. The pressure inside the bubble equals at a point Z_0 below the free surface of water in a container. Taking $g = 10 \text{ m/s}^2$, density of water = 10^3 kg/m^3 , the value of Z_0 is :

- (1) 1 cm (2) 0.5 cm (3) 100 cm (4) 10 cm

Ans. [1]

Sol. $\rho g Z_0 = \frac{4T}{R}$

$$10^3 \cdot 10 \cdot Z_0 = \frac{4(2.5 \times 10^{-2})}{10^{-3}}$$

$$= \frac{100}{10^4}$$

$$Z_0 = 10^{-2}$$

$$Z = 1 \text{ cm}$$

Q.118 The work done to raise a mass m from the surface of the earth to a height h , which is equal to the radius of the earth, is :

- (1) $\frac{1}{2} mgR$ (2) $\frac{3}{2} mgR$ (3) mgR (4) $2 mgR$

Ans. [1]

Sol. $\Delta PE = \frac{GMm}{r_1} - \frac{GMm}{r_2}$

$$= \frac{GMm}{R} - \frac{GMm}{2R}$$

$$= \frac{GMm}{2R} = \frac{mgR}{2}$$

Q.119 Which of the following acts as a circuit protection device ?

- (1) switch (2) fuse (3) conductor (4) inductor

Ans. [2]

Sol. Fuse is used as circuit protector.

Q.120 Two particles A and B are moving in uniform circular motion in concentric circles of radii r_A and r_B with speed v_A and v_B respectively. Their time period of rotation is the same. The ratio of angular speed of A to that of B will be :

- (1) $r_B : r_A$ (2) 1 : 1 (3) $r_A : r_B$ (4) $v_A : v_B$

Ans. [2]

Sol. $\omega = \frac{2\pi}{T}$

$T \rightarrow$ same

$$\omega_1 = \omega_2$$

$$1 : 1$$

Q.121 A parallel plate capacitor of capacitance $20 \mu\text{F}$ is being charged by a voltage source whose potential is changing at the rate of 3 V/s . The conduction current through the connecting wires, and the displacement current through the plates of the capacitor, would be, respectively :

- (1) $60 \mu\text{A}$, zero (2) zero, zero (3) zero, $60 \mu\text{A}$ (4) $60 \mu\text{A}$, $60 \mu\text{A}$

Ans. [4]

Sol. Displacement current

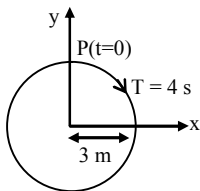
$$i = C \frac{dV}{dt}$$

$$= 20 \times 10^{-6} \times 3$$

$$= 60 \mu\text{A}$$

in circuit displacement current = conductor current.

Q.122 The radius of circle, the period of revolution, initial position and sense of revolution are indicated in the fig.



y-projection of the radius vector of rotating particle P is :

(1) $y(t) = 3 \cos\left(\frac{3\pi t}{2}\right)$, where y in m

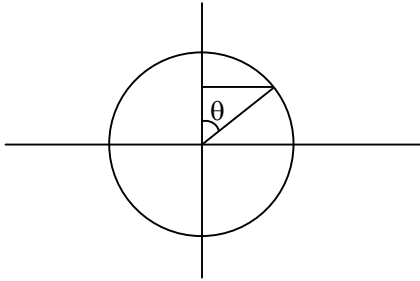
(2) $y(t) = 3 \cos\left(\frac{\pi t}{2}\right)$, where y in m

(3) $y(t) = -3 \cos 2\pi t$, where y in m

(4) $y(t) = 4 \sin\left(\frac{\pi t}{2}\right)$, where y in m

Ans. [2]

Sol.



$$y = r \cos \theta$$

$$y = 3 \cos \omega t$$

$$y = 3 \cos \frac{2\pi}{4} \cdot t$$

$$y = 3 \cos \frac{\pi t}{2}$$

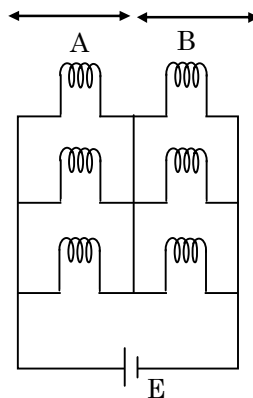
Q.123 For a p-type semiconductor, which of the following statements is true ?

- (1) Holes are the majority carriers and pentavalent atoms are the dopants
- (2) Electrons are the majority carriers and pentavalent atoms are the dopants
- (3) Electrons are the majority carriers and trivalent atoms are the dopants
- (4) Holes are the majority carriers and trivalent atoms are the dopants

Ans. [4]

Sol. In P type semiconductor holes are majority charge carrier and trivalent impurities are mixed.

