NEET 2020 PAPER DISCUSSION

13th September' 2020

CODE: F1

Biology

1. In light reaction, plastoquinone facilitates the transfer of electrons from

(A) PS-I to $NADP^+$

(B) PS-I to ATP synthase

(C) PS-II to $Cytb_6f$ complex

(D) $Cytb_6f$ complex to PS-I

2. The sequence that controls the copy number of the linked DNA in the vector is termed

(A) Palindromic sequence

(B) Recognition site

(C) Selectable marker

(D) Ori site

3. The specific palindromic sequence which is recognized by EcoRI is

(A) 5’ - CTTAAG - 3’
3’ - GAATTC - 5’

(B) 5’ - GGATCC - 3’
3’ - CCTAGG - 5’

(C) 5’ - GAATTC - 3’
3’ - CTTAAG - 5’

(D) 5’ - GGAACC - 3’
3’ - CCTTGG - 5’

4. Identify the wrong statement with reference to immunity.

(A) Active immunity is quick and gives full response

(B) Foetus receives some antibodies from mother, it is an example for passive immunity

(C) When exposed to antigen (living or dead) antibodies are produced in the host’s body. It is called “Active immunity”

(D) When ready-made antibodies are directly given, it is called “Passive immunity”

5. Experimental verification of the chromosomal theory of inheritance was done by

(A) Boveri

(B) Morgan

(C) Mendel

(D) Sutton

6. Match the following concerning essential elements and their functions in plants

(a) Iron (i) Photolysis of water

(b) Zinc (ii) Pollen germination

(iii) Required for chlorophyll biosynthesis

(d) Manganese (iv) IAA biosynthesis

(A) (a) - (iii); (b) - (iv); (c) - (ii); (d) - (i)

(B) (a) - (iv); (b) - (i); (c) - (ii); (d) - (iii)

(C) (a) - (ii); (b) - (i); (c) - (iv); (d) - (iii)

(D) (a) - (iv); (b) - (iii); (c) - (ii); (d) - (i)

7. In gel electrophoresis, separated DNA fragments can be visualized with the help of

(A) Acetocarmine in UV radiation

(B) Ethidium bromide in infrared radiation

(C) Acetocarmine in bright blue light

(D) Ethidium bromide in UV radiation

8. Name the enzyme that facilitates opening of DNA helix during transcription.

(A) DNA polymerase

(B) RNA polymerase

(C) DNA ligase

(D) DNA helicase

9. In which of the following techniques, the embryo are transferred to assist those females who cannot conceive?

(A) ICSI and ZIFT

(B) GIFT and ICSI

(C) ZIFT and IUT

(D) GIFT and ZIFT

10. Identify the basic amino acid from the following

(A) Lysine

(B) Valine

(C) Tyrosine

(D) Glutamic Acid

11. Identify the wrong statement with reference to transport of oxygen.

(A) Higher H^+ conc. In alveoli favours the formation of oxyhaemoglobin

(B) Low pCO_2 in alveoli favours the formation of oxyhaemoglobin

(C) Binding of oxygen with haemoglobin is mainly related to partial pressure of O_2

(D) Partial pressure of CO_2 can interfere with O_2 binding with haemoglobin

12. Floridean starch has structure similar to

(A) Mannitol and algin

(B) Laminarin and cellulose

(C) Starch and cellulose

(D) Amylopectin and glycogen

13. By which method was a new breed 'Hisardale' of sheep formed by using Bikaneri ewes and Marino rams?

(A) Cross breeding

(B) Inbreeding

(C) Out crossing

(D) Mutational breeding

14. Match the following columns and select the correct option.

Column-I	Column-II
(a) Pituitary gland	(i) Grave's disease
(b) Thyroid gland	(ii) Diabetes mellitus
(c) Adrenal gland	(iii) Diabetes insipid
us	
(d) Pancreas	(iv) Addison's disease

(A) (a) - (iii); (b) - (i); (c) - (iv); (d) - (ii)

(B) (a) - (ii); (b) - (i); (c) - (iv); (d) - (iii)

(C) (a) - (iv); (b) - (iii); (c) - (i); (d) - (ii)

(D) (a) - (iii); (b) - (ii); (c) - (i); (d) - (iv)

15. Select the option including all sexually transmitted diseases.

(A) AIDS Malaris, Filaria

(B) Cancer, AIDS, Syphilis

(C) Gonorrhoea, Syphilis, Genital herpes

(D) Gonorrhoea, Malaria, Genital herpes

16. Choose the correct pair from the following:

(A) Nuclease - Separate the two strange of DNA

(B) Exonuclease - Make cuts at specific positions within DNA

(C) Ligases - Join the two DNA molecules

(D) Polymerases - Break the DNA into fragments

17. Ray florets have

(A) Hypogenous ovary

(B) Half inferior ovary

(C) Inferior ovary

(D) Superior ovary

18. Match the organism with its use in biotechnology

(a) Bacillus	(i) Cloning vector
(b) Thermus aquaticus	(ii) Construction of first rDNA
(c) Agrobacterium tumefociens	(iii) DNA polymerase
(d) Salmonella typhimurium	(iv) Cry proteins

Select the correct option from the following:

(A) (a) - (iii); (b) - (ii); (c) - (iv); (d) - (i)

(B) (a) - (iii); (b) - (iv); (c) - (i); (d) - (ii)

(C) (a) - (ii); (b) - (iv); (c) - (iii); (d) - (i)

(D) (a) - (iv); (b) - (iii); (c) - (i); (d) - (ii)

19. The product(s) of reaction catalyzed by nitrogenase in root nodules of leguminous plants is/are:

(A) Ammonia and oxygen

(B) Ammonia and hydrogen

(C) Ammonia alone

(D) Nitrate alone

20. Name the plant growth regulator which upon spraying on sugarcane crop increases the length of stem, thus increasing the yield of sugarcane crop

(A) Ethylene

(B) Abscisic acid

(C) Cytokinin

(D) Gibberellin

21. The body of the ovule is fused within the funicle at

(A) Nucellus

(B) Chalaza

(C) Hilum

(D) Micropyle

22. The process of growth is maximum during

(A) Senescence

(B) Dormancy

(C) Log phase

(D) Lag phase

23. Bilaterally symmetrical and acoelomate animals are exemplified by

(A) Aschelminthes

(B) Annelida

(C) Ctenophora

(D) Platyhelminthes

24. Which of the following is put into Anaerobic sludge digester for further sewage treatment?

(A) Effluents of primary treatment

(B) Activated sludge

(C) Primary sludge

(D) Floating debris

25. Match the following columns and select the correct option.

Column I	Column-II
(a) Floating Ribs	(i) Located between second & seventh ribs
(b) Acromion	(ii) Head of the Humerus
(c) Scapula	(iii) Clavicle
(d) Glenoid cavity	(iv) Do not connect with the sternum

(A) (a) - (iii); (b) - (ii); (c) - (iv); (d) - (i)

(B) (a) - (iv); (b) - (iii); (c) - (i); (d) - (ii)

(C) (a) - (ii); (b) - (iv); (c) - (i); (d) - (iii)

(D) (a) - (i); (b) - (i); (c) - (ii); (d) - (iv)

26. Identify the wrong statement with regard to Restriction Enzymes.

(A) They are useful in genetic engineering

(B) Sticky ends can be joined by using DNA ligases

(C) Each restriction enzyme functions by inspecting the length of a DNA sequence

(D) They cut the strand of DNA at palindromic sites

27. Match the following columns and select the correct option.

Column-I	Column-II
(a) Gregarious, polyphagous pest	(i) Asterias
(b) Adult with radial symmetry & larva with bilateral symmetry	(ii) Scorpion
(c) Book lungs	(iii) Ctenoplana
(d) Bioluminescence	(iv) Locusta

(A) (a) - (iii); (b) - (ii); (c) - (i); (d) - (iv)

(B) (a) - (ii); (b) - (i); (c) - (iii); (d) - (iv)

(C) (a) - (i); (b) - (iii); (c) - (ii); (d) - (iv)

(D) (a) - (iv); (b) - (i); (c) - (ii); (d) - (iii)

28. If the head of cockroach is removed, it may live for few days because:

(A) The head holds a small proportion of a nervous system while the rest is situated along the vetral part of its body

(B) The head holds a 1/3rd of a nervous system while the rest is situated along the dorsal part of its body

(C) The supra-oesophageal ganglia of the cockroach are situated in ventral part of abdomen

(D) The cockroach does not have nervous system

29. Which of the following regions of the globe is exhibits highest species diversity?

(A) Himalayas

(B) Amazon forests

(C) Western Ghats of India

(D) Madagascar

30. Which is the important site of formation of glycoproteins and glycolipids in eukaryotic cells?

(A) Golgi bodies

(B) Polysomes

(C) Endoplasmic reticulum

(D) Peroxisomes

31. Which of the following pairs is of unicellular algae?

(A) Anaboena and Volvox

(B) Chlorella and Spirulina

(C) Laminaria and Sargossum

(D) Galidium ad Graciloria

32. Which one of the following is the most abundant protein in the animals?

(A) Lectin

(B) Insulin

(C) Haemoglobin

(D) Collagen

33. Dissolution of the synaptonemal complex occurs during:

(A) Diplotene

(B) Leptotene

(C) Pachytene

(D) Zygotene

34. How many true breeding pea plant varieties did Mendel select as pairs, which were similar except in one character with contrasting traits?

(A) 14

(B) 8

(C) 4

(D) 2

35. Cuboidal epithelium with brush border of micevilli is found in:

(A) Proximal convoluted tubule of nephron

(B) Eustachian tube

(C) Lining of intestine

(D) Ducts of salivary glanda

36. Match the following with respect to meiosis:

(a) Zygotene	(i) Terminalization
(b) Pachytene	(ii) Chiasmata
(c) Diplotene	(iii) Crossing over
(d) Diakinesis	(iv) Synapsis

Select the correct option from the following:

(A) a-(i), b-(ii), c-(iv), d-(iii)

(B) a-(ii), b-(iv), c-(iii), d-(i)

(C) a-(iii), b-(iv), c-(i), d-(ii)

(D) a-(iv), b-(iii), c-(ii), d-(i)

37. Which of the following statements about inclusion bodies is no correct?

(A) They lie free in the cytoplasm

(B) These represent reserve material in cytoplasm

(C) They are not bound by any membrane

(D) These are involved in ingestion of food particles

38. Which of the following would help in prevention of diuresis?

(A) Atrial natriuretic factor causes vasoconstriction

(B) Decrease in secretion of renin by JG cells

(C) More water reabsorption due to undersecretion of ADH

(D) Reabsorption of Na+ and water and from renal tubules due to aldosterone

39. The transverse section of a plant shows following anatomical features:

(a) Large number of scattered vascular bundles surrounded by bundle sheath

(b) Large conspicuous parenchymatous ground tissues

(c) Vascular bundles conjoint and closed

(d) Phloem parenchyma absent

(A) Dicotyledonous stem

(B) Dicotyledonous root

(C) Monocotyledonous stem

(D) Monocotyledonous root

40. Which of the following statements is correct?

(A) Adenine pairs with thymine through three H-bonds

(B) Adenine does not pair with thymine

(C) Adenine pairs with thymine through two H-bonds

(D) Adenine pairs with thymine through one H-bond

41. Match the following columns and select the correct option.

Column-I	Column-II
(a) Bt cotton	(i) Gene therapy
(b) Adenosine deaminase deficiency	(ii) Cellular defence
(c) RNAi	(iii) Detection of HIV infection
(d) PCR	(iv) Bacillus thuringiensis

(A) (a)-(ii), (b)-(iii), c-(iv), d-(i)

(B) (a)-(i), (b)-(ii), c-(iii), d-(iv)

(C) (a)-(iv), (b)-(i), c-(ii), d-(iii)

(D) (a)-(iii), (b)-(ii), c-(i), d-(iv)

42. Flippers of Penguins and Dolphins are examples of:

(A) Industrial melanism

(B) Natural selection

(C) Adaptive radiation

(D) Convergent evolution

43. The oxygenation activity of RuBinco enzyme is photorespiration leads to the formations of:

(A) 1 molecule of 6-C compound

(B) 1 molecule of 4-C compound and 1 molecule of 2-C compound

(C) 2 molecules of 3-C compound

(D) 1 molecule of 3-C compound

44. The infectious stage of Plasmodium that enters the human body is:

(A) Female gametocytes

(B) Male gametocytes

(C) Trophozoites

(D) Sporozoites

45. Identify the incorrect statement.

(A) Sapwood is the innermost secondary xylems and is lighter in colour

(B) Due-to deposition of tannins, resins, oils etc heart wood is dark in colour

(C) Heart wood does not conduct water but given mechanical support

(D) Sapwood is involved in conduction of water and minerals from root to leaf

46. Which of the following is correct about viroida?

(A) They have DNA with protein coat

(B) They have free DNA without protein coat

(C) They have RNA with protein coat

(D) They have free RNA without protein coat

47. Match the following diseases with the causative organism and select the correct option.

Column-I	Column-II
(a) Typhoid	(i) Wucheria
(b) Pneumonia	(ii) Plasmodium
(c) Filariasis	(iii) Salmonella
(d) Malaria	(iv) Haemophilus

(A) (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

(B) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

(C) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

(D) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

48. Identify the wrong statement with reference to the gene 'I' that controls ABO blood groups.

(A) When IA and IB are present together, they express same type of sugar

(B) Allele 'i' does not produce my any sugar

(C) The gene (1) has three alleles

(D) A person will have only two of the three alleles

49. According to Robert May, the global species diversity is about

(A) 50 million

(B) 7 million

(C) 1.5 million

(D) 20 million

50. Which of the following is not an attribute of a population?

(A) Mortality

(B) Species interaction

(C) Sex ration

(D) Natality

51. In water hyacinth and water lily, pollination takes place by:

(A) Wind and water

(B) Insects and water

(C) Insects or wind

(D) Water currents only

52. The QRS complex in a standard ECG represents:

(A) Depolarisation of ventricles

(B) Repolarisation of ventricles

(C) Repolarisation of auricles

(D) Depolarisation of auricles

53. Select the correct match.

(A) Sickle cell anaemia - Autosomal recessive trait, chromosome-11

(B) Thalassemia - X linked

(C) Haemophilia - Y linked

(D) Phenylketonuria - Autosomal dominant traint

54. The number of substrate level phosphorylations in one turn of citric and cycle is:

(A) Two

(B) Three

(C) Zero

(D) One

55. Match the following:

(a) Inhibitor of catalytic activity (i) Ricin

(b) Possess peptide bonds (ii) Malonate

(c) Cell wall material in fungi (iii) Chitin

(d) Secondary metabolite (iv) Collagen

Choose the correct option from the following:

(A) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

(B) (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

(C) (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

(D) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

56. Which of the following refer to correct example(s) of organisms which have evolved due to changes in environment brought about by anthropogenic action?

