BIO 101/BOT 101

Course Synopsis

The plant cell, Prokaryotic and Eukaryotic cells, Cell Growth, Cell division and Reproduction, Introduction to plant classification, General characteristics and morphology of cryptogams, Pteridophytes, Gymnosperm's and Angiosperms

1. The second and fourth sub stages of prophase are _____ and _____
2. The process by which chromosomes exchange parts is called _____ and its point of occurrence is called _____.
3. The organelle responsible for movement of chromosomes to the poles is known as _____
4. The two strands of a chromosome are known as _____ and they are held together by _____
5. A cell preparing for meiosis is called _____
6. The division of the Nucleus is known as _____ while that of the cytoplasm is called _____
7. Give two characteristics each of the male and female reproductive cells of cryptogram male _____ and _____ female _____ and _____
8. The huge sporophyte of the giant phaeophyta consist of ____ and _____
9. The alternating stages or generation of the sporophyte and pteridophyte differ in _____ and _____
10. An example of the most complex phaeophyta is _____
11. The bacterial reproduce by ____
12. The three pigment organelles that are made up of plastids are _____ and _____ and _____
13. The endoplasmic reticulum that attached to the ribosome is known as _____
14. The non-protoplasmic components of the cytoplasm include _____ and _____
15. The most common crystals found in plant cells are those of _____
16. Leucoplasts that store large amount of starch are called _____ while those storing fat are called _____
17. The cell of the blue green algae can be classified as _____
18. A cell with DNA not located in an organized nucleus is _____
19. The energy production site of the cell is _____
20. The food eaten and oxygen taken in by man are produced by ____

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21. _____ produces primitive flowers
22. List four types of mechanical roots found in plants _____, _____, _____
23. Daucus carrota is an example of _____
24. A swollen tuberous root at interval is termed _____
25. The two major function of plant roots include _____ and _____
26. An example of the pteridophyte is _____
27. The root structures of the bryophytes are called _____
28. Karyogamy is _____.
29. Carbohydrate food is stored in fungi in form of _____
30. The blue green pigment found in the blue green algae is called _____.
31. The algae body is not made of true parenchymatous cells. **True/false**
32. The asexual generation in the alternation of generation reproduces by_____
33. The vascular bundles of the dicotyledonous plants are arranged in Rings. **True/false**
34. The botanical names of green vegetables and cultivated lettuce are _____ and _____ respectively.
35. The sucking roots of parasites plants and the breathing roots of aquatic plants are known as _____ and _____.
36. The two major general functions of the vegetable parts of plants are _____ and _____.
37. The vegetation of a particular region is referred to as the _____ of the region.
38. Exchange of segments between homologous chromosomes during cell division is known as _____ and the point of Exchange are termed _____
39. The first and last sub stages of Meiotic prophase 1 is _____ and _____ respectively.
40. Two classes in the division phycophyta are ___ and ___.
41. The science or act of classifying plants into group is known as _____.
42. The two botanical names given to a plant are termed _____ and _____ name.
43. The smallest unit of classification is the _____.

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44. Symbiotic associations between fungi and blue-green algae produce _____.
45. The three phases of sexual reproduction in fungi are _____ and _____.
46. The most common crystals found in the plant cells are those of _____.
47. The size of bacteria cells ranges between _____ and _____.
48. Leaf roll of potatoes is caused by _____.
49. Energy conversation and storage of fats within the cells take place in _____ and _____ respectively.
50. The waxy substance present in the cell wall is _____ and _____.
51. The major function of the cell wall is _____ while that of ribosomes is _____.
52. Swollen root that cluster at the base of the stem are called _____ while the slender roots that become suddenly swollen at the tip are _____.
53. The type of supporting roots found in sorghum bicolor is _____ while the type found in adansonia digitata is _____.
54. The root of plant develops from _____ while the stem develops from the _____.
55. An example of a tendril climber is _____.
56. The plant root is protected by the _____.
57. With respect of response to stimuli, plant shoot is _____ while plant root is _____.
58. Examples of naked seed plants are _____.
59. Plants that produce naked seed are _____.
60. The asexual spores used by some fungi include _____, _____, _____, _____, and _____.
61. The classes of algae include the following _____, _____, _____, _____, and _____.
62 The motile spores are called _____.
63. Method of sexual reproduction in lower plants includes _____, _____ and _____.
64. In alternation of generation the two stages are _____ and _____.
65. Asexual spores in cryptogams are _____ and _____.
66. The main body of the Tallophyte is called _____.
67. The viral particle in a living cell is _____.
68. The bacteria virus is called _____.
69. Climbing plants without special climbing devices are _____ while those that cover up their support without attaching to the support are _____.
70. Slender tap roots that become suddenly swollen at the tip are _____

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white those with series of ring like swelling are _____.

71. Roots used as sucking organ are called _____.
72. Leafy outgrowth developed at the base of a leaf is _____ while the one at the base of a leaflet is _____.
73. Foliar buds produced at the space between the leaf and stem is known as _____.
74. The two classes of plant under angiosperm are _____ and _____.
75. Where are plastids found in plants _____.
76. Where is DNA found in plants _____.
77. Cell size before division varies from family to family. **(true/false)**
78. Growth occurs in multicellular plants by elongation before division. **(true/false)**
79. One difference between prokaryotic and eukaryotic cells is _____.
80. One difference between nuclear membrane and cell membrane is _____.
81. Cells can be studied by means of _____.
82 Cells sizes vary between _____ and _____.
83. Different types of cells always perform the same function in plants. **(true/false)**
84. Cells in growth regions are called _____ and their chromosomes components (ploidy) is _____ white those in reproductive organ are called _____ and their chromosome components is _____.
85 TMV and CMV are good example of _____.
85 The active virus in a living host is called a _____.
87. The capsid is found in _____, while the bacteriophages are _____ infecting bacteria.
88. From the below magnifera is _____ while indica is the _____ name.
89. The name magnifera indica shows a good example of _____.
90. Bacterial cells are a good example of _____.
91. Nuclear membrane is present in _____ cell but absent in _____ cell.
92. Membranous organelles is lacking in _____ cell, while an internal division of labour is seen in _____.

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93. Ribosome is the structures associated with _____ in the cell while _____ is associated with transportation of materials.
94. _____ and _____ are cellular structures for motility.
95. _____ is the cellular energy produced in the _____ which is referred to as the _____ of the cell.
96. _____ is plants without vascular tissues.
97. Lichens are among the _____ while the Gymnosperms are _____ with _____ ovule.
98. Non-flowering plants are called _____ while the flowering plants are _____.
99. The food we eat and the oxygen we breathe are produced by _____ organelle.
100. Stages of sexual reproduction in some flowerless plants include _____, _____, _____, and _____.
101. _____ is a fusion of the protoplast of only two gamete cells.
102. Akinetes are found in _____.
103. _____ is green thallophytes with or without other pigments.
104. Nitrogen fixation and fertilizers are beneficial effects of _____.
105. Capsid and DNA can be found in _____.
106. CASSAVA MOSAIC disease and TOBACCO MOSAIC disease are caused by _____.
107. A viral particle affecting a host is _____.
108. _____ viruses attack other bacteria.
109. Six classes of algae include _____, _____, _____, _____, _____ and _____.
110. Bryophyta includes _____ and _____.
111. Thallopyta includes _____ and _____.
112. Flowers part in angiosperm are called _____.
113. Plants with naked ovule is _____.
114. The main factor used in classifying plant kingdom into two is _____
115. The plant kingdom is majorly grouped into _____ and _____.
116. _____ is cells without organized nucleus.
117. _____ and _____ are the cells responsible for components genetic information in plants.
118. _____ play important role in cell division.
119. Cellular movement involves two kinds of rod movement _____ and _____.

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120. Cells are separate from their external environment by:
[a] Plasma membrane [b] Organelles [c] Protoplasm
[d] Cytoplasm

121. The cell inclusions embedded within the cytoplasm are called
[a] Cytoplasm [b] Protoplasm
[c] Organelles [d] Tissues

122. The extensive network of membrane enclosed space present in the endoplasmic reticulum is
[a] Ribosome [b] Cisternea
[c] Ribonucleic acid [d] Vesicles

123. Body capable of causing disintegration in the Golgi complex are called
(a) Enzymes (b) Lysosomes
(c) Glandular (d) Mysosomes.