Q.124 Six similar bulbs are connected as shown in the figure with a DC source of emf E and zero internal resistance. The ratio of power consumption by the bulbs when (i) all are glowing and (ii) in the situation when two from section A and one from section B are glowing, will be -



(1) 1 : 2

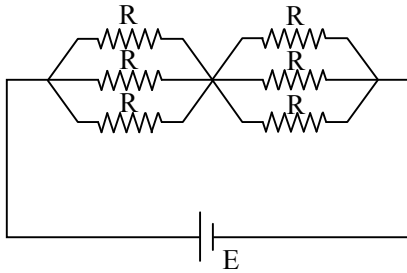
(2) 2 : 1

(3) 4 : 9

(4) 9 : 4

Ans. [4]

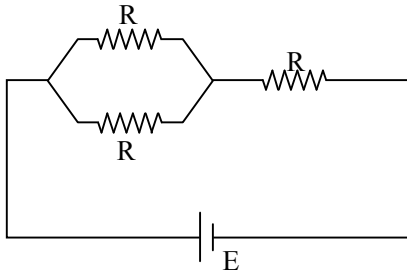
Sol. When all bulbs are glowing



$$R_{eq} = \frac{R}{3} + \frac{R}{3} = \frac{2R}{3}$$

$$\text{Power } P_1 = \frac{3E^2}{2R} \quad \dots(i)$$

In case two



$$R_{eq} = \frac{3R}{2}$$

$$\text{Power } P_2 = \frac{2E^2}{3R} \quad \dots(ii)$$

$$\frac{P_1}{P_2} = \frac{3}{2} \times \frac{3}{2} = \frac{9}{4}$$

Q.125 Increase in temperature of a gas filled in a container would lead to -

- (1) decrease in its pressure
- (2) decrease in intermolecular distance
- (3) increase in its mass
- (4) increase in its kinetic energy

Ans. [4]

Sol. $V \rightarrow \text{constant}$

$T \uparrow \quad P \uparrow \quad KE \uparrow$

Q.126 In a double slit experiment, when light of wavelength 400 nm was used, the angular width of the first minima formed on a screen placed 1 m away, was found to be 0.2° . What will be the angular width of the first minima. If the entire experimental apparatus is immersed in water ? ($\mu_{\text{water}} = 4/3$)

- (1) 0.05° (2) 0.1° (3) 0.266° (4) 0.15°

Ans. [4]**Sol.** $\theta \propto \lambda$

$$\lambda_1 = 400 \text{ nm}, \theta_1 = 0.2^\circ, \mu_{\text{water}} = 4/3$$

$$\frac{\theta_1}{\theta_2} = \frac{\lambda_1}{\lambda_2} \quad \mu = \frac{c}{v} = \frac{\lambda_1}{\lambda_2} = \frac{4}{3}$$

$$\frac{\theta_1}{\theta_2} = \frac{4}{3}$$

$$\theta_2 = \frac{3}{4}(\theta_1)$$

$$= \frac{3}{4}(0.2^\circ) = 0.15^\circ$$

Q.127 The total energy of an electron in an atom in an orbit is -3.4 eV . Its kinetic and potential energies are, respectively -

(1) $3.4 \text{ eV}, -6.8 \text{ eV}$

(2) $3.4 \text{ eV}, 3.4 \text{ eV}$

(3) $-3.4 \text{ eV}, -3.4 \text{ eV}$

(4) $-3.4 \text{ eV}, -6.8 \text{ eV}$

Ans. [1]**Sol.** Total energy = $-[\text{K.E}]$

$$\therefore \text{K.E.} = +3.4 \text{ eV}$$

Potential energy = -2 (Total energy)

$$= -6.8 \text{ eV}$$

Q.128 Which colour of the light has the longest wavelength ?

(1) green

(2) violet

(3) red

(4) blue

Ans. [3]**Sol.** VIBGYORRed \rightarrow max

Q.129 In total internal reflection when the angle of incidence is equal to the critical angle for the pair of media in contact, what will angle of refraction ?

(1) equal to angle of incidence

(2) 90°

(3) 180°

(4) 0°

Ans. [2]**Sol.** In TIR

If $i = \theta_{\text{cr}}$

$r = 90^\circ$

Q.130 A disc of radius 2 m and mass 100 kg rolls on a horizontal floor. Its centre of mass has speed of 20 cm/s . How much work is needed to stop it ?

(1) 2 J

(2) 1 J

(3) 3 J

(4) 30 kJ

Ans. [3]

Sol. $w = \frac{1}{2} mV^2 \left(1 + \frac{K^2}{r^2} \right)$

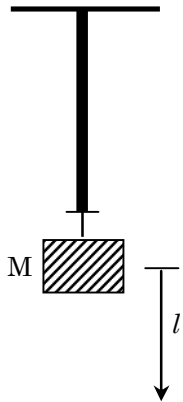
$$= \frac{1}{2} \times 100 (20 \times 10^{-2})^2 \left(1 + \frac{1}{2} \right)$$
$$= \frac{4}{2} \times \frac{3}{2} = 3 \text{ J}$$

Q.131 When a block of mass M is suspended by a long wire of length L , the length of the wire becomes $(L + l)$. The elastic potential energy stored in the extended wire is -

- (1) $\frac{1}{2} Mg l$ (2) $\frac{1}{2} Mg L$ (3) $Mg l$ (4) $Mg L$

Ans. [1]

Sol.