(a) Darwin's Finches of Galapagos islands

(b) Herbicide resistant weeds

(c) Drug resistant eukaryotes

(d) Man-created breeds of domesticated animals like dogs

(A) (b) (c) and (d)

(B) Only (d)

(C) Only (a)

(D) (a) and (c)

57. Some dividing cells exit the cell cycle and enter vegetative inactive stage. This is called quiescent stage (G_0). This process at the end of:

(A) S phase

(B) G_2 phase

(C) M phase

(D) G_1 phase

58. Secondary metabolites such as nicotine, strychnine and caffeine are produced by plants for their:

(A) Defence action

(B) Effect on reproduction

(C) Nutritive value

(D) Growth response

59. Meiotic division of the secondary oocyte is completed:

(A) After zygote formation

(B) At the time of fusion of a sperm with an ovum

(C) Prior to ovulation

(D) At the time of copulation

60. Which of the following statements is not correct?

(A) The functional insulin has A and B chains linked together by hydrogen bonds

(B) Genetically engineered insulin is produced in E-Coli

(C) In man insulin is synthesised as a proinsulin

(D) The proinsulin has a extra peptide called C-peptide-

61. Show- blindness in antarctic region is due to:

(A) High reflection of light from snow

(B) Damage to retina caused by infra-red rays

(C) Freezing of fluids in the eye by low temperature

(D) Inflammation of cornea due to high dose of UV-B radiation

62. Strobili or cones are found in:

(A) Marchantia

(B) Equisetum

(C) Salvinia

(D) Pteris

63. From his experiments, S.L. Miller produced amino acids by mixing the following in a closed flask:

(A) CH_4, H_2, NH_3 and water vapor at 600°C

(B) CH_3, H_2, NH_3 and water vapor at 600°C

(C) CH_4, H_2, NH_3 and water vapor at 800°C

(D) CH_3, H_2, NH_3 and water vapor at 800°C

64. In relation to gross primary productivity and Net primary productivity of an ecosystem, which one of the following statements is correct?

(A) Gross primary productivity and Net primary productivity are one and same.

(B) There is no relationship between Gross primary productivity and Net primary productivity.

(C) Gross primary productivity is always less than Net primary productivity.

(D) Gross primary productivity is always more than Net primary productivity.

65. Match the trophic levels with their correct species examples in grassland ecosystem.

(a) Fourth trophic level	(i) Crow
(b) Second trophic level	(ii) Vulture
(c) First trophic level	(iii) Rabbit
(d) Third trophic level	(iv) Grass

Select the correct option:

(A) a-iv, b-iii, c-ii, d-i

(B) a-i, b-ii, c-iii, d-iv

(C) a-ii, b-iii, c-iv, d-i

(D) a-iii, b-ii, c-i, d-iv

66. Select the correct statement.

(A) Insulin acts on pancreatic cells and adipocytes.

(B) Insulin is associated with hyperglycemia

(C) Glucocorticoids stimulates gluconeogenesis

(D) Glucagon is associated with hypoglycemia.

67. Select the correct events that occur during inspiration.

(a) Contraction of diaphragm

(b) Contraction of external inter-costal muscles

(c) Pulmonary volume decreases

(d) Intrapulmonary pressure increases

(A) (a), (b) and (d)

(B) Only (d)

(C) (a) and (b)

(D) (c) and (d)

68. The roots that originate from the base of the stem are:

(A) Prop roots

(B) Lateral roots

(C) Fibrous roots

(D) Primary roots

69. Goblet cells of alimentary canal are modified from:

(A) Chondrocytes

(B) Compound epithelial cells

(C) Squamous epithelial cells

(D) Columnar epithelial cells

70. Montreal protocol was signed in 1987 for control of:

(A) Release of Green House gases

(B) Disposal of e-wastes

(C) Transport of Genetically modified organisms from one country to another

(D) Emission of ozone depleting substances

71. Which of the following statement are true for the phylum-Chordata?

(a) In Urochordata notochord extends from head to tail and it is present throughout their life.

(b) In Vertebrates notochord is present during the embryonic period only.

(c) Central nervous system is doral and hollow.

(d) Chordata is divided into 3 subphyla: Hemichordata, Tunicata and Cephalochordata.

(A) (a) and (b)

(B) (b) and (c)

(C) (d) and (c)

(D) (c) and (a)

72. Identify the substances having glycosidic bond and peptide bond, respectively in their structure:

(A) Cellulose, lecithin

(B) Inulin, insulin

(C) Chitin, cholesterol

(D) Glycerol, trypsin

73. Match the following columns and select the correct option.

Column-I	Column-II
(a) Placenta	(a) Androgens
(b) Zona pellucida	(b) Human Chorionic

Gonadotropin (HCG)

(c) Bulbourethral

(c) Layer of the ovum Glands

(d) Leydig cells

(d) Lubrication of the penis

(A) a-iii, b-ii, c-iv, d-i

(B) a-ii, b-iii, c-iv, d-i

(C) a-iv, b-iii, c-i, d-ii

(D) a-i, b-iv, c-ii, d-iii

74. If the distance between two consecutive base pairs is 0.34 nm and the total number of base pair os a DNA double helix in a typical mammalian cell is 6.6 X 109 bp, then the length of the DNA is approximately

(A) 2.2 meters

(B) 2.7 meters

(C) 2.0 meters

(D) 2.5 meters

75. The ovary is half inferior in:

(A) Sunflower

(B) Plum

(C) Brinjal

(D) Mustard

76. Identify the correct statement with regard to G1 phase (Gap 1) of interphase.

(A) Cell is metabolically active, grows but does not replicate its DNA

(B) Nuclear Division takes place.

(C) DNA synthesis or replication takes place.

(D) Reorganization of all cell components takes place.

77. Which of the following hormone levels will cause release of ovum (ovulation) from the graafian follicle?

(A) Low concentration of LH

(B) Low concentration of FSH

(C) High concentration of Estrogen

(D) High concentration of progesterone

78. Identify the correct statements with reference to human digestive system

(A) ILeum is a highly coiled part

(B) Vermiform appendix arise from duodenum.

(C) ILeum opens into small intestine.

(D) Serosa is the innermost layer of the alimentary canal

79. Match the following columns and select the correct option.

Column-I	Column-II
(a) Eosinophils	(a) Immune response
(b) basophils	(b) Phagocytosis
(c) neutrophils	(c) Release histaminase, destructive enzymes
(d) Lymphocytes	(d) Release granules

(A) a-i, b-ii, c-iv, d-iii

(B) a-ii, b-i, c-iii, d-iv

(C) a-iii, b-iv, c-ii, d-iii

(D) a-iv, b-i, c-ii, d-iii

80. The plant parts which consist of two generations one within the other:

(a) Pollen grains inside the anther

(b) Germinated pollen grain with two male gametes

(c) Seed inside the fruit

(d) Embryo sac inside the ovule

(A) (c) and (d)

(B) (a) and (d)

(C) (a) only

(D) (a), (b) and (c)

81. Bt cotton variety that was developed by the introduction toxin gene of Bacillus thuringiensis (bt) is resistant to:

(A) Plant nematodes

(B) Insect predators

(C) Insect pest

(D) Fungal diseases

82. The first phase of translation is:

(A) Aminoacylation of tRNA

(B) Recognition of an anti-codon

(C) Binding of mRNA to ribaotine

(D) Recognition of DNA molecules

83. Embryological support for solution was disapproved by

(A) Charles Darwin

(B) Oparin

(C) Karl Ernst von Baer

(D) Alfred wallace

84. Match the following columns and select the correct option.

Column -I	Column-II
(a) 6-15 pairs of gill slits	(i) Trygon
(b) Heterocercal caudal fin	(ii) Cyclostomes
(c) Air bladder	(iii) chondrichthyes
(d) Poison sting	(iv) osteichthyes

(A) a-iv, b-ii, c-iii, d-i

(B) a-i, b-iv, c-iii, d-ii

(C) a-ii, b-iii, c-iv, d-i

(D) a-iii, b-iv, c-i, d-ii

85. Match the following columns and select the correct option

Column -I	Column-II
(a) Clostridium butylicum	(i) Cyclosporin-A
(b) Trichoderma polysporum	(ii) Butyric acid
(c) Monascus purpureus	(iii) Citric Acid
(d) Aspergillus niger	(iv) Blood cholesterol

lowering agent.

(A) a-i, b-ii, c-iv, d-iii

(B) a-iv, b-iii, c-ii, d-i

(C) a-iii, b-iv, c-ii, d-i

(D) a-ii, b-i, c-iv, d-iii

86. Which of the following is not and inhibitory substance governing seed dormancy?

(A) Phenolic acid

(B) Para-ascorbic acid

(C) Gibberellic acid

(D) Abscisic acid

87. Match the following columns and select the correct option.

Column -I	Column-II
(a) Organ of corti	(i) Connects middle ear and pharynx
(b) Cochles	(ii) Coiled part of the labyrinth
(c) Eustachian tube	(iii) Attached to the oval

window stapes	(iv) Located on the basilar membrane

(A) a-iv, b-ii, c-i, d-iii

(B) a-i, b-ii, c-iv, d-iii

(C) a-ii, b-iii, c-i, d-iv

(D) a-iii, b-i, c-iv, d-ii

88. The enzyme enterokinase helps in conversion of:

(A) Caseinogen into casein

(B) Pepsinogen into pepsin

(C) Protein into polypeptides

(D) Trypsinogen into trypsin

89. Presence of which of the following conditions in urine are indicative of diabetes mellitus?

(A) Ketonuria and Glycosuria

(B) Renal calculi and Hyperglycaemia

(C) Uremia and ketonuria

(D) Uremia and Renal Calculi

90. The process responsible for facilitating loss of water in liquid form the tip of grass blades at night and in early morning is:

(A) Imbibition

(B) Plasmolysis

(C) Transpiration

(D) Root pressure

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PHYSICS

91. A short electric dipole has a dipole moment of 16×10^{-9} Cm. The electric potential due to the dipole at a point at a distance of 0.6 m from the centre of the dipole, situated on a line making an angle of 60^0 with the dipole axis is : $\left(\frac{1}{4\pi\varepsilon_0} = 9\times10^9\, NM^2/C^2\right)$

A. 400 v
B. Zero
C. 50 v
D. 200 v

Solution:

$$p = 16\times10^{-9} C-m$$

$$V = \frac{1}{4\pi P}\frac{P_{cord}}{r^2} = \frac{9\times10^4\times16\times10^{-4}\cos 60}{(0.6)^2}$$

$$= \frac{16\times9}{36}\times\frac{1}{2}\times100 = 200V$$

92. A series LCR circuit is connected to an ac voltage source. When L is removed from the circuit, the phase difference between current and voltage Is π/3. If

instead C is removed from the circuit, the phase difference is again π/3 between current and voltage. The power factor of the circuit is

A. 1.0
B. -1.0
C. Zero
D. 0.5

Solution:

$$\tan 60^o = \frac{Xc}{12}; X_L = X_C$$

$$\tan 60^o = \frac{X_L}{2}$$

93. Light of frequency 1.5 times the threshold frequency W incident on a photosensitive material. What will be the photoelectric current if the frequency is halved and intensity is doubled ?