124. The chloroplast that gives colour to flowers and leaves are called
[a] Leucoplast [b] Plasticids
[c] Chromoplast [d] Granaplast.

125. All the characteristics are true of gymnosperms except.
[a] They all posses naked ovule
[b] They possess flower without whorls
[c] They are flower with whorls [d] They are flowering plants.

126. The cyanophyta are the
[a] Green algae [b] Red algae
[c] Blue green algae [d] Brown algae

127. The characteristics of fungi include the following except
[a] They are achlorophyllous
[b] Carbohydrate food stores in form of starch
[c] Wall of hyphae made up of chitin [d] they are autotrophic

128. In which group of angiosperm are the vascular bundles arranged in rings?
[a] Monocotyledons [b] Bryophyte
[c] Dicotyledons [d]A and B

129. Plants without vascular tissues includes
[a] Pterodophytes [b] Gymnosperm

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[c] Angiosperm [d] Bryophytes

130. The collection of species, which bear close resemblance to one another as far as the morphological characteristics of the flora in reproductive plants are considered, is referred to as

[a] Species [b] Taxonomy

[c] Genius [d] Family

131. Oogamy is

[a] The function of differentiated male and female gametes

[b] The fusion of gametes similar in shape, size and behaviour

[c] The fusion of gamete slightly different in size and behaviour

[d] None of the above

132. The life cycle of many flowerless plants is completed in two alternating generation, which differs in:

[a] Mode of respiration and colour

(b) Morphology and mode of reproduction

(c) Morphology and size

(d) Weight and reproduction

133. The female gametes in alternation of generation is the

(a) Sporophyte (b) Chromosome

(c) Egg cell (d) Oogamy

134. The male gametes in alternation generation is the

(a) Antheroziod (b) Haploid

(c) Isogamy (d) Gametes

135. The sporophyte give rise to the

(a) Chromosome (b) Sporophyte

(c) Meiosis (d) Spore young cells

136. The following is true of the algae except

(a) They are autotrophic

(b) Cell wall is not made of true cellulose

© Green thallophytes with chlorophyll

(d) B & C

137. Heterocyst present in the nostoc is likely for

(a) Food storage (b) Absorption of water (c) Vegetable propagation and food storage (d) Absorption of water and food storage

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138. The following statements are true except
[a] Chlamydospores are resting spores from vegetative hyphae
[b] Conidia are formed Singly or in chains conidiophore
[c] Zoospores are non-motile spores
[d] AsCosporic are bone in sacs

139. The fusion protoplasm is referred to as
(a) Karyogamy (b) Plasmogamy
(c) Gamentangia (d) Isogamy

140. The following are examples of pteridophytes except
(a) Lycopodium (b) Sellaginella
(c) Ferns

141. Plants root are modified to perform some functions except _____
(a) Storage (b) Physiological
(c) Chemical (d) Mechanized

142. When tuberous root appear in a cluster at the base of stem it is called _____.
[a] Modulose [b] Fasiculated
[c] Nodulose [d] Annulated

143. Daucus currota is an example of _____ root.
[a] Moniliform [b] Fusiform
[c] Coniform [d] Napiform

144. One of the major function of contractile roots in purely.
(a) Mechanized (b) Physiological
(c) Physical (d) Chemical

145. Stem that can carry the weight of its fruit leaves and flower are known as _____.
(a) Solid stem (b) Bole stem
(c) Erect stem (d) Culm stem

146. The following are examples of bole stem except _____
(a) Catapa (b) Milicia excels
(c) Ficus sun (d) Musasapientum

147. Which of the following is not an erect stem?
[a] Culm (b) Corm

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(c) Cerdex (d) Pseudostem

148. Weak stemmed plants includes the following plants except _____

(a) Runner (b) Rhizome
(c) Stolom (d) Trailer

149. The bud found at apex of underground stem is called ___

[a] Auxiliary bud [b] Terminal bud
[c] Underground bud [d] Aerial bud

150. Sub-aerial stem is found in

[a] Allium cepa [b] Dancus carrota
[c] Manihot esculentum [d] Tridax procumbers

151. A plant which grows on another plant without harm to the host plant is called _____

[a] A parasite [b] A epiphyte
[c] A saprophyte [d] A predator [e] A hermaphrodite

152. The function of lenticels is

[a] To remove excess water in the plant
[b] To absorb water from the atmosphere
[c] For gaseous exchange
[d] To absorb light [e] To store food

153. An organism which lives on the remains of a dead plant is

[a] An Endoparasite [b] A saprophyte
[c] A commensal [d] A symbiont [e] An ectoparasite

154. The carrier of hereditary characters in plants and animals is the

[a] Cell [b] Nucleus
[c] Chromosome [d] Chloroplast [e] Gene

155. Which one of the following options is not true for mucor or rhizopus? It

[a] Grows on moist dead organic matter
[b] Is a plant [c] has cellulose cell wall
[d] Reproduces asexually by producing spores
[e] Haas no chlorophyll

156. The region of cell division in a root is

[a] Root cap [b] Endodermis
[c] Xylem [d] piliferous layer [e] Meristem

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157. Which of the statement below is not characteristic of wind-polluted flowers?
[a] Stigma are usually large and feathery
[b] Nectary is usually absent
[c] The pollen grains have rough spiny surfaces
[d] The flowers are not scented
[e] The pollen is light and smooth

158. If the bark and phloem tissues of a woody shoot are peeled off by ringing, the whole plant will eventually die because
[a] Water does not reach the leaves
[b] Water and salts remain below the ringed portion
[c] There is a withdrawal of water from the roots by soil
[d] Manufactured food does not reach the root
[e] The roots store too much water.

159. One common feature of the fungi, algae, mosses and ferns is that they
[a] Are photosynthetic
[b] Show alternation of generation
[c] Reproduce by means of conjugation
[d] Can survive dry conditions [e] Have no seeds

160. Roots of plant are normally
[a] Positively phototropic [b] Negatively geotropic
[c] Negatively hydrotropic [d] Positively hydrotropic
[e] Negatively chemotropic

161. Root hairs are developed from the
[a] Root apex of roots [b] Epidermis of roots
[c] Vascular bundles [d] Endodermis[e] Pericycle

162. In a dicot leaf, guard cells differ from other epidermal cells because they
[a] Have no definite shape [b] Lack nuclei
[c] Are smaller [d] Contain chloroplasts
[e] Lack vacuole

163. In woody plants, gases and water vapour are transported across the stems by the

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[a] Xylem fibres [b] Medullary rays [c] Sieve tubes
[d] Pholem fibres [e] Pholem parenchyma

164. Plants, which can survive in places where the water supply is limited, are
[a] Bryophytes [b] Mesophytes
[c] Xerophytes [d] Hydrophtyes [e] Pteridophytes

165. Mosses, liverworts and ferns can be grouped together because they
[a] Are all aquatic plants [b] All grow in deserts
[c] Are seedless plants [d] Have undifferentiated plant
[e] All produce colourless flowers

166. Which of the following INCORRECT? The prothallus of a fern
[a] Is a flattened heart shaped structure
[b] Is green because its call contain chloroplasts
[c] Is the dominant plant [d] Bears the sexually organs
[e] Is attached to the ground by numerous rhizoids

167. Which of the following cell constituents is not common in both plants and animals?
[a] Mitochondria [b] Ribosomes
[c] Chloroplast [d] Golgi apparatus [e] Vacuoles

168. Flowering plant is monoecieous if
[a] The androecium is formed on one plant
[b] The gynoecium is monocarpons
[c] It produces essential organs
[d] The gynoecium and androecium are on the same plant
[e] The flowers are unisexual

169. Which of the following is not a waste product of plants?
[a] Tannins [b] Oxygen
[c] Carbon dioxide [d] Sap [e] Alkaloids

170. Bryophytes are different from flowering plants because they
[a] Live in moist habitats
[b] Are small plants
[c] Reproduce sexually and asexually
[d] Have small leaves
[e] Here no vascular tissues