Loss in gravitational P.E. = $Mg l$

Elastic potential energy

$$U = \frac{1}{2} Mg l$$

Q.132 A solid cylinder of mass 2 kg and radius 4 cm is rotating about its axis at the rate of 3 rpm. The torque required to stop after 2π revolutions is-

- (1) $12 \times 10^{-4} \text{ Nm}$ (2) $2 \times 10^6 \text{ Nm}$ (3) $2 \times 10^{-6} \text{ Nm}$ (4) $2 \times 10^{-3} \text{ Nm}$

Ans. [3]

Sol. $\omega_2^2 = \omega_1^2 + 2\alpha\theta$

$$0 = \left(2\pi \frac{3}{60} \right)^2 - 2 \times 2\pi (2\pi)\alpha$$

$$\alpha = \frac{9}{60 \times 60 \times 2} = \frac{1}{800}$$

$$\tau = I\alpha = \frac{mr^2}{2} \alpha$$

$$= \frac{2 \times 16 \times 10^{-4}}{2} \times \frac{1}{800} = 2 \times 10^{-6}$$

Q.133 Two point charges A and B, having charges +Q and –Q respectively, are placed at certain distance apart and force acting between them is F. If 25 % charge of A is transferred to B, then force between the charges becomes-

- (1) $\frac{16F}{9}$ (2) $\frac{4F}{3}$ (3) F (4) $\frac{9F}{16}$

Ans. [4]

Sol. $F = \frac{KQQ}{r^2}$

$$F' = \frac{K \frac{3Q}{4} \times \frac{3Q}{4}}{r^2} = \frac{9F}{16}$$

Q.134 Pick the **wrong** answer in the context with rainbow.

- (1) An observer can see a rainbow when his front is towards the sun
(2) Rainbow is a combined effect of dispersion, refraction and reflection of sunlight
(3) When the light rays undergo two internal reflections in a water drop, a secondary rainbow is formed
(4) The order of colours is reversed in the secondary rainbow

Ans. [1]

Sol. Rainbow can be seen when back is towards the Sun.

Q.135 A copper rod of 88 cm and an aluminium rod of unknown length have their increase in length independent of increase in temperature. The length of aluminium rod is ($\alpha_{Cu} = 1.7 \times 10^{-5} K^{-1}$ and $\alpha_{Al} = 2.2 \times 10^{-5} K^{-1}$)

- (1) 88 cm (2) 68 cm (3) 6.8 cm (4) 113.9 cm

Ans. [2]

Sol. $\Delta l_1 = \Delta l_2$

$$l_1 \alpha_1 = l_2 \alpha_2$$

$$\frac{l_1}{l_2} = \frac{\alpha_2}{\alpha_1}$$

$$\frac{88}{l_a} = \frac{2.2 \times 10^{-5}}{1.7 \times 10^{-5}}$$

$$l_a = 68 \text{ cm}$$

Comment : In this question it should be difference in length instead of increase in length.



NEET Exam. 2019 (5th May 2019)

(Paper & Solution)

Code – S2

Q.136 In which case change in entropy is negative ?

- (1) Sublimation of solid to gas
(2) $2\text{H(g)} \rightarrow \text{H}_2\text{(g)}$
(3) Evaporation of water
(4) Expansion of a gas at temperature

Ans. [2]

- Sol.** (1) Evaporation of water $\Delta S = \oplus$
(2) Expansion of gas at constant temperature = \oplus
(3) $\text{S} \rightarrow \text{g} \oplus$
(4) $2\text{H}_{\text{(g)}} \rightarrow \text{H}_{2\text{(g)}} \ominus$

Q.137 For the chemical reaction $\text{N}_2\text{(g)} + 3\text{H}_2\text{(g)} \rightleftharpoons 2\text{NH}_3\text{(g)}$

- (1) $-\frac{d[\text{N}_2]}{dt} = \frac{1}{2} \frac{d[\text{NH}_3]}{dt}$
(2) $3 \frac{d[\text{H}_2]}{dt} = 2 \frac{d[\text{NH}_3]}{dt}$
(3) $-\frac{1}{3} \frac{d[\text{H}_2]}{dt} = -\frac{1}{2} \frac{d[\text{NH}_3]}{dt}$
(4) $-\frac{d[\text{N}_2]}{dt} = 2 \frac{d[\text{NH}_3]}{dt}$

Ans. [1]

- Sol.** $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$
$$-\frac{d\text{N}_2}{dt} = -\frac{1}{3} \frac{d\text{H}_2}{dt} = +\frac{1}{2} \frac{d\text{NH}_3}{dt}$$

$$-\frac{d\text{N}_2}{dt} = +\frac{1}{2} \frac{d[\text{NH}_3]}{dt}$$

Q.138 Which of the following diatomic molecular species has only π bonds according to Molecular Orbital Theory?

- (1) C_2 (2) Be_2 (3) O_2 (4) N_2

Ans. [1]

- Sol.** $\text{C}_2 = \sigma 1s^2 \sigma^* 1s^2 \sigma 2s^2 \sigma^* 2s^2 \pi 2p_x^2 \pi 2p_y^2$
12 e^- has only π bonds according to M.O.T.
In C_2 molecule, only π electron occupied the bonding molecular orbital.

Q.139 Which of the following is **incorrect** statement ?

- (1) GeX_4 (X = F, Cl, Br, I) is more stable than GeX_2
(2) SnF_4 is ionic in nature
(3) PbF_4 is covalent in nature
(4) SiCl_4 is easily hydrolysed

Ans. [3]

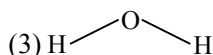
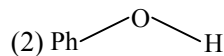
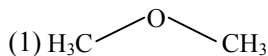
- Sol.** PbF_4 is an ionic compound.