A. one – fourth
B. zero
C. doubled
D. four times

Solution:

Theoretical

94. Dimensions of stress are :

A. $\left[ML^0T^{-2}\right]$

B. $\left[ML^{-1}T^{2}\right]$

C. $\left[MLT^{-2}\right]$

D. $\left[ML^{2}T^{-2}\right]$

Solution:

$$stress = \frac{\left[MLT^{-2}\right]}{\left[L^{2}\right]} = \left[ML^{-1}T^{-2}\right]$$

95. An electron is accelerated from rest through a potential difference of V volt. If the de Broglie wavelength of the electron is 1.227 x 10^{-2} nm, the potential difference is :

A. 10^{3}v

B. 10^{4}v

C. 10v

D. 10^{2}v

Solution:

$$\lambda_D = \frac{12.27}{\sqrt{v}} A^{o}$$

$$m_p = 9.1 \times 10^{-31}$$

$$0.1227 \times 10^{-2} \times 10^{9} = \frac{12.27 \times 10^{-10}}{\sqrt{V}}$$

$$\sqrt{V} = \frac{12.27}{0.1227} = 100$$

$$V = 10^{54} V$$

96. The capacitance of a parallel plate capacitor with air as medium is 6 μF. With the introduction of a dielectric medium, the capacitance becomes 30 μF. The permittivity of the medium is : (ε_0 = 8.85 x 10^{-12} C^2 N^{-1} m^{-2})

A. 0.44×10^{-10} C^2 N^{-1} m^{-2}
B. 5.00 C^2 N^{-1} m^{-2}
C. 0.44×10^{-13} C^2 N^{-1} m^{-2}
D. 1.77×10^{-12} C^2 N^{-1} m^{-2}

Solution:

$C = C_0 K$

$30 = 6 K$

$K = 5$

97. The solids which have the negative temperature coefficient of resistance are :

A. Semiconductors only
B. Insulators and semiconductors
C. Metals
D. Insulators only

Solution:

$\varepsilon_m = t_0.k$

$= 5 \times 0.05 \times 10^{-12}$

$= 44.25 \times 10^{-12}$

$= 0.44 \times 10^{-10}$

98. For transistor action, which of the following statements is correct?

A. Both emitter junction as well as the collector junction are forward biased.

B. The base region must be very thin and lightly doped.

C. Base, emitter and collector regions should have same doping concentrations

D. Base, emitter and collector regions should have same size

Solution:

Semiconductor.

99. A screw gauge has least count of 0.01 mm and there are 50 divisions in its circular scale.

The pitch of the screw guage is

A. 0.5mm

B. 1.0mm

C. 0.01mm

D. 0.25mm

100. The phase difference between displacement and acceleration of a particle in a simple harmonic motion is :

A. $\pi/2$ rad

B. zero

C. π rad

D. $3\pi/2$ rad

Solution:

$$\alpha.C = \frac{Pitch}{\mu_0 \text{ of d}}$$

$$0.01 = \frac{Pitch}{s_0} = 0.5m$$

101. A long solenoid of 50 cm length having 100 turns carries a current 2.5 A. The magnetic field at the centre of the solenoid is ($\mu_0 = 4\pi$ x 10^{-7} T m A^{-1})

A. 6.28×10^{-5} T

B. 3.14×10^{-5} T

C. 6.28×10^{-4} T

D. 3.14×10^{-4} T

Solution:

$$B = \mu_0 m$$

$$= 4\pi 10^{-7} \frac{100}{5.0} \times 2.5$$

$$= 4\pi \times 5 \times 10^{-5}$$

$$= 20 \times 3.14 \times 10^{-5}$$

$$= 6.28 \times 10^{-4}$$

102. A ball is thrown vertically downward with a velocity of 20 m/s from the top of a tower. It hits the ground after some time with a velocity of 80 m/s. The height of the tower is : (g = 10 m/s^2)

A. 320m

B. 300m
C. 360m
D. 340m

Solution:

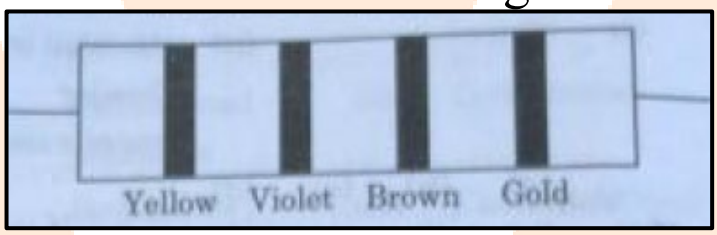
$v^2 = u^2 - 2gh$

$64\omega = 400 = 29h$

$6000 = 20h$

$h = 300m$

103. The color code of a resistance is given below :



The values of resistances and tolerance, respectively are

A. 4.7 kΩ, 5%
B. 470 Ω, 5%
C. 470 kΩ, 5%
D. 47 kΩ, 10%

104. The Brewsters angle i_b for an interface should be:

A. $45^0 < i_b < 90^0$
B. $i_b = 90^0$
C. $0^0 < i_b < 30^0$
D. $30^0 < i_b < 45^0$

Solution:

$\mu = \tan\theta_1$

$1 < \mu < 90^o$

$45^o < \theta < 90^o$

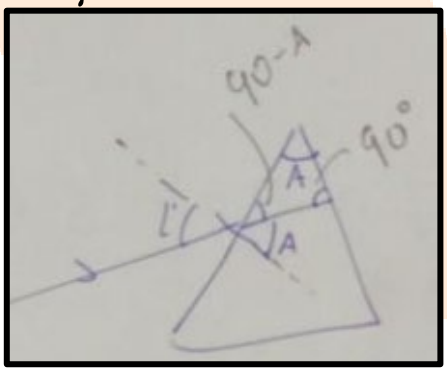
105. A ray is incident at an angle of incidence i on one surface of a small angle prism (with angle of prism A) and emerges normally from the opposite surface. If the refractive index of the material of the prism is μ, then the angle of incidence is nearly equal to

A. μA
B. μA/2
C. A/2 μ
D. 2A/ μ

Solution:

$\mu = \dfrac{\sin 1^o}{\sin A}$

$i = \mu A$



106. An iron rod of susceptibility 599 is subjected to a magnetising field of 1200 Am^{-1}. The permeability of the material of the rod is : ($\mu_0 = 4\pi$ x 10^{-7} Tm A^{-1})

A. $2.4\pi \times 10^{-5}$ Tm A^{-1}

B. $2.4\pi \times 10^{-7}$ Tm A^{-1}

C. $2.4\pi \times 10^{-4}$ Tm A^{-1}

D. 8.0×10^{-5} Tm A^{-1}

Solution:

$$\mu r = (1 + x) = 599 + 1 = 600$$

$$\mu = \mu_0 \mu r$$

$$= 4\pi \times 10^{-7} \times 600$$

$$= 24\pi \times 10^{-5}$$

$$= 2.4 \times 10^{-4} TmA^{-1}$$

107. Find the torque about the origin when a force of acts on a particle whose position vector is

A. $-6\hat{i}Nm$

B. $6\hat{k}Nm$

C. $6\hat{i}Nm$

D. $6\hat{j}Nm$

Solution:

$\vec{F} = 3\hat{j}$

$\vec{r} = 2\hat{k}$

$\vec{\tau} = \vec{r} \times \vec{F}$

$= 2\hat{k} \times 3\hat{j}$

$= 6\left[\hat{k} \times \hat{j}\right]$

$= -6\hat{j}$

108.The average thermal energy for a mono-atomic gas is : (k_B is Boltzmann constant and T, absolute temperature)

A. $\frac{5}{2}k_BT$

B. $\frac{7}{2}k_BT$

C. $\frac{1}{2}k_BT$

D. $\frac{3}{2}k_BT$

Solution :

$$U = \frac{f}{2} nRT$$

$$= \frac{f}{2} \frac{N}{N_A} RT$$

$$= \frac{f}{2} N \left(\frac{R}{N_A} \right)^T$$

$$U = \frac{f}{2} N k_{BT}$$

Where N → No. of atoms

N_A → Avogadro Number

U → Total thermal energy

T → Temperature

R → Gas constant

K_B → Boltzmann constant

Average energy = U/N

$$\therefore \text{Average thermal energy} = \frac{f}{2} k_{BT}$$

For mono-atomic gas f = 3

$$U_{avg} = \frac{3}{2} k_B T$$

109. Assume that light of wavelength 600 nm is coming from a star. The limit of resolution of telescope whose objective has a diameter of 2 m is :

A. 7.32×10^{-7} rad
B. 6.00×10^{-7} rad
C. 3.66×10^{-7} rad
D. 1.83×10^{-7} rad

Solution:

Limit of Resolution of Telescope :

$$= \frac{1.22 \times \text{Wavelenght}}{\text{diameter of Telescope}}$$

$$= \frac{122 \times 600 \times 10^{-9}\,(m)}{2(m)}$$

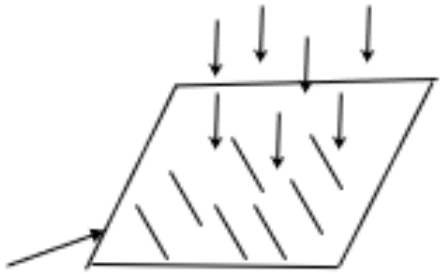
$$= 3.66 \times 10^{-7}$$

110. Light with an average flux of 20 W/cm^2 falls on a non-reflecting surface at normal incidence having surface area 20 cm^2. The energy received by the surface during time span of 1 minute is :

A. 24×10^3 J
B. 48×10^3 J
C. 10×10^3 J
D. 12×10^3 J

Solutions :

Intensity or average flux 20 W/cm^2



Area = 20 cm^2

Non reflecting

Time = 1 min

= 6 sec

$$\text{Intensity}=\frac{\text{Energy}}{\text{Area}\times\text{Time}}$$

$$20\frac{w}{cm^2}=\frac{\text{Energy}}{20cm^2\times 60\,\text{sec}}$$

$$\text{Energy}=24000J$$

$$=24\times10^3 J$$

111.The ratio of contributions made by the electric field and magnetic field components to the intensity of an electromagnetic wave is : (c = speed of electromagnetic waves)

A. 1:c
B. $1:c^2$
C. c:1
D. 1:1

Solution:

$$E_0 = CB_0 \rightarrow \frac{E_0}{B_0 = C}$$

E_0 → Amplitude electric field

C → Speed of light

B → Amplitude of magnetic field

E.M. wave consists of electric and magnetic field.

Intensity x Energy Average energy density due to electric field

$$\frac{dU}{au}|_{avg} = \frac{1}{2}\varepsilon_0 E_0^{\ 2}$$

Average energy density due to magnetic field

$$\frac{dU}{au}|_{avg} = \frac{1}{2}\frac{B_0^{\ 2}}{\mu_0}$$

$$\mu_0\varepsilon_0 = \frac{1}{c^2}$$

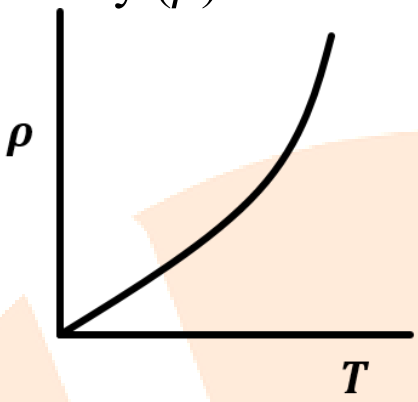
$$= \frac{\frac{1}{2}\varepsilon_0 E_o^{\ 2}}{\frac{1}{2}\frac{B_0}{\mu_0}}$$

$$= \mu\varepsilon_0 \frac{E_0^{\ 2}}{B_0^{\ 2}} = \frac{1}{c^2} = 1:1$$

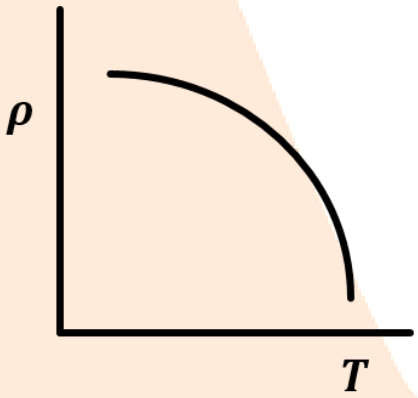
s

112.Which of the following graph represents the variation of resistivity (ρ) with temperature (T) for copper ?

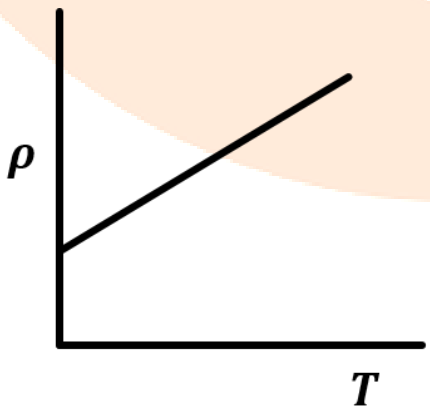
A.