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ANSWERS TO BIO 101

1. Eygonema, Diplonema
2. CrosSing over. Chiasmata
3. Spindle fibre
   It is chiefly involved in morning and segregating the chromosomes during nuclear division, collective form is referred to as mitotic spindle in mitosis and meiotic spindle in meiosis
4. Chromatids, Centromeres
5. Metocyte
6. Karyokinesis and cytokinesis
   Note that the fusion of nuclei is karyogamy while the division is karyokinesis
7. Male-motile, active and small female-non-motile, passive and large
8. Blade and [sporophyiis]
9. Mode of reproduction and morphology
10. Kelps [large sea weed]
    Phaeophytes are also known as brown algae and are commonly adapted to marine environment they are the largest protoctist
11. Binary fission
12. Chloroplast, chromoplast and leucoplast Chloroplast [green], chromoplast [colourful] and leucoplast [white] and are responsible for pigment synthesis and storage
13. Rough endoplasmic reticulum also referred to as [RER]
14. Crystals and vacuoles
15. Calcium oxalate
16. Amyloplast, Elainoplast
17. Prokaryotic cell
18. Prokaryotic cell
19. Mitochondria
    It is the "power house of the cell" ATP [AdenoSine Triphosphate] is the energy food [The most important cellular energy]
20. Chloroplast
21. Gymnosperms
22. Prop Root, silt roots, climbing roots, buttress roots
    There are only five types of roots classified for mechanical or additional support and they include the four above and epiphytic roots.
23. Conical roots
    Dameus carrot is specie of carrot and posses the type of root that swollen at the upper part and gradually tapes towards the base to give a cone shape and that type of root is called "CONICAL ROOT"
24. Moliniform root

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25. Absorption of nutrient
Anchorage for the plant it gives it support
26. Fern
Example of pteridophytes include fern, horse tail or equiseum
27. Rhizoids
Rhizoid help in storage and absorption of water and nutrients in the soil
28. Fusion of nuclei
Part of the stages of the sexual reproduction in fungi
29. Glycogen
30. Phycocyanin
31 False
The algae body is made of parenchymatous cells
32. Spores
Alternation of generation asexually by majority reproductive by the use of spore in the gametophyte and saprophyte
33. True
34. Green Vegetable
Cultivated lettuce, lactuca sativa
35. Haustoria, pneumatopore
36. Nutrition and Growth of a plant
37. Flora
38. CrosSing over, chiasmata
39. Leptonema and diakinesis
The five sub-stages involved in meiotic prophase are leptonema, Eygonema[Zygonema]-pachynema-diplonema-diakinesis
40. Cyanopyhta and Euglenophyta
41. Taxonomy
42. Generic name and Specific name.
43. Species
44. Lichen
45. Plasmogamy, karyogamy and Gaments with gamentangia
46. Calcium oxalate
47. 0.1NM to 0.25NM
48. Virus
49. Mitochondria, Elainoplast storage of fats and oil is called Elainoplast [leucoplasts], storage of starch is called amyloplast [leucoplasts] they are both examples of leucoplasts.
50. Suberin and cut in
The waxy substances make it a flower flexible
51. Protection, synthesis of protein

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52. Fasciculated root: fascicle at the base of the stem e.g. dahlea
53. Pro roots, buttress root
Pro root: is modified for additional support and develops from the lower node of the stem of erect monocotyledonous plant.
Buttress root: are huge outward extensions of the base of tall forest tree that provide additional support to huge trucks against wind currents.
54. Radicule plumule
The ridicule then forms the roots that posses the root hair, the plumule forms the stem that carries the flower, leaf etc.
55. Gloriosa superba
Tendril clumbers attach themselves to other plants or objects doing their tendril and are majority classified as scandent plants.
56. Root cap
57. Positively phototropic and positively geostrophic and Hydrographic due to the photosynthesis characteristic of green plant, their shoot that contains the chlorophyll [Chloroplast] is positively phototrophic and move against gravity [negatively geotropic]. The plant root that grows downward to tap nutrients and water is therefore negatively phototropic and positively phototrophic and hydrotrophic
58. Conifers, cycads
Conifers and cycads belong to the division pinophyta [Coniferophyta] and cycadophyta respectively both belonging to gymnosperm.
59. Gymnosperm
60. AsCospores, oidia, basidospores, chlanidospores, zoospores and gonidia.
61. Phacophyta [Brown algae]
Cyanophyta [Blue-green algae]
Euglenophyta [Euglenoids]
Bacillarophyta [Diatoms]
Chlorophyta [Green algae]
Rhodophyta [Red algae]
62. Zoospores
The motile spore are generally called zoospores while the stationary spores are called Gonidia
63. Anisogamy, Oogamy and Isogamy
This is quite different from sexual reproduction of fungi that take place in three phases: the stages above are for lower plants belonging to phase gametangia
64. Gametophyte and sporophyte
65. Gonidia and zoospores
66. Thallus
67. Virion
68. Bacteriophage

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69. Laines or lianes, scramblers lianes are very thick and woody perennial climbers usually found in the forest e.g. Alafia Barteri
Scramblers do not attach to their support but simply i.e. an against nearly plants e.g. combretum Sp

70. Nodulose, annulated root example of nodulose include maranta while an example of annulated root is psychotria

71. Haustoria
Roots modified for parasition, suckling roots can also be called "Haustoria"

72. Stipules, stipules
Stipules are difference stipes which are also leaf life out growths but are developed at the bases of the leaflets of compound leaves

73. Auxiliary buds
Auxiliary buds are buds occurring in the axil of leaves

74. Monocot and dicot. Monocot one [cotyledon embryo] with paralleled venation and dicot [Two cotyledon embryo] with reticulate venation are the two classes of plants under angiosperm

75. Cytoplasm plastid is sub-cellular, self-replicating major organelle found in the cytoplasm of plants and algae

76. Nucleus

77. False
Cellular growth is the same in all families in multicellular plant

78 False
The phase of growth includes cell division, cell elongation and cell differentiation. One occurs before the other occurs so cell division occurs before cell elongation

79. There are a lot of differences between prokaryotic and Eukaryotic cells and they are
Prokaryotic cells
1. Nuclear membrane is absent
2. DNA with some non-histone
3. Absence of intracellular movement
Eukaryotic cell
1. Nuclear membrane present
2. DNA complexed with histone and non-histone, cytoplasmic
3. Cytoplasmic: presence of intercellular movement cytoplasmic streaming, phagocytosis, pinocytosis

80. Nuclear membrane encloses the nucleus white cell membrane encloses the whole cell organelles and is quite bigger then nucleus membrane

81. Microscope.
Cells are microscopy therefore needs microscope for proper viewing.

82. 0.1μm – 0.25μm & 10μm -100μm

83. False

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Different types of cell would also carry out different function in plants

84. Question not clear

85. Virus

86. Viron

They are viral particle that affect specific host.

87. Head of the virus, virus affecting bacteria [Bacteriophages]

88. Genus, specie

The last two nomenclature binomial systems of classification are called genus and specie which then combination is known as "Botanical Name".

89. Mango tree

The botanized name for mango is Mangifera Indica.

90. Prokaryote

Prokaryote consists of bacterial and blue-green algae.

91. Prokaryote cell, Eukaryotic cell

92. Prokaryote cell, Eukaryotic cell

The prokaryotes are the smallest cells known that lack membranous Organelle that undergo division of labour.

93. Endoplasmic recticulum [ER] Endoplasmic Recticulum helps in transport, storage and synthesis of materials in the cell.

94. Microtubules and microfilaments. The microtubules are structure framework of cilia and flagella and the micro filaments do not contain tubulin.

95. ATP [AdenoSine Triphosphate], Mitochondrion, power of the cell, mitochondrion is mostly referred to as the power house of the cell because enzymes located on the cristse carry pot the energy yielding steps of Aerobic metabolism, ATP the most important cellular energy is produced

96. Bryophytes

Bryophytes are the only plants that lack vascular tissues.

97. Thallophyte borne with naked Ovule. Thallophytes include fungi, Algae and lichen. Gymnosperms are flowers without which and are borne with naked ovule.

98. Cryptogams and phanerogams

99. Chloroplast found in the green plants.

100. Plasmogamy, karygamy and gametangia.

101. Plasmogamy

Plasmogamy is the one of the sexual reproduction of fungi, the cytoplasm of two parent mycelia use together without fusion of nuclei [Kayogamy].

102. Filamentous form of anaebena

103. Blue green algae

Blue green algae are the green thallophytes that can undergo photosynthesis because of their green pigment e.g. Noston and anaebena.