- Q.140** Under isothermal condition, a gas at 300 K expands from 0.1 L to 0.25 L against a constant external pressure of 2 bar. The work done by the gas is [Given that 1 L bar = 100 J]
 (1) 25 J (2) 30 J (3) -30 J (4) 5 kJ

Ans. [2]

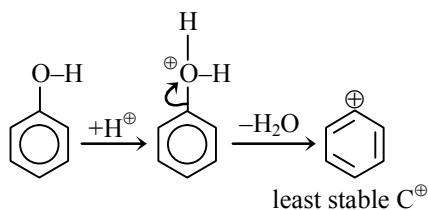
Sol. $W = -P_{\text{ext}}\Delta V$
 since in question work done by gas (not only work done)
 than $W = -(-P_{\text{ext}}\Delta V)$
 $= + (2 \text{ bar}) (0.15 \text{ L})$
 $= + 30 \text{ J}$

- Q.141** The compound that is most difficult to protonate is :

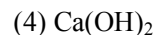
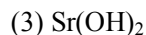
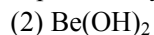
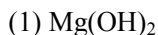


Ans. [2]

Sol.



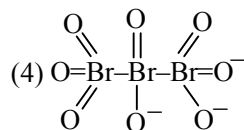
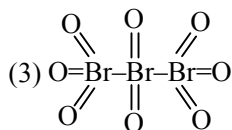
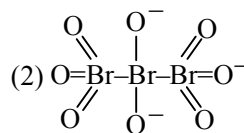
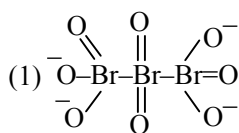
- Q.142** Which of the following is an amphoteric hydroxide ?



Ans. [2]

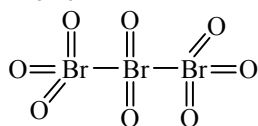
Sol. $\text{Be}(\text{OH})_2$ is amphoteric in nature.

- Q.143** The correct structure of tribromooctaoxide is -



Ans. [3]

Sol. Br_3O_8



- Q.144** The biodegradable polymer is -

(1) nylon-6

(2) Buna-S

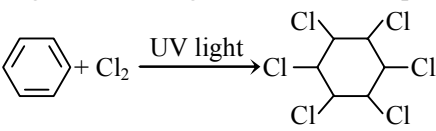
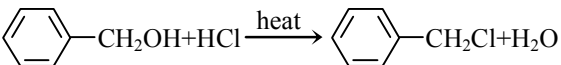
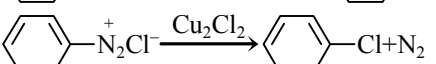
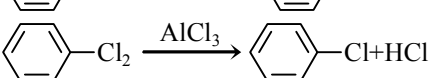
(3) nylon-6, 6

(4) nylon 2-nylon 6

Ans. [4]

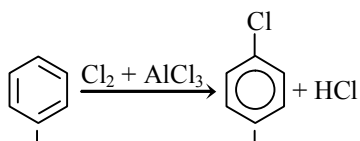
Sol. Biodegradable polymer \rightarrow Nylon-2-Nylon-6.

Q.145 Among the following, the reaction that proceeds through an electrophilic substitution, is -

- (1) 
- (2) 
- (3) 
- (4) 

Ans. [4]

Sol.



Electrophilic substitution reaction

Q.146 Match the following :

(a)	Pure nitrogen	(i)	Chlorine
(b)	Haber process	(ii)	Sulphuric acid
(c)	Contact process	(iii)	Ammonia
(d)	Deacon's process	(iv)	Sodium azide or Barium azide

Which of the following is the correct option ?

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

Ans. [2]

Sol. Pure N_2 $BaN_3 \rightarrow Ba + N_2$

Haber process $N_2 + 3H_2 + 2NH_3$

Contact process $2SO_2 + O_2 + 2SO_3$

Deacon's process $HCl + O_2 \xrightarrow{CuCl_2} H_2O + Cl_2$

Q.147 The number of sigma (σ) and pi (π) bonds in pent-2-en-4-yne is -

- (1) 11 σ bonds and 2 π bonds (2) 13 σ bonds and no π bond
 (3) 10 σ bonds and 3 π bonds (4) 8 σ bonds and 5 π bonds

Ans. [3]

Sol. $H-C\equiv C-CH=CH-CH_3$

$10\sigma + 3\pi$ -Bonds

Q.148 Enzymes that utilize ATP is phosphate transfer require an alkaline earth metal (M) as the cofactor. M is -

- (1) Ca (2) Sr (3) Be (4) Mg

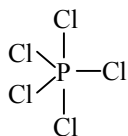
Ans. [4]

Sol. $Mg \rightarrow$ In ATP Phosphate transfer

- Q.149** Identify the incorrect statement related to PCl_5 from the following -
- (1) Axial P–Cl bonds are longer than equatorial P–Cl bonds
 - (2) PCl_5 molecule is non-reactive
 - (3) Three equatorial P–Cl bonds make an angle of 120° with each other
 - (4) Two axial P–Cl bonds make an angle of 180° with each other

Ans. [2]

Sol.



Three equatorial bonds and two axial bonds.

Due to unsymmetry PCl_5 is reactive.