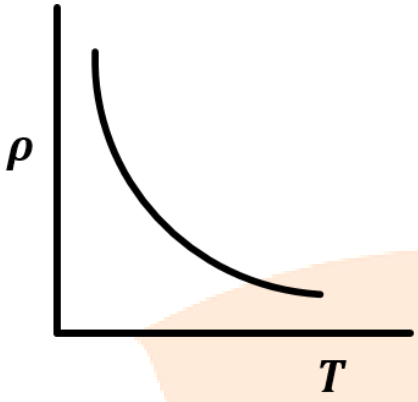


B.



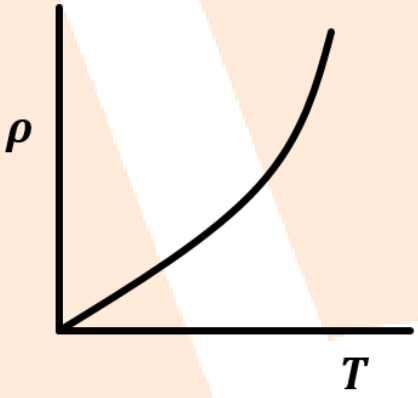
C.





D.

Solution :



Reference : N.C.E.R.T

Fact base

113.The quantities of heat required to raise the temperature of two solid copper spheres of radii r_1 and r_2 ($r_1 = 1.5\ r_2$) through 1 K are in the ratio

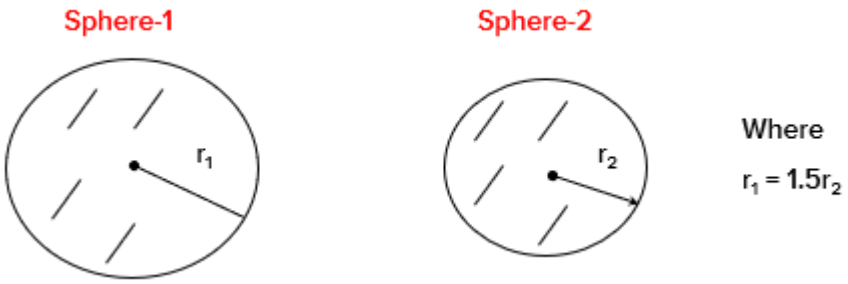
A. 3/2
B. 5/3
C. 27/8
D. 9/4

Solution:

General formula for heat required in order to raise the temperature of an object mass m by ΔT is

Where s is specific heat

Given are to solid sphere of radius r_1 and r_2



Both spheres are made up of same material, so their density and specific heat capacities will be same

Mass of sphere -1 i.e $m_1 = p\left(\frac{4}{3}\pi r_1^3\right)$

Mass of sphere -2 i.e $m_1 = p\left(\frac{4}{3}\pi r_2^3\right)$

Both spheres are raised by same temperature = ΔT

So Heat required Q_1 for sphere -1 is

$Q_1 = m_1 s\Delta T$

So Heat required Q_2 for sphere -2 is

$Q_2 = m_2 s\Delta T$

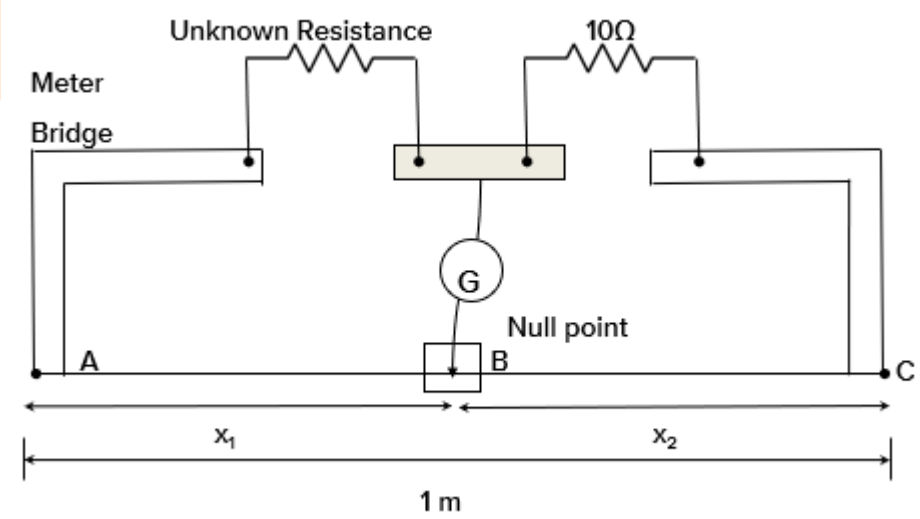
$$\therefore \frac{Q_1}{Q_2} = \frac{m_1 s \Delta T}{m_2 \Delta T} = \frac{m_1}{m_2} = \frac{\rho\left(\frac{4}{3}\pi e_1^{\,3}\right)}{\rho\left(\frac{4}{3}\pi r_2^{\,3}\right)}$$

$$= \left(\frac{r_1}{r_2}\right)^3 = \left(\frac{3}{2}\right)^2 = \frac{27}{8}$$

114.A resistance wire connected in the left gap of a metre bridge balances a 10 Ω resistance in the right gap at a point which divides the bridge wire in the ratio 3 : 2. If the length of the resistance wire is 1.5 m, then the length of 1 Ω of the resistance wire is :

A. 1.5×10^{-1} m
B. 1.5×10^{-2} m
C. 1.0×10^{-2} m
D. 1.0×10^{-1} m

Solution:



115.Given length of unknown resistance = 1.5 m

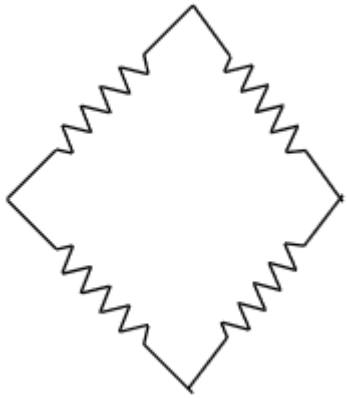
We have to find length of unknown resistance when its resistance will be 1m.

Let us assume the resistance of meter bridge there to be $\boxed{R}$ since $\boxed{R\alpha l}$

So the resistance of wire AB will be = 3R/5

Resistance of wire BC = 2R/ 5

Principle of wheatstone Bridge



$$\frac{y}{\frac{3R}{5}} = \frac{10}{\frac{2R}{5}}$$

$$y = \frac{10 \times 3}{2} = 15\Omega$$

So when the resistance of unknown wire is 15 Ω its length resistance = 1.5 m

So when the resistance of unknown wire is 1 Ω then its length will be $\frac{1.5}{15\Omega} \times 1\Omega$

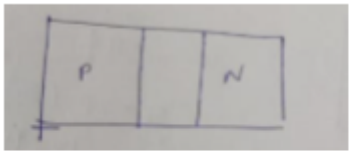
$$= \frac{1}{10}\Omega$$

or 10^{-1} m

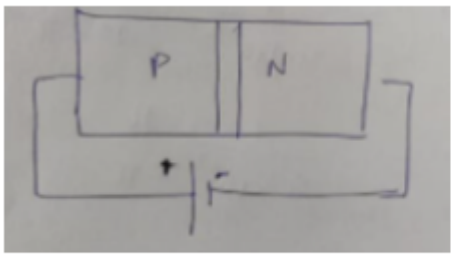
116.The increase in the width of the depletion region in a p-n junction diode is due to :

A. Both forward bias and reverse bias
B. Increase in forward current
C. Forward bias only
D. Reverse bias only

Solution:

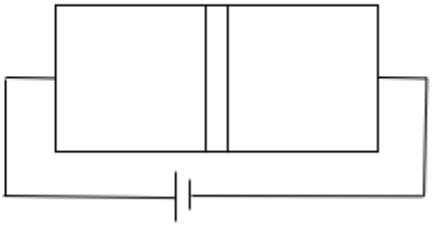


Forward Biasing



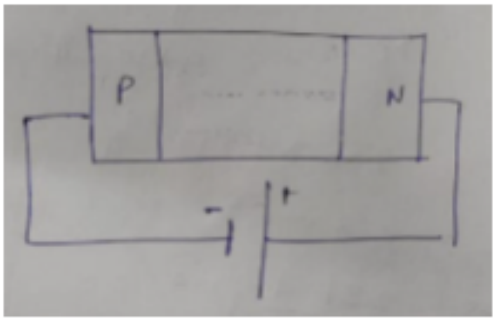
Width

Depletion layer decreases



Reverse Biasing

Width of depletion
Layer decreases



117.A 40 μF capacitor is connected to a 200V, 50 Hz ac supply. The rms value of the current in the circuit is, nearly :

A. 2.5A
B. 25.1A
C. 1.7A
D. 2.05A

Solution:

$\omega = 2\pi f$

$\theta = 2\pi(50)$

$= 100\pi rad$

Capacitive Reactive $\leftarrow X_c = \frac{1}{\omega c} = \frac{1}{40\times10^{-6}} \times \frac{1}{100\pi}$

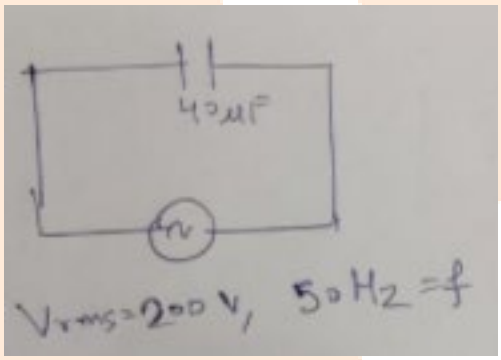
$$= \frac{1}{4\times100^{-3}\times\pi}\Omega$$

$$I_{rms} = \frac{V_{rms}}{X_c} = \frac{200}{\frac{1}{4\times10^{-3}\pi}}$$

$$= 200\times4\times10^{-3}\pi$$

$$= 0.8\times\pi$$

$$I_{rms} = 2.51 \text{ Ampere}$$



118.Taking into account of the significant figures, what is the value of 9.99m - 0.009 m ?

A. 9.980m
B. 9.9m
C. 9.901m
D. 9.98m

Solution:

$$\begin{array}{r} 9.99 \\ -0.0099 \\ \hline 9.9801 \end{array}$$

In case of addition or subtraction final answer should be according to the value that constant least number places after decimal So final answer is $\boxed{9.98}$

119.A charged particle having drift velocity of 7.5 x 10^{-4} ms^{-1} in an electric field of 3 x 10^{-10} Vm^{-1}, has a mobility in $m^2 V^{-1} s^{-1}$ of :

A. 2.5×10^{-6}
B. 2.25×10^{-15}
C. 2.25×10^{15}
D. 2.5×10^{6}

Solutions:

$V = \mu\varepsilon \; 7.5\times10^{-4} m/s = V \rightarrow drift \; velocity$

$? = \mu \rightarrow$ Mobility

$3\times10^{-10} V/m^{-1} = \varepsilon \rightarrow$ Electric field

$7.5\times10^{-4} = \mu\times3\times10^{-10}$

$$\mu = \frac{7.5\times10^{-4}}{3\times10^{-10}} = \frac{7.5}{3}\times10^{6} = 2.5\times10^{6}$$

120.In a guitar, two strings A and B made of same material are slightly out of tune and produce beats of frequency 6 Hz. When tension in B is slightly decreased, the beat frequency increases to 7 Hz. If the frequency of A is 530 Hz, the original frequency of B will be:

A. 536 Hz

B. 537 Hz
C. 523 Hz
D. 524 Hz

Solution:

$$\boxed{f = \frac{1}{L}\sqrt{\frac{T}{\mu}}}$$

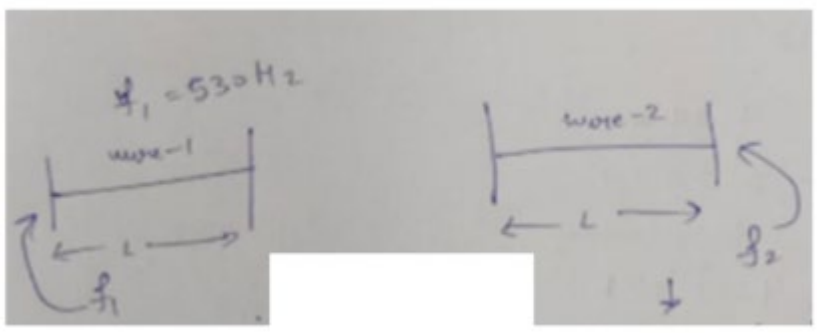
$$f \alpha \sqrt{T}$$

$$f_1 - f_2 = 6Hz$$

$$530 - f_2 = 6$$

$$\boxed{f_2 = 54Hz}$$

Tension in T is decreased So its frequency will decrease, So that is why the no beats will increase so from here we can say $f_1 > f_2$



121.Two particles of mass 5 kg and 10 kg respectively are attached to the two ends of a rigid rod of length 1 m with negligible mass. The centre of mass of the system from the 5 kg particle is nearly at a distance of :

A. 67 cm
B. 80 cm
C. 33 cm
D. 50 cm

Solutions:

$$x = \frac{5(0)+(10)(1)}{10+5}$$

$$= \frac{10}{15} = 0.6666m$$

$$= 67cm$$

122.A short electric dipole has a dipole moment of 16×10^{-9} Cm. The electric potential due to the dipole at a point at a distance of 0.6 m from the centre of the dipole, situated on a line making an angle of 60^0 with the dipole axis is : $\left(\frac{1}{4\pi\varepsilon_0} = 9\times10^9\, NM^2/C^2\right)$

A. 400 v
B. Zero
C. 50 v
D. 200 v

Solution:

$$p = 16 \times 10^{-9} C - m$$

$$V = \frac{1}{4\pi P}\frac{P_{cord}}{r^2} = \frac{9 \times 10^4 \times 16 \times 10^{-4} \cos 60}{(0.6)^2}$$

$$= \frac{16 \times 9}{36} \times \frac{1}{2} \times 100 = 200V$$

123.A series LCR circuit is connected to an ac voltage source. When L is removed from the circuit, the phase difference between current and voltage Is π/3. If instead C is removed from the circuit, the phase difference is again π/3 between current and voltage. The power factor of the circuit is

A. 1.0
B. -1.0
C. Zero
D. 0.5

Solution:

$$\tan 60^o = \frac{Xc}{12}; X_L = X_C$$

$$\tan 60^o = \frac{X_L}{2}$$

124.Light of frequency 1.5 times the threshold frequency W incident on a photosensitive material. What will be the photoelectric current if the frequency is halved and intensity is doubled ?