104. Bacteria

Beneficial effects of bacterial include nitrogen fixation, fertilizers, and nitrification.

105. Head of virus

Head of virus contain only two structures the DNA which is inside the capsid [Protein loat].

106. Virus
107. Viron
108. Bacteriophage
109. Rhodophyta [Red Algae], phaeophyta [Brown Algae], Cyanophyta [Blue Green], englenophyta [Englenoid], Baccillaophyta [Diatoms] and Chlorophyta [Green Algae]
110. Liverwort mad mosses
111. Algae, fungi, lichen
112. The flowering parts are the main reproductive organ of the flowering plant.
113. Gymnosperm
114. Their flowering ability [ability to produce flower]
115. Cryptogams know as non-flowering plant, phanerogan known as flowering plants.
116. Prokaryotic cell literally means "before the nucleus" they do not have organized nucleus.
117. Chromatin and nucleolus
118. Nucleus [Nucleoli]
119. Microfilament and microtubules

Microtubules are capable of rapid assembly, disassembly and primary composed of protein tubulous they are structure framework of Celia and flagella.

Microfilament are thread like and are cannular in diameter than microtubules, they do not contain tubulers.

120. A
121. B
122. B
123. C

Leucoplast is white in colour white granoplast is not a pigment.

Plastid is the combination of the three pigments in plant which are chloroplast, chromoplast and leucoplast.

124. B
125. C
126. C
127. D
128. C

Bryophyte is not an example of angiosperm and they do not belong to the same class. Bryophyta is a non-flowering plant [Cryptogams] white angiosperm is a flower plant [Pharogram].

129. D
130. C

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131. A
132. B
133. C
134. A
135. D
136. B
Algae are cell wall it's not made up of true cellulose.
137. C
The main function of heterocyst is for vegetative propagation and food storage.
138. D
Zoospores are motile spores white gonidia are non-motile spores.
139. B
Karyogamy is the fusion of nuclei. Gametangia consists of either isogamy, anisogamy or oogamy.
140. D
141. C
142. B
143. C
144. C
145. C
Culm stem and bole stem are types of erect stem. Solid stem doesn't exist as a type of stem it is either erect [strong] or weak type of stem.
146. D
Musa sp possess pseudostem and it is formed by joining together the leaf base of several leaves of the plant.
147. B
Examples of erect stem include bote stem, candex stem, culms stem, scape stem and pseudostem.
148. B
Example of weak stemmed plant include travers, creepers, climbers, tunners, lianes/lianes, scramblers and stranglers
149. B
Terminal bind gives rise to the Ariel shoot.
150. A
151. B
An epiphyte is a plant growing on another plant mainly for support without harming the host. A parasite is an organism which lives in endoparasite or on ectoparasite, the parasite benefits but the host suffers.
152. C
Lenticels are small air pores which are usually elliptical in shape.

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153. B
A saprophyte is an organism that lives on dead and decaying organic matters e.g. bacteria and fungi.

154. E
Genes are unit hereditary material located on chromosome present in the nucleus, the nucleus controls the activity of the cell in which it is found, Chloroplast is a cytoplasmic organelle present only in plant cells.

155. C
Mucor or rhizopus belongs to the kingdom fungi, it lacks chloroplast, it grows saprophytically on moist dead organic matter; it has many nuclei; it reproduces asexually by spore formation and it is covered by wall made up of chitin and cellulose.

156. E
The root and stem apex of plant can be divided into region of cell division, followed by the region of cell elongation and the region of cell maturity.
The region of cell division is also known as the apical meristematic cells.

157. C

158. D
The phloem tissue is responsible for the translocation of manufactured food from the leaves to the root when the bark and phloem tissue is removed by ringing; manufactured food from the leaves is disallowed from reaching the roots so the plant dies.

159. E
Fungi lacks chlorophyll hence they cannot photosynthesize. Conjugation occurs in fungi and algae only while mosses, ferns and some algae shows alternation of generation, all of them reproduce by forming spores and not seeds.

160. D
Hydrotropism is the directional response of a plant part in response to water, it is positive when the movement is towards water and negative when it is away from it, Roots of plant bend towards moisture [Positive hydrotropic] while stems and leaves show no response.

161. E
The piliferous layer forms the outer layer in the transverse section of a root; the root heirs arise from the outermost layers of cells of the piliferous layer; the cells are thin-walled and lack cuticle; this facilitates the absorption of water and mineral salts from the soil.

162. D

163. B

164. C

165. C

166. C

167. B

168. D

169. D

170. E

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BIO 103

INTRODUCTION PHYSIOLOGY

Course synopsis

Nature of living organism/Activities of living things, Homoeostasis, Growth and Development, Endocrine system, Respiration, Reproduction, Nutrition and Enzymes, Digestion and Excretion.

Questions:

1. Raw Materials required by green plants and Microbes apart from solar radiation are:
   [a] H_2S, H_2O, CO_2 [b] Light, H_2O, CO_2
   [c] H_2O, H_2S [d] H_2O, CO_2
2. The so called essential elements of Macro elements are
   [a] 8 [b] 16 [c] 12 [d] 10
3. Carbon enters the plant in combination with oxygen as
   [a] $C_6H_{12}O_6$ [b] Co_2 [c] CHO [d] CO
4. The source of Raw materials for plant.
   [a] May be constant with environment
   [b] May change with environment
   [c] May vary with environment
   [d] May be varying and constant
5. Phosphorous is taken the soil as
   [a] PO_4 [b] Phosphoric acid
   [c] Phosphate Ions [d] FO4 Molecules
6. _____ form part of the structure Materials and Respiratory Substrates
   [a] C,H [b] C, H, O [c] Ca, C, H [d] C, H, S
7. _____ is Associated with biological oxidation
   [a] Hydrogen [b] Carbon [c] Oxygen [d] Potassium
8. _____ could be found in few amino acid cysteine etc.
   [a] Sodium [b] Carbon [c] Sulphur [d] Oxygen
9. _____ is constituent of Chlorophii
   [a] Magnesium [b] Calcium [c] Sulphur [d] Iron
10. All Cycles of Raw Materials in Nature Must have
    [a] Source, Utilization, and source.
    [b] Utilization, Returns and source.
    [c] Source, Utilization and return
    [d] Source, Return, Utilization.
11. Metabolites are
    [a] Materials involved in metabolic activities of the cells

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[b] Materials in Oxidation in cells
[c] Materials involved in metabolic activities of the living cells
[d] Materials involve in metabolism and excretion

12. The smallest Monosaccharide include the
[a] Trioses [b] Tetroses [c] Hexoses [d] Heptoses

13. C = O is a common functional group in the
[a] Heptoses [b] Aldoses [c] Ketoses [d] Pentoses

14. The agar of a sea weed is a _____
[a] Structural [b] Nutritional [c] Structure [d] Oxidation

15. Protein, purines, nucleic acids are related because they are
[a] Polysaccharide [b] Nitrogenous compound
[c] Polypeptides [d] For Protein Synthesis

16. The building units of Nucleic acids are:
[a] Nucleotides [b] Pirines and Pyrimidine
[c] Nucleosides [d] DNA and RNA

17. These could also be a component of the Mitochondria and Chloroplast
[a] Carbohydrate [b] Protein
[c] Nucleic acids [d] Lipid

18. Series of Chemical Reactions Involving use of reducing agent is
[a] Calvin cycle [b] Hill Reaction
[c] Light Reaction [d] TCA

19. Breakdown of $C_6H_{12}O_6$ into 2 molecules of lactic acid is
[a] Pathway [b] Glycolytic
[c] Fermentation [d] Krebs cycle

20. Which is the connecting link between glycolytic pathway and Krebs's cycle?
[a] Pyruvic Acid [b] Pyruvic acid and Acetyl COA
[c] Acetyl COA [d] Citric Acid

21. _____ is the type of energy stored in the organic food substances.
[a] Kinetic [b] Potential
[c] Mechanical [d] Solar

22. The complete combination of one molecule of gluCose yields
[a] 2 ATP [b] 16 ATP
[c] 38 ATP [d] 36 ATP

23. The process of passing out undigested food substance is _____
[a] Excretion [b] Defecation
[c] Respiration [d] Digestion

24. An Alkaloid gotten from tobacco leaves and form farm part of

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plant excretory waste is

[a] Quinine [b] Morphine
[c] Nicotine [d] Brucine

25. Protozoans in aquatic Environment usually excrete ammonia and are thus called

[a] Ammonetelic [b] Ureotelic
[c] Uricotelic [d] Hippuricotelic

26. The excretory organ of amphioxus is?

[a] Flame cells [b] Nephridia
[c] Contractile vacuole [d] Solenocyte Cells

27. _____ is the form of a sexual reproduction that results in the breaking up of the parents into several parts.