- Q.150** If the rate constant for a first order reaction is k , the time (t) required for the completion of 99 % of the reaction is given by -

- (1) $t = 4.606/k$ (2) $t = 2.303/k$ (3) $t = 0.693/k$ (4) $t = 6.909/k$

Ans. [1]

Sol. Chemical kinetics

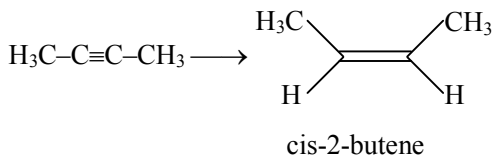
$$t = \frac{2.3}{K} \log \frac{a}{a-x}$$

$$= \frac{2.3}{k} \log \frac{1.0}{1}$$

$$= \frac{2.303 \times 2}{k}$$

$$t_{99\%} = \frac{6.606}{k} = 4.606/k$$

- Q.151** The most suitable reagent for the following conversion, is :

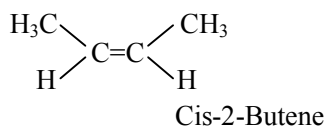
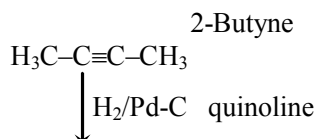


- (1) Zn / HCl
 (3) $\text{Na} / \text{liquid NH}_3$

- (2) $\text{Hg}^{2+} / \text{H}^+, \text{H}_2\text{O}$
 (4) $\text{H}_2, \text{Pd/C}, \text{quinoline}$

Ans. [4]

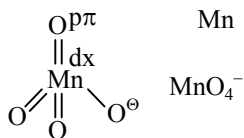
Sol.



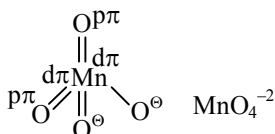
- Q.152** The manganate and permanganate ions are tetrahedral due to -
- (1) The π -bonding involves overlap of p-orbitals of oxygen with p-orbitals of manganese
 - (2) The π -bonding involves overlap of d-orbitals of oxygen with d-orbitals of manganese
 - (3) The π -bonding involves overlap of p-orbitals of oxygen with d-orbitals of manganese
 - (4) There is no π -bonding

Ans. [3]

Sol. Structure of permanganate ion



and manganate ion



- Q.153** For a cell involving one electron $E_{\text{cell}}^{\ominus} = 0.59$ V at 298 K, the equilibrium constant for the cell reaction is :

[Given that $\frac{2.303 kT}{F} = 0.059$ V at T = 298 K]

- (1) 1.0×10^{10} (2) 1.0×10^{30} (3) 1.0×10^2 (4) 1.0×10^5

Ans. [1]

Sol. $E_{\text{cell}}^{\ominus} = \frac{0.06}{n} \log_{10} k$

$$0.6 = \frac{0.06}{1} \log_{10} k$$

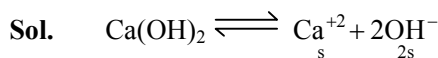
$$\log_{10} k = 10$$

$$k = 10^{10}$$

- Q.154** pH of a saturated solution of Ca(OH)_2 is 9. The solubility product (K_{sp}) of Ca(OH)_2 is -

- (1) 0.125×10^{-15} (2) 0.5×10^{-10} (3) 0.5×10^{-15} (4) 0.25×10^{-10}

Ans. [3]



$$\text{pH} = 9 \quad \text{pOH} = 5$$

$$[\text{OH}^-] = 10^{-5} = 2s$$

$$s = \frac{10^{-5}}{2}$$

$$K_{\text{sp}} = (s) (\text{OH}^-)^2$$

$$= \frac{10^{-5}}{2} \times (10^{-5})^2$$

$$= \frac{1}{2} \times 10^{-15}$$

$$= 0.5 \times 10^{-15}$$

Q.155 For an ideal solution, the correct option is -

- (1) $\Delta_{\text{mix}} H = 0$ at constant T and P
 (2) $\Delta_{\text{mix}} G = 0$ at constant T and P
 (3) $\Delta_{\text{mix}} S = 0$ at constant T and P
 (4) $\Delta_{\text{mix}} V \neq 0$ at constant T and P

Ans. [1]

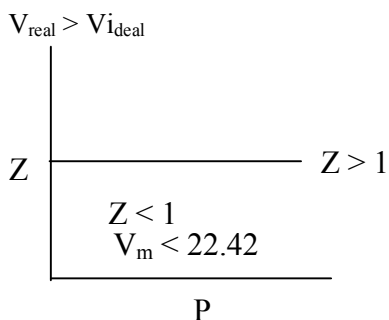
Sol. Liquid solution
 For ideal solution
 $\Delta H_{\text{mix}} = 0$
 $\Delta S_{\text{mix}} = \oplus$
 $\Delta G_{\text{mix}} = \ominus$

Q.156 A gas at 350 K and 15 bar has molar volume 20 percent smaller than that for an ideal gas under the same conditions. The correct option about the gas and its compressibility factor (Z) is -

- (1) $Z < 1$ and attractive forces are dominant
 (2) $Z < 1$ and repulsive forces are dominant
 (3) $Z > 1$ and attractive forces are dominant
 (4) $Z > 1$ and repulsive forces are dominant

Ans. [1]

Sol. $Z = \frac{pV}{\eta R_t}$ $Z = \frac{V_{\text{real}}}{V_{\text{ideal}}}$



$Z < 1$ then intermolecular forces are dominant
 $Z > 1$ then repulsive forces dominate

Q.157 The correct order of the basic strength of methyl substituted amines in aqueous solution is -