A. one – fourth
B. zero
C. doubled
D. four times

Solution:

Theoretical

Dimensions of stress are :

A. $\left[ML^0T^{-2}\right]$
B. $\left[ML^{-1}T^2\right]$
C. $\left[MLT^{-2}\right]$
D. $\left[ML^2T^{-2}\right]$

Solution:

$$stress = \frac{\left[MLT^{-2}\right]}{\left[L^2\right]} = \left[ML^{-1}T^{-2}\right]$$

125.An electron is accelerated from rest through a potential difference of V volt. If the de Broglie wavelength of the electron is 1.227 x 10^{-2} nm, the potential difference is :

A. 10^3v
B. 10^4v
C. 10v
D. 10^2v

Solution:

$$\lambda_D = \frac{12.27}{\sqrt{v}} A^o$$

$$m_p = 9.1 \times 10^{-31}$$

$$0.1227 \times 10^{-2} \times 10^{9} = \frac{12.27 \times 10^{-10}}{\sqrt{V}}$$

$$\sqrt{V} = \frac{12.27}{0.1227} = 100$$

$$V = 10^{54} V$$

126.The capacitance of a parallel plate capacitor with air as medium is 6 μF. With the introduction of a dielectric medium, the capacitance becomes 30 μF. The permittivity of the medium is : (ε_0 = 8.85 x 10^{-12} C^2 N^{-1} m^{-2})

A. 0.44 × 10^{-10} C^2 N^{-1} m^{-2}
B. 5.00 C^2 N^{-1} m^{-2}
C. 0.44 × 10^{-13} C^2 N^{-1} m^{-2}
D. 1.77 × 10^{-12} C^2 N^{-1} m^{-2}

Solution:

$C = C_0 K$

$30 = 6 K$

$K = 5$

127.The solids which have the negative temperature coefficient of resistance are :

A. Semiconductors only

B. Insulators and semiconductors
C. Metals
D. Insulators only

Solution:

$\varepsilon_m = t_0.k$

$= 5 \times 0.05 \times 10^{-12}$

$= 44.25 \times 10^{-12}$

$= 0.44 \times 10^{-10}$

128.For transistor action, which of the following statements is correct?

A. Both emitter junction as well as the collector junction are forward biased.
B. The base region must be very thin and lightly doped.
C. Base, emitter and collector regions should have same doping concentrations
D. Base, emitter and collector regions should have same size

Solution:

Semiconductor.

129.A screw gauge has least count of 0.01 mm and there are 50 divisions in its circular scale.

The pitch of the screw guage is

A. 0.5mm
B. 1.0mm

A. 0.01mm

B. 0.25mm

130. The phase difference between displacement and acceleration of a particle in a simple harmonic motion is :

A. π/2 rad

B. zero

C. π rad

D. **3**π/2 rad

Solution:

$$\alpha.C = \frac{Pitch}{\mu_0 \text{ of d}}$$

$$0.01 = \frac{Pitch}{s_0} = 0.5m$$

131. A long solenoid of 50 cm length having 100 turns carries a current 2.5 A. The magnetic field at the centre of the solenoid is ($\mu_0 = 4\pi \times 10^{-7}$ T m A^{-1})

A. 6.28×10^{-5} T

B. 3.14×10^{-5} T

C. 6.28×10^{-4} T

D. 3.14×10^{-4} T

Solution:

$$B = \mu_0 m$$

$$= 4\pi 10^{-7} \frac{100}{5.0} \times 2.5$$

$$= 4\pi \times 5 \times 10^{-5}$$

$$= 20 \times 3.14 \times 10^{-5}$$

$$= 6.28 \times 10^{-4}$$

132.A ball is thrown vertically downward with a velocity of 20 m/s from the top of a tower. It hits the ground after some time with a velocity of 80 m/s. The height of the tower is : (g = 10 m/s^2)

A. 320m
B. 300m
C. 360m
D. 340m

Solution:

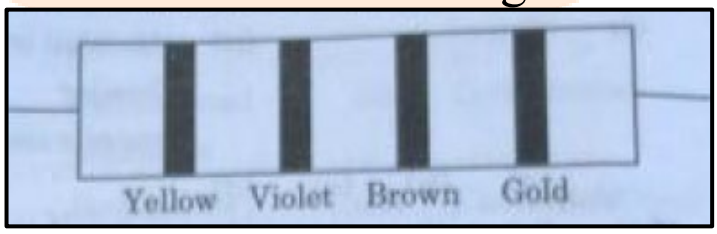
$$v^2 = u^2 - 2gh$$

$$64\omega = 400 = 29h$$

$$6000 = 20h$$

$$h = 300m$$

133.The color code of a resistance is given below :



The values of resistances and tolerance, respectively are

A. 4.7 kΩ, 5%
B. 470 Ω, 5%
C. 470 kΩ, 5%
D. 47 kΩ, 10%

134.The Brewsters angle i_b for an interface should be:
A. $45^0 < i_b < 90^0$
B. $i_b = 90^0$
C. $0^0 < i_b < 30^0$
D. $30^0 < i_b < 45^0$

Solution:

$\mu = \tan\theta_1$

$1 < \mu < 90^o$

$45^o < \theta < 90^o$

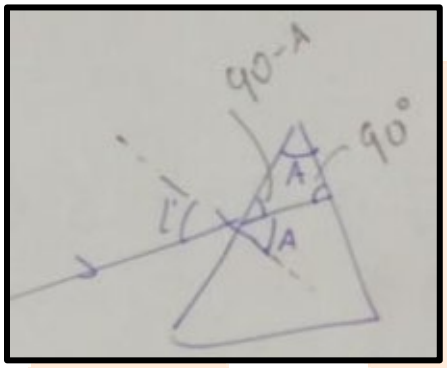
135.A ray is incident at an angle of incidence i on one surface of a small angle prism (with angle of prism A) and emerges normally from the opposite surface. If the refractive index of the material of the prism is μ, then the angle of incidence is nearly equal to

A. μA
B. μA/2
C. A/2 μ
D. 2A/ μ

Solution:

$$\mu = \frac{\sin 1^o}{\sin A}$$

$$i = \mu A$$



NEET 2020 PAPER DISCUSSION
13th September' 2020

CODE: F1

CHEMISTRY

136. Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as :

A. Cross Cannizzaro's reaction
B. Cross Aldol condensation
C. Aldol condensation
D. Cannizzaro's reaction

Solutions:

$$C_6H_5CHO + CH_3COC_6H_5 \xrightarrow[-H_2O]{NaOH}$$

$$C_6H_5 - CH = CH - \overset{O}{\overset{\|}{C}} - C_6H_5$$

Benzyl acetophenone

137. Measuring Zeta potential is useful in determining which property of colloidal solution?

A. Stability of the colloidal particles
B. Size of the colloidal particles
C. Viscosity
D. Solubility

Solutions:

Stability of colloidal particles.

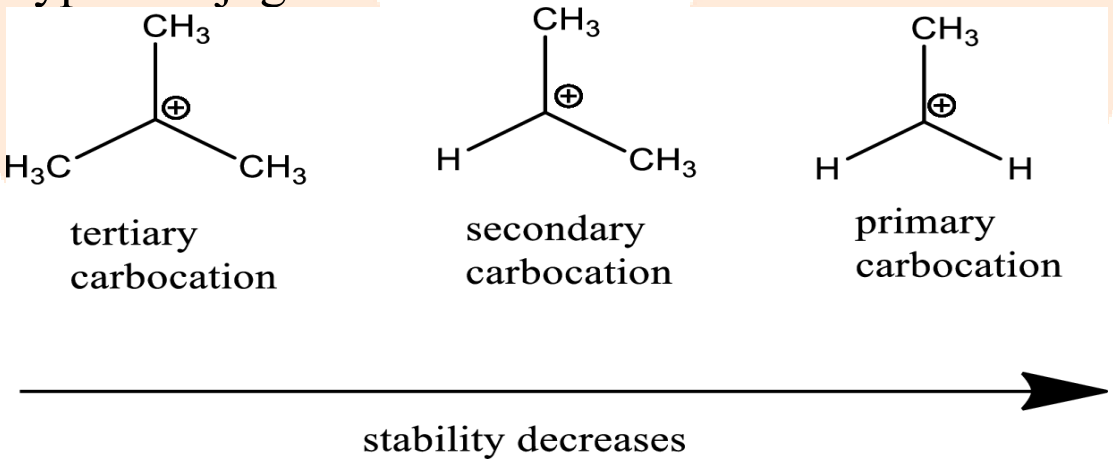
The colloids with high zeta potential are electrically stable and with low tends to coagulate

138. A tertiary butyl carbocation is more stable than the secondary butyl carbocation because of which one of the following

A. -R effect of $-CH_3$ group
B. Hyperconjugation
C. -I effect of $-CH_3$ groups
D. +R effect of $-CH_3$ groups

Solutions:

Tertiary carbocations are stable due to +I effect & hyper conjugation



139. The correct option for free expansion of an ideal gas under adiabatic condition is

A. $q < 0, \Delta T = 0$ and $w = 0$
B. $q > 0, \Delta T > 0$ and $w > 0$
C. $q = 0, \Delta T = 0$ and $w = 0$
D. $q = 0, \Delta T < 0$ and $w > 0$

Solutions:

- Free expansion, W =0
- Adiabatic process, q = 0
- $\Delta U = q + w = 0$
- Therefore $\Delta T = 0$

140. Match the following.

Oxide	Nature
(a) CO	(i) Basic
(b) BaO	(ii) Neutral
(c) Al_2O_3	(iii) Acidic
(d) Cl_2O_7	(iv) Amphoteric

Which one of the following is correct?