[a] Fragmentation [b] Sporulation
[c] Budding [d] Fission

28. Oogenesis Occurs in the

[a] Testis [b] Ovaries
[c] Germs Cells [d] Nucleus

29. The fuel stage of Growth marked by decrease in Weight and leads to death is?

[a] Lag [b] Equilibrium
[c] Exponential [d] Senescence

30. The separating of the Old cuticle from the new one during Metamorphosis in insect is termed

[a] Moulting [b] Apolysis [c] Growth

31. _____ is the Resting Condition in plant characterized by a low metabolic rate.

[a] Hibernation [b] Aestiration
[c] Dormancy [d] Encystment

32. _____ is an example of a co-enzyme

[a] Cu [b] Mg [c] Fe [d] Vitamins

33. An Enzymes that convert glucose to CO_2 and ethanol is

[a] Zymase [b] Maltase [c] Amylase [d] Invertase

34. _____ is an enzymes that catalyzes the Removal or addition of hydrogen, Oxygen or election from substance

[a] Hydrolases [b] Oxidases
[c] Phosphorylases [d] Lipases

35. One of these is not a method of estimation rates of Enzymes activities

[a] Colouration [b] Manometric
[c] Electric [d] Spectrophotometric

36. _____ is the enzymes used in textile industry to break down

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clothes
[a] Cellulose [b] Amylase
[c] Papain [d] Glycosidase

37. The inner conversion of aldose and ketene sugar is done by
[a] Lyases [b] Isomerases
[c]Carboxylase [d] Phosphorylase

38. Enzymes were first discovered by_____
[a] Buckner .E [b]Newton .I
[c] Gregor .M [d]Darwin .C

39. One of these is not a growth factor
[a] Age [b] Gene
[c] Nutrition [d] Light

40. The tap pole larva of frog is a/an
[a] Omnivore [b]Carnivore
[c] Herbivore [d]Scavenger

41. The list of plant hormones includes the following except
[a] Cubberellins, auxins, ethylene, cytokinins
[b] Cubberllins, auxins, ABA, ethylene, Cytokinins
[c] Caffeine, gibberellins, auxins ethylene, cytokinins
[d] Cubberellins, auxins, cytokinins, indo ethanol.

42. Cubberellins are noted for the following except
[a] Cell elongation in stems
[b] Overcoming of Genetic dwarfism
[c] Root irritation and Growth
[d] Promotion of Cambial Activity

43. Auxins are produced at
[a] Stem apical tip [b] Stem apical tip
[c] Stem apocal tip [d] Stem apocal top

44. The site of activity of auxin is in the
[a] Stem [b] Cell
[c] Root [d] Tissue

45. The following hormones are responsible for Osmoregulation, excretion, Water and Salt Metabolism.
[a] Vasopressin, prolactin, Aldosterone
[b] Vasopressin, thyroxin, Aldosterone
[c] Vasopressin, thyroxin, prolactin And calcitonin
[d] VasopresSin, Prolactin, Aldosterone and Calcitonin

46. All except on are peptide hormones
[a] Prolactin [b] Insulin
[c] Progesterone [d] Calcitonin

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47. Diabetes insipidus is a result of insufficient secretion of
[a] Antidiuretic Hormone
[b] Insulin Hormone
[c] Glucagon [d] Secretin

48. Example of amino acid based hormone is
[a] Thyroid [b] Insulin
[c] Calcitonin [d] Thymosin

49. Cretinism results from
[a] Hyposecretion of Growth hormone in growth years.
[b] Hyper secretion of thyroid hormone on growth years
[c] Hypo secretion of thyroid hormone in growth years
[d] Hyper secretion of growth hormone in growth years.

50. Androgen, Cortisone, Progesterone and Relaxing are examples of
[a] Peptide hormones
[b] Modified amino acid hormones
[c] Steroid hormone
[d] Amino acid hormone

51. The following are hormones secreted by the anterior pituitary except.
[a] TSH [b] ADH
[c] APH [d] Growth hormones

52. Oxytocin help to stimulate
[a] Contraction of uterine muscle during feeding
[b] Contraction of uterine muscle during exercise
[c] Contraction of uterine muscle during reproduction.
[d] Contraction of uterine muscle during parturition

53. Calculation and parathormone are involves on
[a] Calcium anabolism
[b] Calcium Metabolism
[c] Calcium digestion
[d] Calcium Induction

54. The name of hormone secreted by the heart is
[a] Atrial Neurotic factor (AVF)
[b] Atrial Natriretic Factor (ANF)
[c] Atrial Nutriuretic Factor (ANF)
[d] Atrial nanouretic factor (ANF)

55. Gastrin, Secreting, Enterogastrone and pan creozymin are hormones of the
[a] Reproductive System
[b] Digestive System
[c] Pancreatic System
[d] Parturition System

56. The hormone somatomedin is a product of and functions for

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[a] Thymus and Stimulates maturation of cells of immune system.
[b] Kidney and stimulates secretion from adrenal cortex
[c] Liver and stimulates growth
[d] Duodenum and stimulates secretion

57. The other name for aldosterone is _____
[a] Mineral ocorticoids
[b] Glucocorticoids
[c] Cortical androgen
[d] CortiCosterone

58. One of the hormones listed below has been implicated in amphibian Metamorphosis.
[a] Growth hormone [b] Thyroxin
[c] Somatomedin [d] Prolactin

59. Which of the hormones listed below has a link with the hypothalamus?
[a] Antidiuretic hormone [b] Growth Hormone
[c] Thyroid [d] Glucagons

60. Which of the hormones listed below is common secretion from the ovaries and adrenal cortex.
[a] oestrogens [b] Progesterone
[c] Testosterone [d] Relaxin

61. The flow of materials through the living system is called
[a] Metabolism [b] Catabolism
[c] Regulation [d] all of the above

62. The existence of living things into several varieties and complexity is made possible because they are able to
[a] Mutate [b] Adapt
[c] Evolve [d] All of the above

63. Which of the following is not required essentially in green plants?
[a] Phosphorous [b] Zinc
[c] Sulphur [d] Iron

64. The element that plays a large part in the structure of organic materials and in gaseous form is
[a] Nitrogen [b] Phosphorous [c] Oxygen [d] Carbon

65. Which of these element is absent in the plastids and nucleus
[a] Sulphur [b] Potassium [c] Oxygen [d] Carbon

66. One of the following is not true about the Iron element.
[a] It is essential for the pophyrin enzymes of respiration
[b] It is essential for chlorophii formation
[c] It influence the transport of carbohydrate and proteins

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[d] All of the above

67. Stunting and poor growth in plants is a result of deficiency in
[a] Calcium [b] Magnesium
[c] Sulphur [d] Potassium

68. The following statements are true except
[a] Nucleic acid are made from building units called nucleotides
[b] Nucleotides are phosphoric acid esters.
[c] The C,H,O are built from various unit called monosaccharide
[d] None of the above

69. Nucleic acids are components of the
[a] Mitochondria
[b] Chromosomes
[c] Chloroplasts
[d] All of the above

70. The Nitrogen bases are
[a] Purines [b] Pyrimidines
[c] A and B [d] Thymine

71. The following statements are true except
[a] Lipids are water insoluble organic substances.
[b] Lipids are chloroform soluble
[c] Lipids are benzene insoluble
[d] Lipid are either soluble

72. Absorption by root carried out
[a] Actively [b] Passively
[c] Semi actively [d] None of the above

73. The following are true about passive absorption except
[a] Physical absorption [b] Non metallic
[c] Movement occur through transpiration push
[d] All of the above

74. Which of the following is dependent on cellular Energy?
[a] Passive absorption [b] Transpiration
[c] Active absorption [d] B & C

75. The absorption of salts depends on all factors listed except
[a] Rate of transpiratio [b] Light intensity
[c] Temperature [d] Mass Flow

76. Active transport is of high importance in salt absorption because
[a] Ions carried cannot be leached and washed out
[b] Ions carried be exchanged for those in the external solution.
[c] A and B [d] It does not require cellular energy

77. Pyrimidine include the following except

[a] Uracil [b] Cytosine [c] Adenine [d] Thymie

78. DNA is
[a] Deoxyribonucleic acid
[b] Deribonucleic acid
[c] Deoxyribose acid
[d] Dioxyribonucleic acid

79. Which of the following is not a class of lipids?
[a] Steroids [b] Terpenses
[c] Phosphoglycerides [d] Lipid Benzene

80. The energy transformation in the metabolic processes of life is carried out with the aid of.
[a] Enzymes [b] In organic energy
[c] Energy capacity [d] None of the above

81. _____ essential for pophyrin enzymes

82. Nitrogen might be obtained from the soil solution as _____ and _____

83. From the soil the plants have the ability obtaining _____

84. _____, _____ and_____ are used as structural materials in the plant

85. _____ is necessary for aerobic respiration in plants.