- (1) $(\text{CH}_3)_3\text{N} > (\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2$
 (2) $\text{CH}_3\text{NH}_2 > (\text{CH}_3)_2\text{NH} > (\text{CH}_3)_3\text{N}$
 (3) $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_3\text{N}$
 (4) $(\text{CH}_3)_3\text{N} > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_2\text{NH}$

Ans. [3]

Sol. $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_3\text{N}$
 In aqueous sol
 Reason → (i) Hydrogen Bonding
 (ii) Steric factor

Q.158 For the second period elements the correct increasing order of first ionization enthalpy is -

- (1) $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{N} < \text{O} < \text{F} < \text{Ne}$
 (2) $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{O} < \text{N} < \text{F} < \text{Ne}$
 (3) $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{N} < \text{O} < \text{F} < \text{Ne}$
 (4) $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{O} < \text{N} < \text{F} < \text{Ne}$

Ans. [4]

Sol. Order of IE
 I.E of $\text{Be} > \text{B}$
 I.E of $\text{N} > \text{O}$
 $\therefore \text{Li} < \text{B} < \text{Be} < \text{C} < \text{O} < \text{N} < \text{F} < \text{Ne}$

- Q.159** Which mixture of the solution will lead to the formation of negatively charged colloidal $[AgI]^-$
- (1) 50 mL of 2 M $AgNO_3$ + 50 mL of 1.5 M KI (2) 50 mL of 0.1 M $AgNO_3$ + 50 mL of 0.1 M KI
(3) 50 mL of 1 M $AgNO_3$ + 50 mL of 1.5 M KI (4) 50 mL of M $AgNO_3$ + 50 mL of 2 M KI

Ans. [3,4]



for $[AgI]^-$ colloidal

KI must be in excess

(1), (2) both correct

50 ml $AgNO_3$ + 50 ml

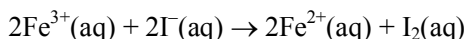
1.5 M

KI

50 ml $AgNO_3$ + 50 ml

2 M KI

- Q.160** For the cell reaction

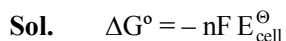


$E_{cell}^\ominus = 0.24$ V at 298 K. The standard Gibbs energy ($\Delta_r G^\ominus$) of the cell reaction is :

[Given that Faraday constant $F = 96500$ C mol $^{-1}$]

- (1) 46.32 kJ mol $^{-1}$ (2) 23.16 kJ mol $^{-1}$ (3) -46.32 kJ mol $^{-1}$ (4) -23.16 kJ mol $^{-1}$

Ans. [3]



$$= -2(96500)(0.24)$$

$$= -46320 \text{ J/mole}$$

$$= -\frac{46320}{1000}$$

$$= -46.32 \text{ KJ/mole}$$

- Q.161** Which is the correct thermal stability order for H_2E (E = O, S, Se, Te and Po)?

- (1) $H_2Po < H_2Te < H_2Se < H_2S < H_2O$ (2) $H_2Se < H_2Te < H_2Po < H_2O < H_2S$
(3) $H_2S < H_2O < H_2Se < H_2Te < H_2Po$ (4) $H_2O < H_2S < H_2Se < H_2Te < H_2Po$

Ans. [1]

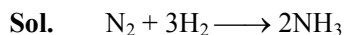
Sol. As we move downwards stability of Hydrides decreases



- Q.162** The number of moles of hydrogen molecules required to produce 20 moles of ammonia through Haber's process is :

- (1) 30 (2) 40 (3) 10 (4) 20

Ans. [1]



moles = ? 20 moles

$$2 \times \text{moles } H_2 = 3 \times \text{moles } NH_3$$

$$2 \times x = 3 \times 20$$

$$x = 30 \text{ moles}$$

- Q.163** Which of the following series of transitions in the spectrum of hydrogen atom falls in visible region?
 (1) Paschen series (2) Brackett series (3) Lyman series (4) Balmer series

Ans. [4]

Sol. Visible region
Balmer series

- Q.164** A compound is formed by cation C and anion A. The anions form hexagonal close packed (hcp) lattice and the cations occupy 75% of octahedral voids. The formula of the compound is :

- (1) C₃A₄ (2) C₄A₃ (3) C₂A₃ (4) C₃A₂

Ans. [1]

Sol. Solid state

C	:	A
75% O.V.	:	(HCP)
$6 \times \frac{75}{100}$:	6
$\frac{3}{4}$:	1
3	:	4
C ₃ A ₄		

- Q.165** The non-essential amino acid among the following is :

- (1) alanine (2) lysine (3) valine (4) leucine

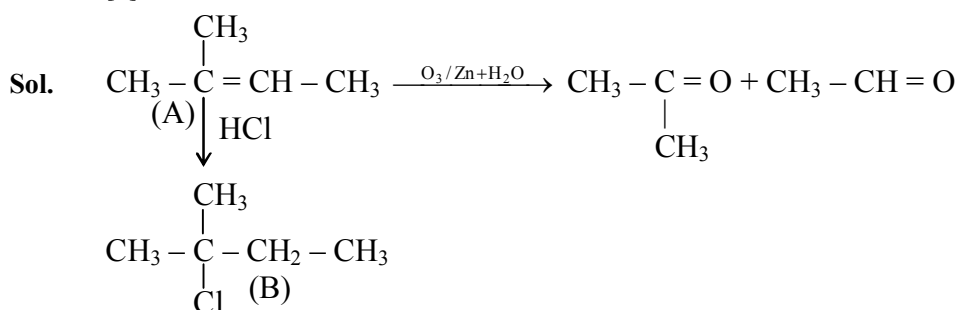
Ans. [1]

Sol. Non Essential amino acid → Alanine

- Q.166** An alkene “A” on reaction with O₃ and Zn + H₂O gives propanone and ethanal in equimolar ratio. Addition of HCl to alkene “A” gives “B” as the major product. The structure of product “B” is :



Ans. [1]



Q.167 Which of the following species is not stable?