A. (a) (iii); (b) (iv); c (i); d (ii)
B. (a) (iv); (b) (iii); c (ii); d (i)
C. (a) (i); (b) (ii); c (iii); d (iv)
D. (a) (ii); (b) (i); c (iv); d (iii)

Solutions:

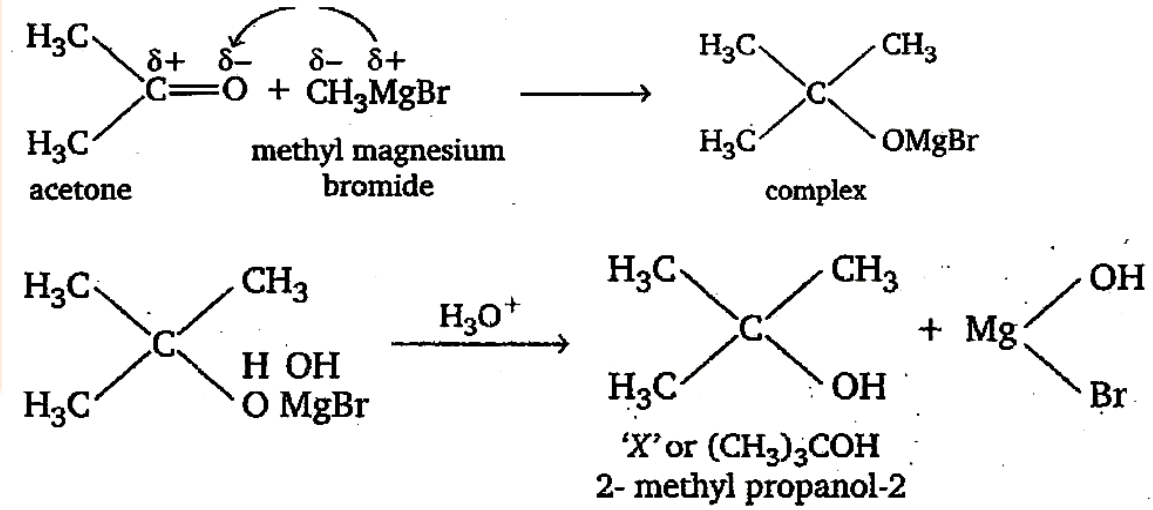
Oxide	Nature
(a) CO	(i) Neutral

(b) BaO	(ii) Basic
(c) Al_2O_3	(iii) Amphoteric
(d) Cl_2O_7	(iv) Acidic

141. Reaction between acetone and methylmagnesium chloride followed by hydrolysis will give

A. Tert. butyl alcohol
B. Isobutyl alcohol
C. Isopropyl alcohol
D. Sec. butyl alcohol

Solutions:



3° butyl alcohol

142. The following metal ion activates many enzymes participates in the oxidation of glucose to produce ATP and with Na, is responsible for the transmission of nerve signals

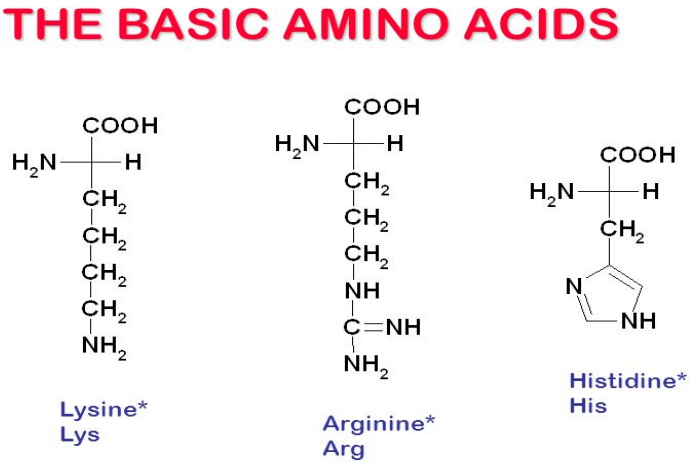
A. Calcium
B. Potassium
C. Iron
D. Copper

Solutions:

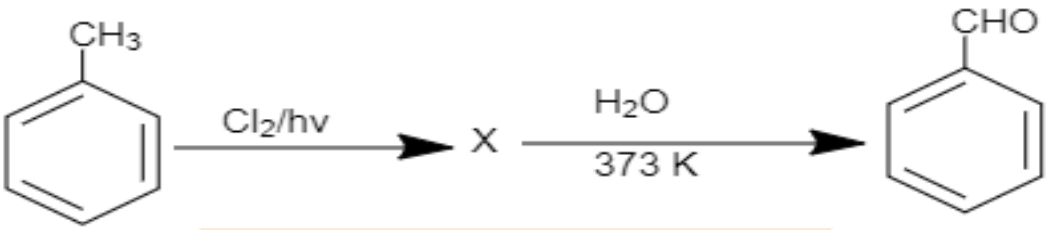
- The Potassium ions that are abundant within the cell fluids can activate many enzymes
- They participate in the oxidation of glucose to produce ATP and along with Sodium ions , they are responsible for the transmission of nerve signals.

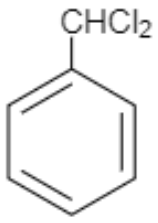
143. Which of the following is a basic amino acid?
A. Tyrosine
B. Lysine
C. Serine
D. Alanine

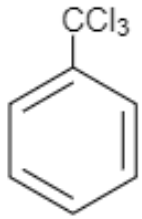
Solutions:

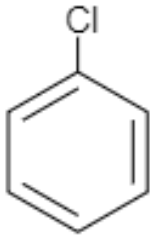


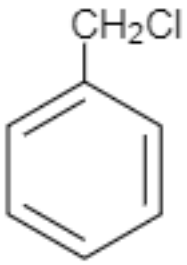
144. Identify compound X in the following aqueous of reaction:



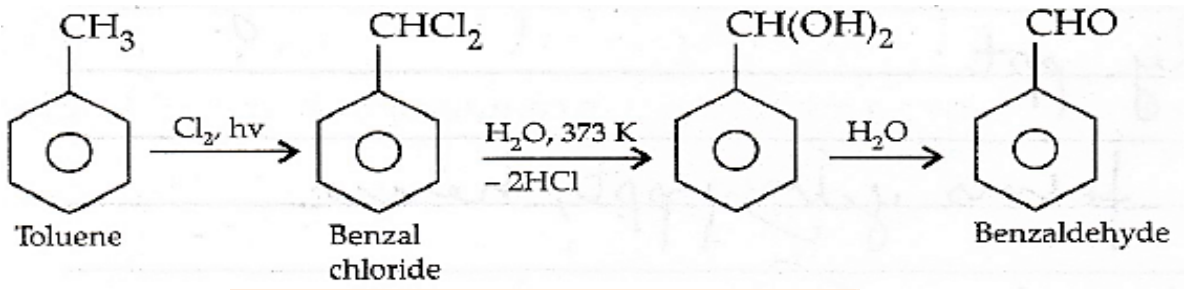
A. 

B. 

C. 

D. 

Solutions:



145. Which of the following is the correct order of increasing field strength of ligand to form coordination compound?

A. $F^- < SCN^- < C_2O_4^{2-} < CN^-$

B. $CN^- < C_2O_4^{2-} < SCN^- < F^-$

C. $SCN^- < F^- < C_2O_4^{2-} < CN^-$

D. $SCN^- < F^- < CN^- < C_2O_4^{2-}$

Solutions:

Weak Field

$I^- < Br < S^2 < SCN^- < CI^- <$

$NO_3^- < F^- < C_2O_4^{2-} < H_2O < NCS^- <$

$CH_3CN < NH_3 < en < bipy < phen <$

$NO_2^- < PPh_3 < CN^-CO$ Strong Field

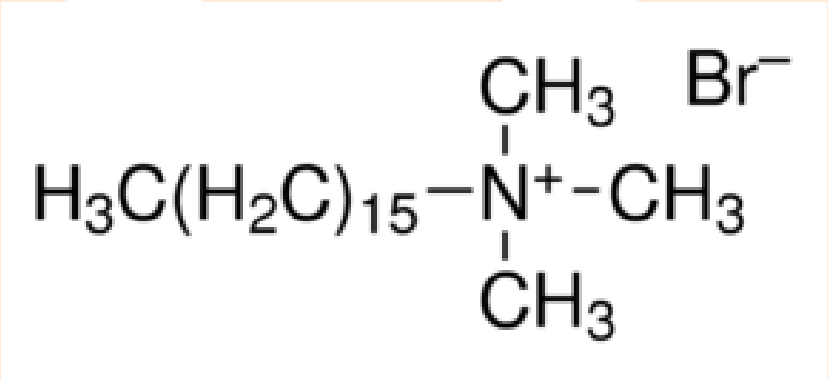
146. Which of the following is cationic detergent?

A. Cetyl trimethyl ammonium bromide

B. Sodium dodecylbenzene sulphonate
C. Sodium lauryl sulphate
D. Sodium stearate

Solutions:

- Cetyl trimethyl ammonium bromide(CTAB) is Cationic type of detergent in which the active part of the molecule is a positive ion (cation).
- In cationic detergents, cationic part contains long chain of hydrocarbon and has a positive charge on N atom



147. Which one of the followings has maximum number of atoms
A. 1g of $O_2(g)$ [Atomic mass of O = 16]
B. 1g of Li(s) [Atomic mass of Li = 7]
C. 1g of Ag(s) [Atomic mass of Ag = 108]
D. 1g of Mg(s) [Atomic mass of Mg = 24]

Solutions:

No.of atoms = $6.023 \times 10^{23} \times 1$ g

Atomic mass

Lower is atomic mass, more is number of atoms

148. Match the following.

Name	IUPAC Official name
(a) Unnilunium	(i) Mendelevium
(b) Unniltrium	(ii) Lawrencium
(c) Unnilhexium	(iii) Seaborgium
(d) Unununnium	(iv) Darmstadtium

Which one of the following is correct?

A. (c) (iii)

B. (d) (iv)

C. (a) (i)

D. (b) (ii)

Solutions:

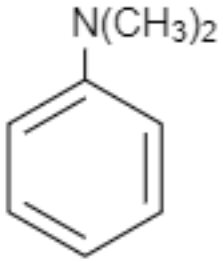
(a) Unnilunium $\Rightarrow$ 101 $\Rightarrow$ Md

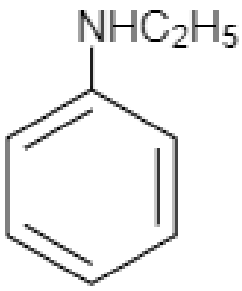
(b) Unniltrium $\Rightarrow$ 103 $\Rightarrow$ Lr

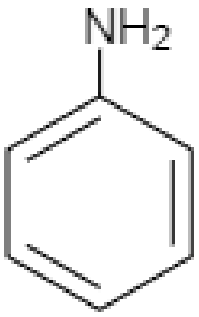
(c) Unnilhexium $\Rightarrow$ 106 $\Rightarrow$ Sg

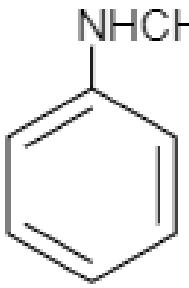
(d) Unununnium $\Rightarrow$ 111 $\Rightarrow$ Rg

149. Which of the following amine will give the carbylamine test?

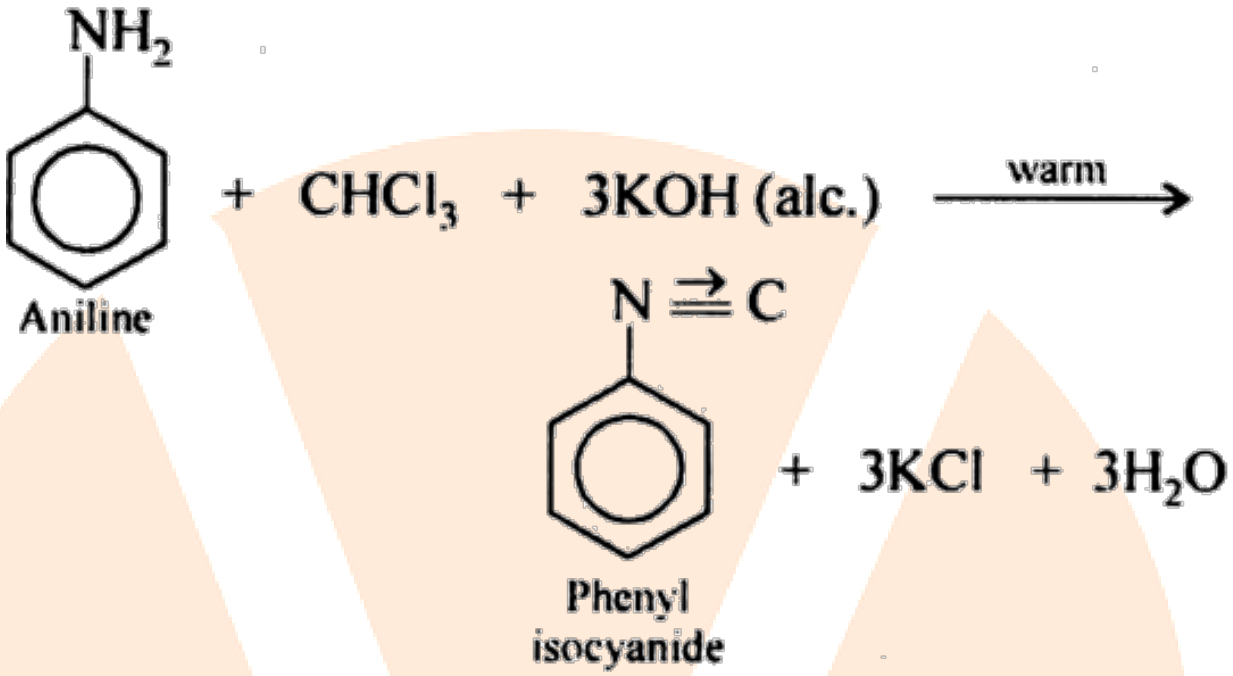
A. 

B. 

C. 

D. 