86. Yellowness of leaves is caused by _____

87. Enzymes such as _____and _____ required crystine group for activation.

88. Lack of Iron causes _____.

89. The sources of the inorganic element (ion) varies with._____

90. _____ is responsible for weakness in plant.

91. What part of plant does calcium enter_____.

92. A nucleotides are compound of sugar +_____

93. _____ is an insoluble organic substance found in cell.

94. Absorption of salt depend on _____, _____, _____ and _____

95. Lack of _____ cause red or purple leaf colouration.

96. _____ is responsible for electro osmosis transport mechanism in the synthesis of carbohydrate and protein.

97. The product of C,H,O built from various unit called monosaccharide's are named either according to _____ or _____

98. _____ element is responsible for cell derision

99. Magnesium act as an activator in _____ and _____

100. ion of mineral salt is either absorbs _____ or _____

101. _____ is a constituent of protoplasm

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102. Cell cannot enlarge in the total absence of _____
103. The building block of most lipid include _____ and glycerol
104. Crystal of _____ is of common occurrence in the tissue of many plants
105. The Nuclei acids is made of _____ and _____
106. DNA and RNA are made of the building unit called _____
107. _____ materials is involved in the metabolic of living cell.
108. _____ element is important constituent of custard oil
109. _____ hasten the ripening of fruit
110. When ions more upward through the transpiration current along with mass flow of water is called_____
111. Nucleotides are phosphoric acid esters of _____
112. The deficiency of sulphur is _____
113. Nucleotides is composed of sugar + Nitrogenous bases + _____
114. Phosphorous is always present as _____ and _____
115. Sulphur is contained in some amino acid such as _____
116. Lack of _____ is responsible for poor root development
117. The root system is promoted by _____
118. The deficiency of magnesium leads to _____
119. Calcium enter into the construction of plants as _____
120. _____ hasten the ripening of fruit
121. Plant with only one or two gametes in a lifetime is _____
122. Define Growth in organism.
123. The major group of metabolites needed by plant and animal are_____ and _____
124. _____ is the reducing agent in the light regulation
125. Mention two main group of plant hormone _____ and_____
126. Enzymes can be divided into _____ and _____ based on their sites of operation
127. Two ways by which enzymes mechanism of action can be explain are_____ and _____
128. Endocrine organ are also known as _____
129. The hormones responsible for development of the reproductive organ and secondary sexual characteristics in female is _____ while the one that ensure maintenance of pregnancy is _____
130. What are the macro elements?

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131. _____ is the means of suffering against fluctuations from the optional condition
132. _____ and _____ are hormones for sugar regulation in man
133. _____ is the element required for protection synthesis and its deficiency symptom is _____
134. _____ and _____ are material involves in metabolic activities of the living cell.
135. _____ + _____ = lactose
136. Two example of chemosynthesis bacteria are _____ and____
137. Three forms of asexual reproduction are _____ and _____
138. _____and _____ are phase at photosynthesis
139. Spermatogenesis taken place in _____ while cogenesis is done in _____
140. What is development?
141. State three differences between tadpoles and flog
142. List three commercial uses of enzymes.
143. What is parthenocaropy?
144. AHD means _____
145. _____ is the maintenance of steady state in human body
146. _____ is the increase in size of an organism due to synthesis of new structural material.
147. Irritability is _____
148. _____is material involved in the metabolic activities of living cells
149. The three material involved in metabolic are _____
150. The smallest unit of carbohydrate is _____
151. Based on the number of carbon and functional group glyceraldehydes is _____ and _____ sugar, which fructose
152. _____ and ____ are good example of storage and polysaccharides
153. A nucleotide is compose of _____ and_____ while a nucleoside is made up of _____ and _____
154. The two stage of photosynthesis are _____ and _____
155. What is excretion?
156. _____ + _____ = lactose
157. $C_6H_{12}O_6.6O_6$ = _____ + _____ +
158. Two name of Krebs cycle are _____ and _____
159. Substance/mineral in small amount by the plant call are termed ____

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160. Two criteria used in naming carbohydrate are_____ and_____
161. The nucleotide composition include _____
162. The process of replacing lost part of the body is called _____
163. _____ is the production of two identical gametes
164. An inhibitor with similar shape and size as the substance will undergo _____ and _____
165. _____ has a specific shape giving each enzyme has specifically.
166. A major product of anaerobic respiration in plant is _____
167. The find stage of growth called _____ is marked by _____ and finally terminates in _____
168. The three main region of, growth in flowering plant are _____
169. Four method of measuring growth are _____
170. Nucleotides are made of _____
171. Starting from pyruvate glycolysis end up in giving ____ and _____
172. While Alcohol fermentation ends up in giving _____
173. On the basis of functional group, carbohydrate could be _____ or _____
174. While on the basis of numbers of carbon atom carbohydrates could be _____ storage polysaccharide may include _____ or _____
175. Homeostasis is controlled by _____ is _____
176. Blastula is a _____
177. Gastrulating is _____
178. The master gland in the human body is called _____
179. To example of organisms having unlimited growth are ____ and ____
180. Three excretory product in plant are ____ and _____
181. organizing excretory ammonia are called _____organism
182. Two unusual nitrogenous compound found in excreted matter are _____ and_____
183. Flame cell system is found in _____
184. Green gland is found in _____
185. Solenocyte cell is found in _____
186. Three factors affecting growth are _____ and _____
187. The process of responding to change in the environment is _____
188. _____ and _____ are the main hormones responsible for the regulation of sugar in animal
189. Nitrogen is primarily required for the formation of _____

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190. The three major metabolites in the living cell are _____
191. Lactose = _____ + _____
192. The conversation of ammonia to nitrate in the soil is achieved by bacteria called _____
193. Photosynthesis is divided into _____ and dark phrase/reaction.
194. Respiration can be defined as _____
195.
196. Three forms of asexual reproduction in living organism are _____
197. When the rate of _____ is greater than rate of _____ organism are _____
198. Amoeba goes into dormancy during drought and extreme of temperature by forming _____
199. Four (4) important growth factors are _____
200. Enzymes working outside the cell are classified as _____
201. The enzymes lipase acts on _____
202. The commercial uses of enzymes papain is _____
203. The genetic material responsible for all biochemical activities is
A. Gene B. phenotype C. DNA D. Genotype
204. Necrosis in potato is caused by..
A. Fungi B. Virus C. Algae D. Nematode
205. The central portion of a bacterial cell is known as ……
A.Gene B. DNA C. RNA D. Spiral
206. The organ which serves the function of food storage and vegetative propagation in anaebena is known as ….
A.Root B. Heterocyst C. Pneumatophores D. Oidia
207. A compact head and rounded mass of hyphae is called……
A. Sclerotium B. anaebena C. Stem D. Leaves
208. Amyloplasts and elaioplasts are responsible for the storage of .....and .....
A. Starch& fat B. Fats & starch
C. Protein& fats D. Fats and protein
209. The botanical name of onion is…..
A. Cocos mucifera B. Bambusa Vulgaris
C. Allium cepa D. Magnifera indica
210. A stem with scars of fallen leaves is termed…
A. Culm B. Bulb C. Candex D. Bole
211. The class of the club fungi is ……..
A. Ascomycetes B. myxomycetes
C. Phycomycetes D. basidiomycetes