- (1) $[\text{Sn}(\text{OH})_6]^{2-}$ (2) $[\text{SiCl}_6]^{2-}$ (3) $[\text{SiF}_6]^{2-}$ (4) $[\text{GeCl}_6]^{2-}$

Ans. [2]

Sol. SiCl_6^{2-} does not exist due to small size of Si and steric hindrance of 6 Cl atoms

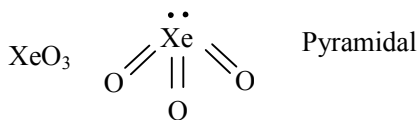
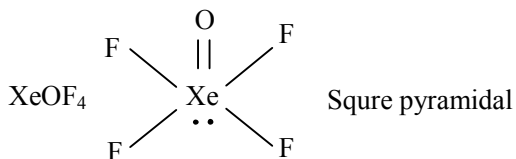
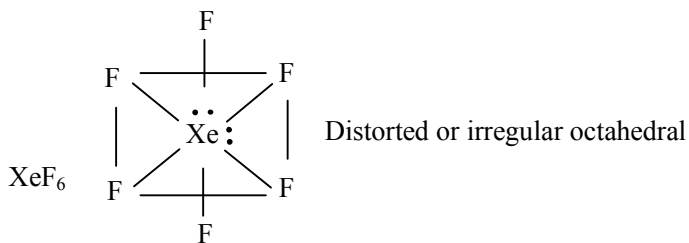
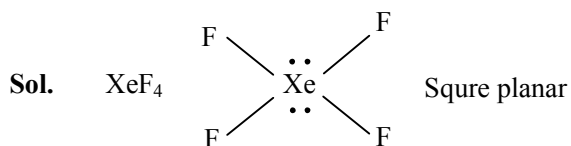
Q.168 Match the Xenon compounds in Column-I with its structure in column-II and assign the correct code :

Column-I	Column-II
(a) XeF_4	(i) pyramidal
(b) XeF_6	(ii) square planar
(c) XeOF_4	(iii) distorted octahedral
(d) XeO_3	(iv) square pyramidal

Code :

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

Ans. [4]



Q.169 Among the following, the one that is not a green house gas is :

- (1) ozone (2) sulphur dioxide (3) nitrous oxide (4) methane

Ans. [2]

Sol. Sulphurdioxide SO_2

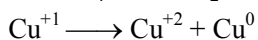
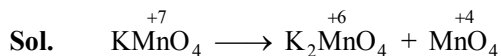
Q.170 Which of the following reactions are disproportionation reaction?

- (a) $2\text{Cu}^+ \rightarrow \text{Cu}^2 + \text{Cu}^0$
 (b) $3\text{MnO}_4^{2-} + 4\text{H}^+ \rightarrow 2\text{MnO}_4^- + \text{MnO}_2 + 2\text{H}_2\text{O}$
 (c) $2\text{KMnO}_4 \xrightarrow{\Delta} \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$
 (d) $2\text{MnO}_4^- + 3\text{Mn}^{2+} + 2\text{H}_2\text{O} \rightarrow 5\text{MnO}_2 + 4\text{H}^+$

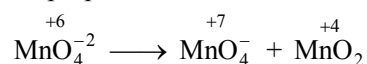
Select the correct option from the following :

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

Ans. [3]

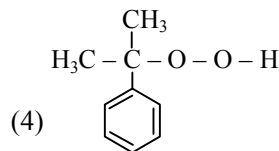
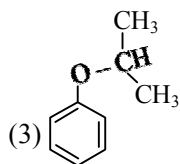
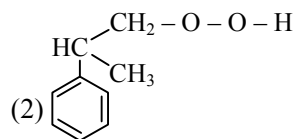
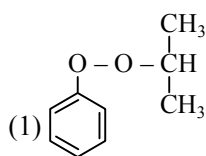
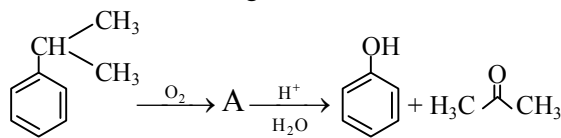


Disproportionate Rxⁿ

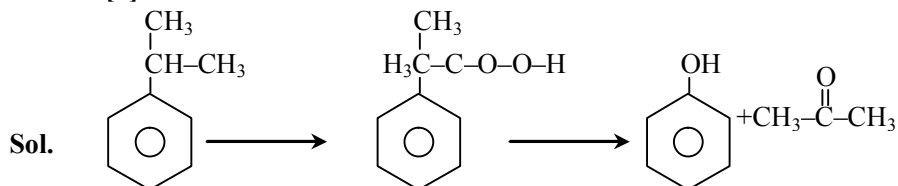


(a), (b) only

Q.171 The structure of intermediate A in the following reaction, is :



Ans. [4]



Q.172 The mixture that forms maximum boiling azeotrope is :

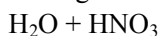
- (1) Acetone + Carbon disulphide
 (2) Heptane + Octane
 (3) Water + Nitric acid
 (4) Ethanol + Water

Ans. [3]

Sol. Liquid solution

⇒ Max. bpt. Azeotrope

⇒ Negative deviation



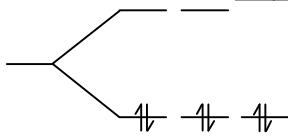
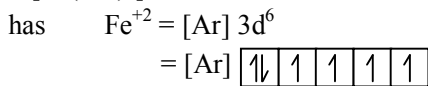


Q.173 What is the correct electronic configuration of the central atom in $K_4[Fe(CN)_6]$ based on crystal field theory?