Solutions:



150. Paper chromatography is an example of
   A. Thin layer chromatography
   B. Column chromatography
   C. Adsorption chromatography
   D. Partition chromatography

Solutions:

Paper chromatography is a type of partition chromatography

151. A mixture of N_2 and Ar gases in a cylinder contains 7g of N_2 and 8g of Ar. If the total pressure of the

mixture of the gases in the cylinder is 27 bar, the partial pressure of N_2 is:

A. 15 bar
B. 18 bar
C. 9 bar
D. 12 bar

Solutions:

Mass of $N_2 = 7g$

$$\text{moles of } N_2 = \frac{7}{28} = \frac{1}{4} =$$

Mass of $Ar = 8g$

$$\text{moles of Ar} = \frac{8}{40} = \frac{1}{5}$$

$$\text{mole fraction of } N_2 = \frac{moles\ of\ N_2}{total\ moles}$$

$$\Rightarrow \quad p_N = X_N \quad p_{tot.}$$

$$= 5/9 \times 27 = 15 \text{ bar}$$

152. The number of protons. Neutrons and electrons Lu. respectively, are:

A. 71, 71 and 104
B. 175, 104 and 71

C. 71, 104 and 71
D. 104, 71 and 71

Solutions:

175

71Lu

Z = 71
A = 175
No. of protons = 71

No. of electrons = 71

No. of neutrons = 175 - 71

= 104

153. The rate constant for a first order reaction $4.606 \times 10^{-3}\ {}_{8}^{-1}$. The time required to reduce 2.0g of the reactant to 0.2g is:
A. 500s
B. 1000s
C. 100s
D. 200s

Solution:

$$Kt = 2.303 \log \frac{[A_0]}{[A_t]}$$

$$t = \frac{2.303}{4.606 \times 10^{-3}} \log \frac{2}{0.2}$$

$$\left(As\ k = 4.606 \times 10^{-3} \right)$$

$$t = 500 \text{sec}.$$

154. Identify a molecule which does not exist.

A. C_2

B. O_2

C. He_2

D. Li_2

Solutions:

$$\mathbf{He_2 \rightarrow \underset{(2)}{No}\ of\ e^-\ in\ BMO\ = \underset{(2)}{No.}\ of\ e^-\ in\ ABMO}$$

155. Hydrolysis of sucrose is given by the following reaction

Sucrose + $H_2O \rightleftharpoons$ Glucose + Fructose

If the equilibrium constant (K_C) is 2×10^{13} 300 K, teh vale of $\Delta_r G^0$ at the same temperature will be:

A. 8.314 J mol^{-1} K^{-1} × 300 K × ln(3n × 10^{13})

B. -8.314 J mol^{-1} K^{-1} × 300 K × ln (4 × 10^{13})

C. $-8.314\ J\ mol^{-1}\ K^{-1} \times 300\ K \times \ln (2 \times 10^{13})$

D. $8.314\ J\ mol^{-1}\ K^{-1} \times 300\ K \times \ln (2 \times 10^{13})$

Solutions:

As $\Delta_G^0 = - RT \ln Kc$

$\Delta_G^0 = - 8.314 \times 300 \ln (2 \times 10^{13})$

156. For the reaction, $2Cl(g) \rightarrow Cl_2(g)$, the correct option is:

A. $0\ \Delta_rH < 0$ and $\Delta_rS > 0$

B. $\Delta_rH < 0$ and $\Delta_rS < 0$

C. $\Delta_rH > 0$ and $\Delta_rS > 0$

D. $\Delta_rH > 0$ and $\Delta_rS <$

Solutions:

$2Cl\ (g) \rightarrow Cl_2(g)$

As bond formation is accompanied by release of energy

$\therefore \Delta H$ = -ve.

Also, no. of particles dec. so

ΔS = -ve

157. Find out the solubility of $Ni(OH)_2$ in 0.1 M NaOH given that the solubility product of $Ni(OH)_2$ is 2×10^{15}

A. $1 \times 10^{-13} M$

B. $1 \times 10^{8}\ M$

C. 2×10^{-13} M

D. 2×10^{-8} M

Solutions:

$Ni(OH)_2$

Let solubility be s

$Ni(OH)_2 \rightleftharpoons Ni^{2+} + 2OH^-$

s 2S + 0.1

$K_{sp} = [Ni^{2+}] [OH^-]^2$

$\Rightarrow 2 \times 10^{-15} = S (2s + 0.1)^2$

$\Rightarrow s = \frac{2 \times 10^{-15}}{(0.1)^2}$ [2s + 0.1 ≈ 0.1]

$s = 2 \times 10^{-13}$M

158. on electrolysis of dil. Sulphuric acid using platinum (Pt) electrode, the product obtained at anode will be:

A. H_2S gas

B. SO_2 gas

C. Hydrogen gas

D. Oxygen gas

Solutions:

On electrolysis of dil. H_2SO_4 using it electrolysis,

At cathode we obtain H_2g

At anode we obtain O_2g

Cathode:

$2H^+ (....) + 2\ e^- \rightarrow H_2(g)$

Anode:

$4(OH^-) \rightarrow 2H_2O + O_2(g) + 4e^-$

159. Which of the following is not correct about carbon monoxide?

A. The carboxyhemoglobin (haemoglobin bound to CO) is less stable than oxyhaemoglobin.

B. It is produced due to incomplete combustion.

C. It forms carboxyhaemoglobin.

D. It reduces oxygen carrying ability of blood

Solutions:

Carboxyhemoglobin is more stable complex because CO is stronger ligand than O_2

160. The number of Faradays(F) required to produce 20g of calcium from molten $CaCl_2$ (Atomic mass of Ca = 40 g mol^{-1}) is:

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

Solutions:

As, m = Zq

⇒ 20 g = mass of Ca deposited

$Ca^{2+} + 2e^{-} \rightarrow Ca$

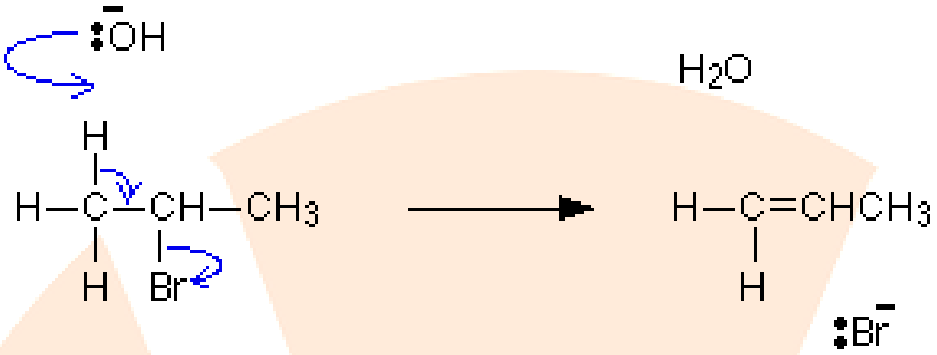
40g Ca deposited by 2F change

20g Ca deposited by 1F change

161. Elimination reaction of 2-Bromo-pentane to form pent-2-ene is:
(a) β-Elimination reaction
(b) Follows Zaitsev rule
(c) Dehydration reaction
(d) Dehydration reaction
A. (b), (c), (d)
B. (a), (b), (d)
C. (a), (b), (c)
D. (a), (c), (d)

Solutions:

a) **β**-Elimination reaction



b) Zaitsev rule: Double bond "C" has more substitution.
c) removal of both H and Br - "De" "Hydro" "Halogenation"

162. What is change in oxidation number of carbon in the following reaction?

$$CH_4(g) + 4Cl_2(g) \rightarrow CCl_4(1) + 4HCl(g)$$

A. -4 to +4
B. 0 to -4
C. +4 to +4
D. 0 to + 4

Solutions:

ln CH_4 the or. st. of C = -4 and in CCl_4 or. st. of C = +4

163. Which of the following alkane cannot be made in good good yield by wurtz reaction

A. n-Heptane
B. n-Butane
C. n-Hexane
D. 2,3-dimethylbutane

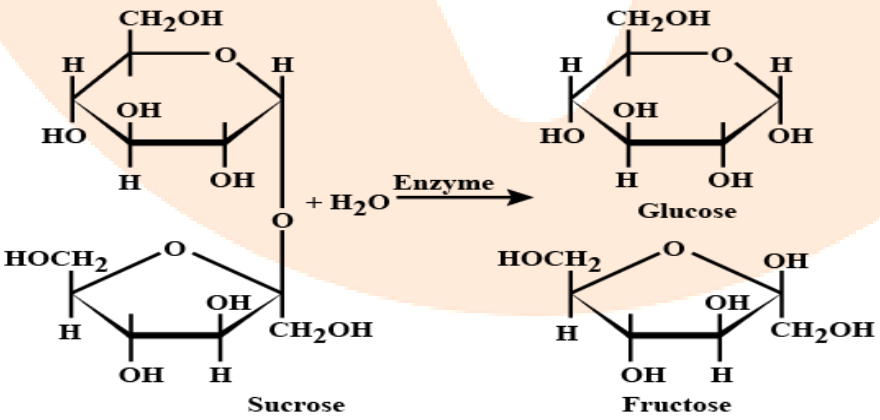
Solutions:

Wurtz Reaction is limited to the synthesis of symmetrical alkanes.

164. Sucrose on hydrolysis gives:

A. α-D-Glucose + β-D-Fructose
B. α-D-Fructose + β-D-Fructose
C. β-D-Glucose + α-D-Fructose
D. α-D-Glucose + β-D-Glucose

Solutions:



165. Identify the incorrect statement.

A. Interstitial compounds are those that are formed when small atoms like H, C or N are trapped inside the crystal lattices of metals.

B. The oxidation states of chromium in CrO_4^{2-} and $Cr_2O_7^{2-}$ are not teh same

C. $Cr^{2+}(d^4)$ is a stronger reducing agent than $Fe^{2+}(d^6)$ in water.

D. The transition metals and their compounds are known for their catalytic activity due to their ability to adopt multiple oxidation states and to form complexes

Solutions:

CrO_4^{2-}	$Cr_2O_7^{2-}$
$x = 8 = -2$	$2x - 14 = -2$
$x = +6$	$2x = 12$
$x = +6$	

166. CHl was passed through a solution of $CaCl_2$ and NaCl. Which of the following compound(s) crystallise(s)?

A. Only $MgCl_2$

B. NaCl, $MgCl_2$ and $CaCl_2$

C. Both $CgCl_2$ and $CaCl_2$

D. Only NaCl

Solutions:

$Crude\ CaCl \xrightarrow[filter]{H_2O} solution$

$\downarrow CHI$ gas

$NaCl \downarrow$

$CaCl_2$ and $mgCl_2$ due to solubility remain in solution

167. Identify the correct statements from the following:
(a) CO_2(M) is used as refrigerant for ice-cream and frozen food
(b) The structure of C_{60} contains twelve six carbon rings and twenty five carbon rings.
(c) ZSM-5, a type of zeolite, is used to convert alcohols into gasoline.
(d) CO is colorless and odourless gas.

A. (b) and (c) only
B. (c) and (d) only
C. (a), (b) and (c) only
D. (a) and (c) only

Solutions:

ZSM-5 is a zeolite which converts alcohol directly into gasoline(petrol)
Carbon dioxide, CO2, is a colorless, odorless, and tasteless gas.

168. An increase in the concentration of the reactants of a reaction leads to change in:

A. Threshold energy
B. Collision frequency
C. Activation energy
D. Heat of reaction

Solutions:

As No. of particles increase, No. of collisions increase

169. The calculated spin only magnetic moment of Cr^{2+} ion is:

A. 5.92 BM
B. 2.84 BM
C. 3.87 BM
D. 4.90 BM

Solutions:

$Cr = 3d^5\ 4s^1$

$Cr^{+2} = 3d^4$

$$u = \sqrt{n(n+2)} = \sqrt{4(4+2)} = \sqrt{24} = 4.90BM$$

170. Match the following and identify the correct option.

(a) $CO(g) + H_2(g)$ (i)$Mg(HCO_3)_2$+

$Ca(HCO_3)_2$

(b)Temporary hardness of water

(ii) An electron deficient hydride

(c)B_2H_6 (iii)Synthesis gas

(d)H_2O_2 (iv)Non-planar structure

A. (a)(iii); (b)(iv); (c)(ii); (d)(i)

B. (a)(i); (b)(iii); (c)(ii); (d)(iv)

C. (a)(iii); (b)(i); (c)(ii); (d)(iv)

D. (a)(iii); (b)(ii); (c)(i); (d)(iv);

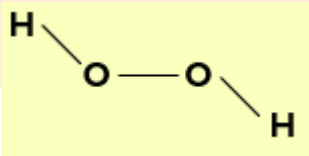
Solutions:

$Co + H_2 \longrightarrow$ Syn gas

Temporaty hardness $\Rightarrow$ sue to bicarbonates of mg^{+2} and a^{+2}

$B_2H_6 \longrightarrow e^-$ defficient

$H_2O_2 \longrightarrow$ Half open book $\Rightarrow$ Non-planar



171. The mixture which shows positive deviation from Raoult's law is:

A. Acetone + Chloroform

B. Chloroethane + Bromoethane

C. Ethanol + Acetone

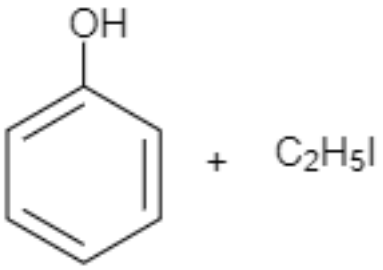
D. Benzene + Toluene

Solutions:

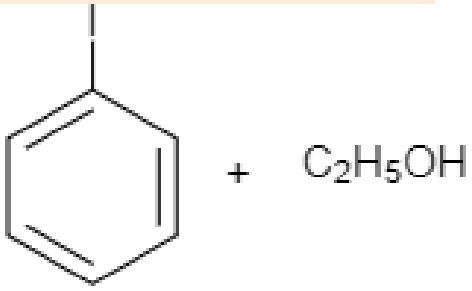
- A mixture of ethanol and acetone shows positive deviation from Raoult's Law.
- Introduction of acetone between the molecules of ethanol results in breaking of some of these hydrogen bonds
  Due to weakening of interactions, the solution shows positive deviation from Raoult's law

172. Anisole on cleavage with HI gives

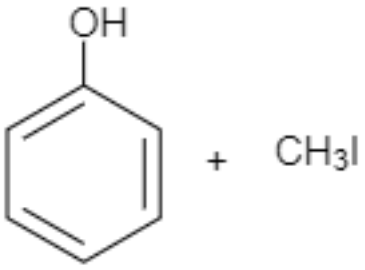
A. $C_6H_5OH + C_2H_5I$



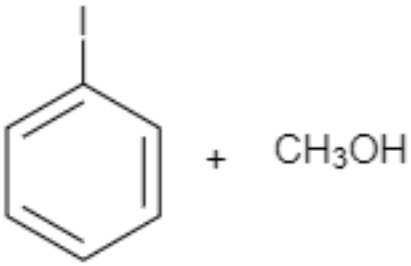
B. $C_6H_5I + C_2H_5OH$



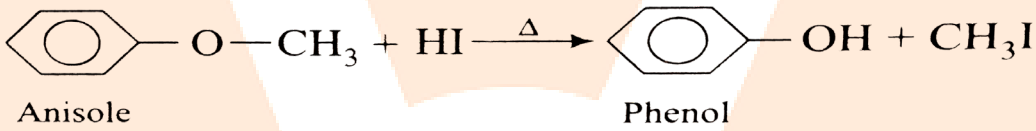
C. $C_6H_5OH + CH_3I$



D. $C_6H_5I + CH_3OH$



Solutions:



173. Urea reacts with water to form A which will decompose to form B. B when passed through Cu^{2+} (aq), deep blue colour solution C is formed. What is the formula of C from the following?

A. $Cu(OH)_2$
B. $CuCO_3.Cu(OH)_2$
C. $CuSO_4$
D. $[Cu(NH_3)_4]^{2+}$

Solutions:

$$NH_2 - \overset{O}{\overset{\|}{C}} - NH_2 + H_2O \rightarrow \underset{\downarrow}{(NH_4)_2}CO_3\,(A)$$

$$\underset{(B)}{\overset{O}{\mathbf{NH_3}}} + \mathbf{CO_2} + \mathbf{H_2O}$$

$Cu^2 + NH_3$ (a) ⟶ $[Cu(NH_3)_4]^{+2}$(or) deep-blue.

174. The freezing point depression constant (K_f) af benzene is 5.12 K kg mol^{-1}. The freezing points depression for the solution of molality 0.087 n containing a non-electrolyte solute in benzene is (rounded off upto two decimal places):

A. 0.40K
B. 0.60K
C. 0.20K
D. 0.80K

Solutions:

$\Delta T_f = K_f\, m$

K_f of benzene = 5.12 kg mol^{-1}

molality, m of solution = 0.078 m

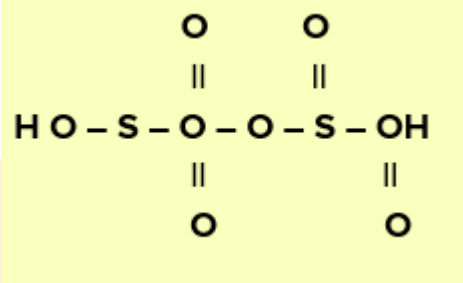
$\Delta T_f = 5.12 \times 0.078$ K

$= 0.399\ K \approx 0.40\ K$

175. which of the following oxoacid of solphur has - O - O - linkage?

A. $H_2S_2O_8$, peroxodisulphuric acid
B. $H_2S_2O_7$, pyrosulphuric acid
C. H_2SO_3, sulphurous acid
D. H_2SO_4, sulphuric acid

Solutions:



176. Identify the correct statement from the following:
A. Vapour phase refining is carried out for Nickel by Van Arkel method.
B. Pig iron can be moulded into a variety of shapes.
C. Wrought iron is impure iron with 4% carbon.
D. Blister copper has blistered appearance due to evolution of CO_2.

Solutions:

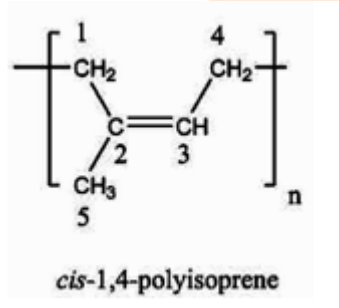
Option 1: Mond's process is carried for Ni
Option 3: Purest form of iron
Option 4: Due to So_2 bubbies.

177. Which of the following is a natural polymer?
A. Polybutadiene
B. Poly (Butadiene - acrylonitrile)

C. Cis - 1, 4 - polyisoprene

D. Poly (butadiene - styrene)

Solutions:



cis-1,4-polyisoprene

Natural polymers are always cis isomers

178. An element has a body centered cubic (bcc) structure with a cell edge of 288 pm. The atomic radius is:

A. $\frac{4}{\sqrt{3}} \times 283\,pm$

B. $\frac{4}{\sqrt{2}} \times 288\,pm$

C. $\frac{\sqrt{3}}{4} \times 288\,pm$

D. $\frac{\sqrt{2}}{4} \times 288\,pm$

Solutions:

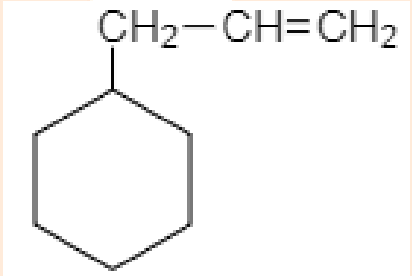
In bcc unit cell,

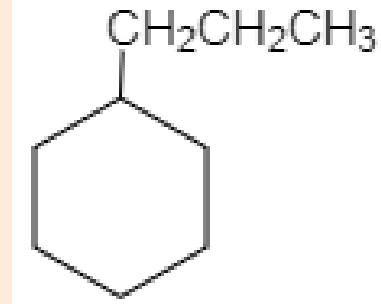
A = 288 pm

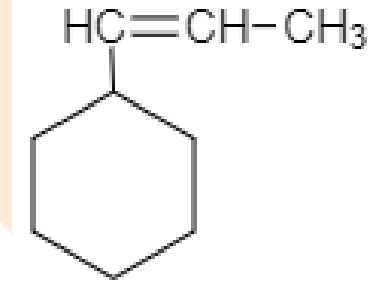
$$\sqrt{3}a = 4r$$

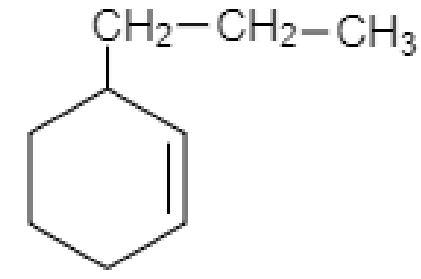
$$\Rightarrow r = \frac{\sqrt{3}}{4}s = \frac{\sqrt{3}}{4} \times 288\,pm$$

179. An alkene on ozonolysis gives methanal as one of the product. Its structure is:

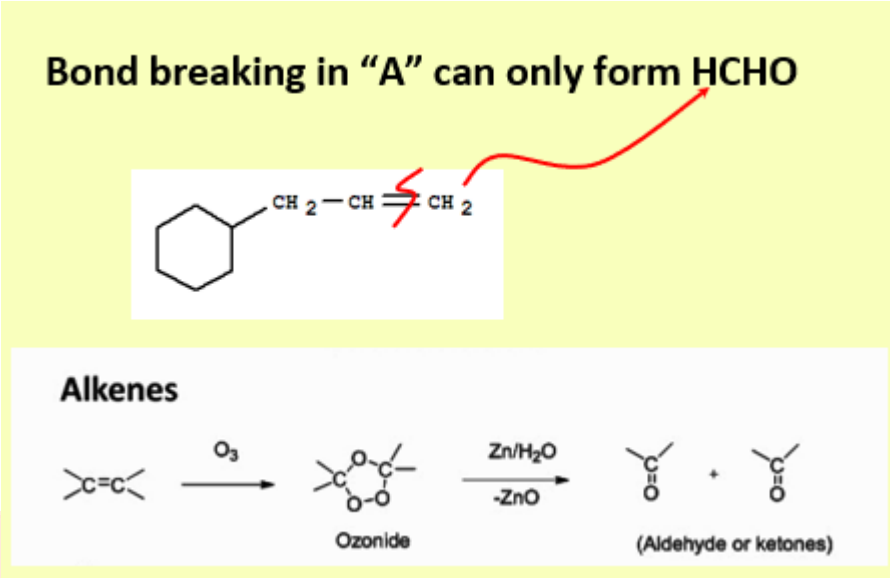
A. 

B. 

C. 

D. 

Solutions:



180. Which of the following set of molecules will have zero dipole moment?

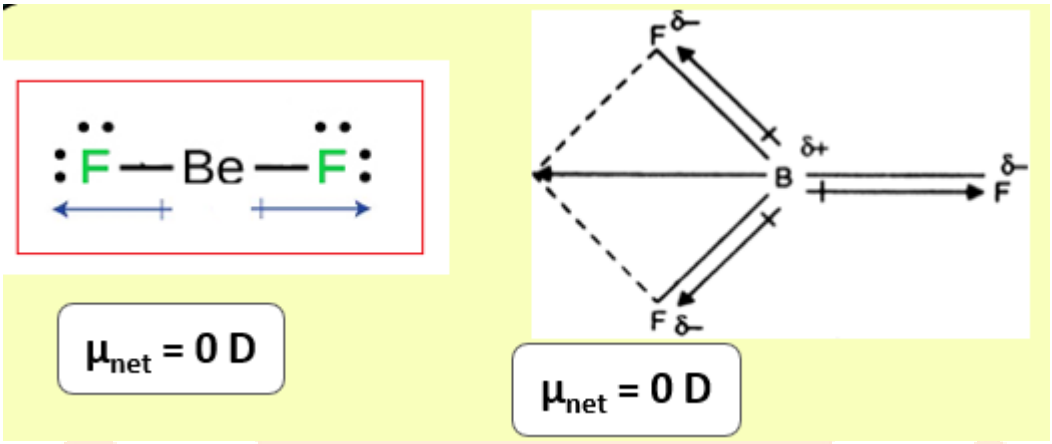
A. Nitrogen trifluoride, beryllium difluoride, water, 1, 3-dichlorobenzene

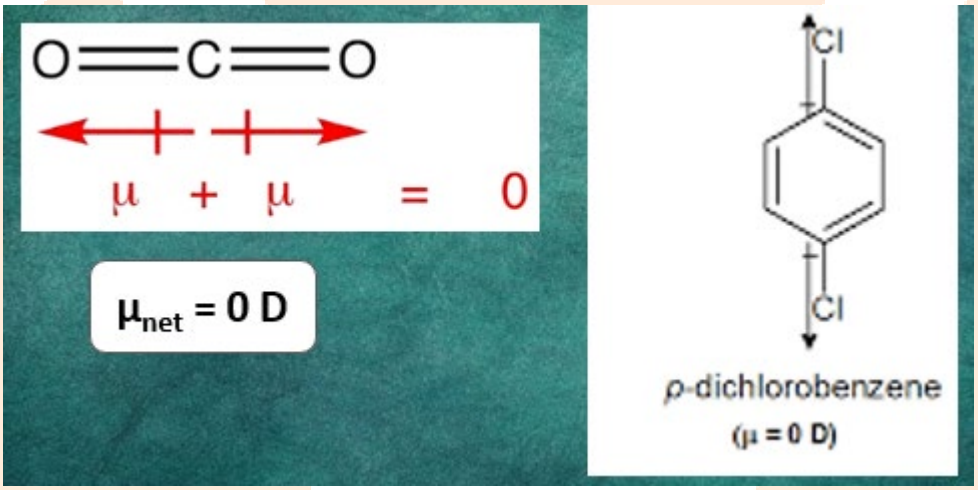
B. Boron trifluoride, beryllium difluoride, carbon dioxide, 1, 4-dichlorobenzene

C. Ammonia, beryllium difluoride, water, 1, 4-dichlorobenzene

D. Boron trifluoride, hydrogen fluoride, carbon dioxide, 1, 3-dichlorobenzene

Solutions:


F — Be — F
μ_{net} = 0 D
F δ−
δ+
B
δ−
F
F δ−
μ_{net} = 0 D


O = C = O
μ + μ = 0
μ_{net} = 0 D
Cl
Cl
p-dichlorobenzene
(μ = 0 D)