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212. The common name of zingiber officinales is .....
A. Garlic B. Ginger C. Onion D. cocoyam

213. The number of the daughter cells after meiosis is .....
A. 3 B. 2 C. 4 D. 1

214. The general term for roots that did not develop from the radical is .....
A. Adventitious B. Epiphytic C. Hanging D. tap

215. The publication containing the records and description of plants of a particular region is known as
A. Fora B. Flora C. Article D. Book

216. When the stipules die with the leaf it is said to be.....
A. Caducuous B. deciduous C. persistent D. crucify

217. The leaf shape which is long, narrow, cylindrical and needle-like is called.....
A. Lanceolate B. Acicular C. Linear D. Ovate

218. The arrangement of leaves on the stem or branch in order to ensure maximum exposure to sunlight and minimum overlapping is...
A. Veination B. Phylotaxy
C. Leaf shape D. disposition

219. When a leaf looks like a spoon, it is said to be.....
A. Falcate B. elliptic
C. spathulate D. cordate

220. The swollen end of flora axis on which all the flora whorls are inserted is.....
A. Pedicel B. receptacle C. Petal D. sepal

221. When a leaf consists of a Single blade it is said to be .....
A. Complex B. Compound
C. Simple D. semi-complex

222. The flower stalk that attaches the flower to the stem or branch is called.....
A. Pedicel B. peduncle C. Petiole D. stamen

ANSWER TO BIO 103

1. Option D
2. Option D
3. Option B
   Plants respire by taking CO_2 giving O_2 out
4. Option C
   Environment is an important factor when dealing with the source of raw materials for plant
5. Option C
   Phosphorous as an element cannot be use in the soil only when they are present as ions.
6. Option B
7. Option A
8. Option C
9. Option A
10. Option C
    Raw materials have to be gotten first, utilize (used) and then returned that is what give birth to the cycle we have e.g. carbon cycle
11. Option C
12. Option C
13. Option C
14. Option C
    Storage polysaccharide Include starch and glucose
15. Option B
16. Option A
17. Option C
18. Option A
19. Option C
20. Option C
21. Option B
22. Option C
    36 ATP from aerobic respiration + 2ATP from anaerobic respiration
23. Option B
    Excretion is different from defecation. The former is the removed waste metabolic product from chemical reaction not undigested food.
24. Option C
    Quinine: is gotten from bark of the cinchona tree
    Morphine: is gotten from fruit of poppy plant

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Brucine: is gotten from strychnos plants.

25. Option A
26. Option D
27. Option A
28. Option B
29. Option D
30. Option B
31. Option C
32. Option D
33. Option A
34. Option B
35. Option C
36. Option A
37. Option B
38. Option A
39. Option A
40. Option C

Frogs are carnivorous feeding on mostly Gastropods, Annelids and arthropods

41. Option C

Caffeine is not an enzyme

42. Option C
43. Option A
44. Option B
45. Option B
46. Option C
47. Option A

Deficiency of Insulin Causes Mellitus

48. Option B
49. Option C
50. Option C
51. Option B
52. Option C
53. Option B
54. Option B
55. Option B

Pancreatic system secrets mainly insulin but also Glucagon.

56. Option C
57. Option A

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58. Option B
59. Option A
60. Option B
61. Option A
62. Option D
63. Option B
It is a Microelement
64. Option C
65. Option B
66. Option C
67. Option A
68. Option D
69. Option D
70. Option C
Thymine is an example of pyrimdine
71. Option C
72. Option A
73. Option B
Passive absorption is non-metallic not non-metallic
74. Option C
75. Option D
76. Option C
77. Option C
78. Option A
While RNA Ribonucleic acid
79. Option D
80. Option A
81. Iron
82. Nitrate and Nitrite
Nitrite is present in the soil by the action of a nitrifying bacterium called nitrosamines on aminomia
83. Water and Nutrient
84. Carbon, Hydrogen and Oxygen
85. Oxygen
86. Nitrogen
87. Urease and hexokinase
88. Chlorosis
89. Environment of Plants
90. Deficiency of Potassium in plant

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91. Middle lamella of the cell wall
192. Nucleotide – Sugar + Nitrogen bases _ Phosphate group
93. Lipid
94. Absorption of salts depends on Aerobic Root respiration, light intensity, rate of transpiration, permeability of cell membrane temperature PH
95. Potassium
96. Potassium
97. Functional group and number of Carbohydrate.
98. Phosphorous
99. Magnesium acts as an activator in phosphates and Carbohydrate system.
100. Passive or actively
101. Phosphorus
102. Calcium
103. Fatty acid
104. Calcium Oxalate
105. RN +) Ribonucleic Acid and DNA (Deoxyribonucleic acid.
106. Nucleoside
107. Metabolites
108. Phosphorus
109. Sulphur
110. Passive absorption
It is physical and Non Metabolic
111. Nucleosides
112. Chlorotic plant and dander stem
113. Nucleotides = Sugar + Nitrogenous bases + Phosphate group
114. Nucleotide, Nucleoprotein
115. Crystine, Crystiene and Methionine
116. Phosphorous
117. Calcium or Phosphorous
118. Chlorosis
Chlorosis in biology is a condition in which leaves produce insufficient chlorophii and chlorophii is responsible for the Green colour of leaves chlorotic leaves are pale, yellow or yellow-white.
119. Calcium enters as Calcium pectate through the middle lamella of the cell wall.
120. Phosphorous
121. Diecous
It is sexually destinist, denoting species in which male and female Genitals' do not occur in the same individual

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122. Growth
It is generally an increase in size of an organism ariSing from the synthesis of a new structural materials wing the energy provided by respiration and raw materials from outside the organism

123. Various Carbohydrate, fats and oil, Nitrogen containing compounds

124. NADPH
Nadph is the abbreviation of nicotinamide adenine dinudeotide phosphate

125. Option D
Growth promotes and growth inhibitors.
Growth promoters are further divided into auxins, gibberellins, cytokines and ethylene while growth inhibitor consist of abscisic acid, phenilics e.g. Catteine, glyCosides, alkaloids and actinonycin

126. Intracellular Enzymes
Extracellular Enzymes

127. Chemical hypothesis lock and key hypothesis

128. Ductless gland

129. Oestrogen progesterone

130. Macro elements are elements needed in large quantity. They are usually ten in number e.g. Nitrogen, potassium, calcium, magnesium etc.

131. Homeostasis

132. Insulin and glycogen

133. Nitrogen, yellowness of green plants, stinted growth and general weakness.

134. Various carbohydrates Nitrogen containing compounds fats and oils.

135. Lactose = glucose + galactose

136. Sulphur, bacteria, won bacteria and nitrifying bacteria

137. Dark and light phases

138. Budding, sponilation any fission and fragmentation budding. It is similar to fission but the parts to which it divides to are not equal.
A project or bud develops at a portion of cell wall.
Binary fission is the most common among unicellular organism.
Sporulation formation of small bodies with nucleus and small cytoplasm
Fragmentation: it is when organisms break up unto several parts each of them regenerates all features of mature organism

139. Test, ovaries

140 Development is the process whereby a living things transforms itself from a Single cell into a vastly complicated multicellular organism.

141. Tadpoles are the youngest stage of frog

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Tadpoles Frog
They have only they can swim and
One way of hop
Movement –Swimming
They breathe though They breathe through Gill Lungs instead of gill
They have long tails They Posses short Tail (Veryshort)

142. Commercial uses of enzymes include papain obtained from plants. It breaks protein into peptones and makes the meet soft synthetic cellulose is used in textile industry to break down clothes into maltose amylase synthetic is used to beer industry to break down starch substances into maltose.

143. Parthenocarpy (literally meaning Virgin fruit) is the natural or artificially induced production of fruit without fertilization of ovules.