- (1) $e^3 t_2^3$ (2) $e^4 t_2^2$ (3) $t_{2g}^4 e_g^2$ (4) $t_{2g}^6 e_g^0$

Ans. [4]

Sol. $K_4[Fe(CN)_6]$



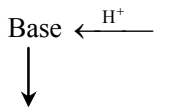
$\therefore t_{2g}^6 e_g^0$

Q.174 Conjugate base for Bronsted acids H_2O and HF are :

- (1) OH^- and F^- , respectively (2) H_3O^+ and H_2F^+ , respectively
 (3) OH^- and H_2F^+ , respectively (4) H_3O^+ and F^- , respectively

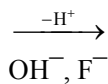
Ans. [1]

Sol. Bronsted Acids or H_2O & HF



Bronsted Acid
 H_3O^+, H_2F^+

Bronsted Base



Q.175 Which will make basic buffer?

- (1) 100 mL of 0.1 M HCl + 200 mL of 0.1 M NH_4OH
 (2) 100 mL of 0.1 M HCl + 100 mL of 0.1 M $NHOH$
 (3) 50 mL of 0.1 M $NaOH$ + 25 mL of 0.1 M CH_3COOH
 (4) 100 mL of 0.1 M CH_3COOH + 100 mL of 0.1 M $NaOH$

Ans. [1]

Sol. Weak Acid > Strong Base

Weak Base > Strong Acid

0.1 M 200 ml NH_4OH > 0.1 M 100 ml HCl

Q.176 4d, 5p, 5f and 6p orbitals are arranged in the order of decreasing energy. The correct option is :

- (1) $6p > 5f > 4d > 5p$ (2) $5f > 6p > 4d > 5p$ (3) $5f > 6p > 5p > 4d$ (4) $6p > 5f > 5p > 4d$

Ans. [3]

Sol. 4d, 5p, 5f, 6p

$n+l = 4+2, 5+1, 5+3, 6+1$

6, 6, 8, 7

5f > 6p > 5p > 4d

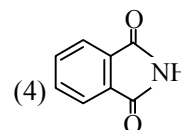
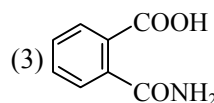
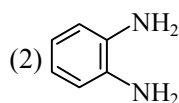
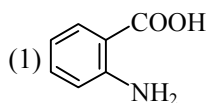
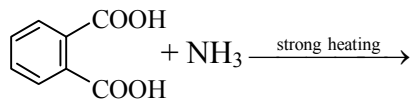
Q.177 Among the following, the narrow spectrum antibiotic is :

- (1) amoxicillin (2) chloramphenicol
(3) penicillin G (4) ampicillin

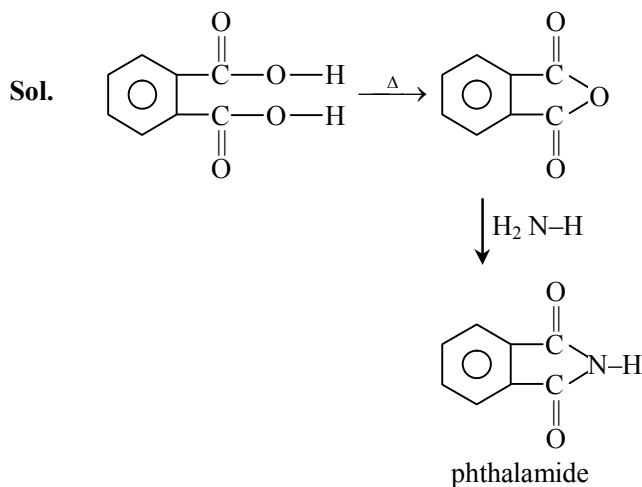
Ans. [3]

Sol. Penicillin – G
Narrow Spectrum antibiotics

Q.178 The major product of the following reaction is :



Ans. [4]



Q.179 The method used to remove temporary hardness of water is :

- (1) Ion-exchange method (2) Synthetic resins method
(3) Calgon's method (4) Clark's method

Ans. [4]

Sol. Clark's method is used to remove temporary hardness
 $\text{Ca}(\text{HCO}_3)_2 + \text{Ca}^{+2} \text{ or } \text{Mg}^{+2} \longrightarrow \text{CaCO}_3 \text{ or } \text{MgCO}_3 + \text{H}_2\text{O}$

Q.180 Which one is malachite from the following?

- (1) Fe_3O_4 (2) $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$ (3) CuFeS_2 (4) $\text{Cu}(\text{OH})_2$

Ans. [2]

Sol. Malachite = $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$