144. ADH means anti diuretic hormones. It is also known as VasopresSin. It is protein hormone insufficient production of and causes enormous loss of water through the kidneys. This disease is known as diabetes insipidus

145. Homeostasis

146. Growth

147. Irritability is also called sensitivity and responsiveness is the process of responding the changes in the surroundings or environment

148. Metabolites

149. Various Carbohydrate, Nitrogen containing compound and fats and Oil

150. Glyceraldehydes and fatty acid

151. Maltose and aldose, hexose and ketose

152. Starch and Cellulose

153. Nucleotide = Sugar + Nitrogen bases
Niteoside = sugar + Nitrogen bases sugar

154. Light and dark reaction

155. Excretion is the removal of metabolic waste products from chemical reaction which have occurred in the organism

156. Lactose: GluCose + Galactose

157. $C_6H_{12}O_6 + 6CO_2$ $6CO_2 + 6H_2O + 38$ ATP (Energy)

158. Citric Acid cycle and tricaboxylic acid cycle

159. Micro elements

160. Functional group and number of carbon atoms

161. Nucleotides = Sugar + Nitrogen bases + Phosphate group

162. Regeneration

163. Isogamy

164. Competitive inhibitors

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Non competitive either undergo chemical reaction with the enzymes substrate complex to form inactive compound. Enzymes inhibitors are divided into competitive or non-competitive.

165. Sequence of protein digestion polypeptides –peptores - Proteoses – protein
166. Ethanol (C_2H_5OH)
167. Senescence, loss of weight, death
168. Cell division, cell elongation and cell differentiation region
169. Total fresh weight, dry weight volume overflow can and photographs
170. Nudeotides are made up of sugar + Nitrogen bases + Phosphate Group The nitrogen bases are either purene (Adenine and guanine) or pyramiding (uracil, thymine and cytoSine)
171. Lactic acid and water
172. Aldehyde group, Aldose form or ketone group/ketone form
173. Trioses (3c), tetrose (4c) pentoses (5c), hexoses (6c), heptoses (7c), Octoses (8c)
174. Starch, glucose and chitin.
175. Endocrine or the autonomic nervous system.
176. Blastula is a mass of undifferentiated cells produced when fertilized egg nucleus undergoes repaired mitosis
177. Gastrulation is the process by which cell differentiate into three main group.
178. Pituitary Gland
179. Lobsters and Seaweeds
180. Calcium salt of Organic acids, some metallic irons, oxalic acid and calcium oxalate crystals.
181. Ammonotelic
182. Hippuric acid and ornithuric acid
183. Flatworms (tapeworm) also known as Platyhelminthes
184. Astacus (Crayfish)
185. Amphioxus
186. Genes, nutrition, chemicals and drugs (Carcinogenic chemicals) and light.
187. Irritability
188. Insulin and Glycogen
189. Protein and amino acid
190. The three major metabolites are various carbohydrates, Nitrogen containing compound, fat and oils (lipids).
191. Lactose = Glucose + Galactose

192. Nitrobacteria
193. Light and dark
194. Respirations is the essential process of oxidations of organic compound especially simple carbohydrates such as Glucose in the living cell with the release of energy in form of ATP
195. Green Gland, contractive vacuole and Nephidrum system (nephidia) - Excretory organs of animals are more that the ones listed above. They also include solenxytes calls malpighian tubules, kidney, flame cells and cell surfaces.
196. Binary fission, budding, sporulation and fragmentation
197. Anabolism greater that Catabolism.
198. Encysts
199. Nutrition, Gene chemicals and carcinogenic drugs
200. Extracellular enzymes
201. Lipids
202. Papain breaks down lipid breaking It into fatty acids and glycerol often referred to as meat tenderizer.
203. Option C
204. Option B
205. Option B
206. Option B
207. Option A
208. Option A
209. Option C
210. Option C
211. Option D
212. Option B
213. Option C
214. Option A
215. Option B
216. Option C
217. Option B
218. Option B
219. Option C
220. Option B
221. Option C
222. Option A

ENGLISH LANGUAGE (GNS 101)

In the question below, choose the expression or word which best complete each sentences.

1. After the initial confusion, the manager's suggestion brought……to the depressed investors.
   A. Aglitter of hope
   B. A glimmer of hope
   C. A sparkle of hope
   D. A raise of hope
   E. A shower of hope
2. The farmer has brought the insecticide because he was bent on …..The insects in his farm.
   A. Exterminating B. estimating
   C. extenuating D. Extinguishing E. Exemplifying.
3. The young lady decided to ……
   A. do away with the many advises given by her relatives.
   B. Reject all the advises given by her relatives.
   C. rejects all the advices given by her relations.
   D. takes to all the advices given by her relations.
   E. Eject all the advice given by her relatives.
4. Two ministers found it very difficult to get…..
   A. through with each other in the cabinet.
   B. by which one another. C. through one another.
   D. off from each other. E. on with each other.
5. The school board has placed an order for …….
   A. all furniture's and equipment's required in the new schools.
   B. all the furniture and equipment required in the new schools.
   C. all of the furniture and equipment's required in the new schools.
   D. many of the furniture's and equipment required in the new schools.
   E. many of the furniture's and equipment's require in the new schools.
6. On his way back, the boy ran into a long procession of men, women and children in
   A. white beautiful exceedingly flowering gowns.
   B. exceedingly flowing white beautiful gowns.
   C. exceedingly beautiful white flowing gowns.
   D. white flowing exceedingly beautiful gowns.
   E. flowing exceedingly white beautiful gowns.
7. The proprietors should be blamed for such a deplorable condition in the nursery schools….

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A. isn't it B. shouldn't they
C. should they D. is it? E. shouldn't it

8. I could not believe that our team.....the match after being in the lead foremost of the match.
A. to lose B. lost C. will be loSing
D. loSing E. loosen

9. The Head of Department is away to Muritala Muhammed Airport and has asked Dr. Haruna to stand.....for him.
A. out B. in C. on D. across E. about

10. The commission was set up to enquire.....the general conditions of child abuse in such institutions.
A. at B. from C. after D. before E. into

11. We hold that the nation, both in its public and private sectors....the best consultancy service and advice in all its endeavors.
A. deserve B. is deserving C. deserves
D. are deserving E. richly deserve

12. The situation has deteriorated sharply, and relations between the two countries may soon be
A. removed B. broken C. withdrawn D. Eliminated E. deferred

13. One of the old men....round the lawn three times every morning.
A. Use to run B. are used to run C. is used to running
D. are use to run E. are used to running

14. The problems of Nigeria's worsening economy seem to have ..... An immediate solution.
A. defined B. defied C. rejected D. rewarded E. retained

15. The conference is designed to enable delegates....their personal interest's with specialists in various fields.
A. to discuss about B. discussing C. to discuss
D. for discussing E. by discussing

16. The car owner does not think about the.....of his vehicle and the payments involved in owning it.
A. transportation B. depreciation C. calculation
D. appreciation E. association

17. The very moment she.....her folly, she will come back to apologize.
A. realized B. is realizing C. will realize
D. has realized E. realizes

18. The lazy student suggested that it.....
A. is time we do away with Examination
B. was time we do away with Examination
C. is time we did away with Examination
D. was time we did away with Examination
E. is time we did away with Examination

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19. I do not want the light in my room……when I am asleep.
A. turned off B. turn off C. to run out
D. turned out E. turned in

20. I have applied for……on the campus and I am almost certain I shall get it.
A. acommodation B. accommondation C. accommodation
D. accommoddation E. accommodation

21. The dead body of the armed robber has…..in the street for three days
A. laid B. lain C. layed D. lied E. lay

22. Candidates who are not accustomed to ……fast will find it difficult to finish this paper
A. write B. have written C. be writing D. writing E. having written

23. Do you mind ….another minute or two?
A. to wait B. wait C. waiting D. having awaited E. being awaited

24. We shall offer a good job to a …..To register guest in the central hotel
A. waiter B. watchman C. cashier D. receptionist E. cleaner

25. I've lived….this Street…ten years
A. at, Since B. for, during C. on, for D. on, from E. in, for

26. North America is ….than Northern Europe.
A. hotter B. more hot C. more hotter D. the hottest E. hot

27. i….a lot when I was a student
A. used travel B. was used to travel C. used to travel
D. use travel E. was used to travelling

28. I wish i….your age.
A. to be B. were C. to have been D. would be E. could be

29. I am looking forward to…you.
A. seeing B. see C. have seen D. will see E. be see

30. I can't offer you another loan; I have….money left in my account.
A. few B. a little C. little D. a few E. some

31. The student who went home without an exeat has apologized….his misconduct.
A. on B. at C. to D. for E. about

32. The man has atoned…his Sins.
A. upon B. on C. for D. at E. against

33. The headmaster was interviewed in connection….the expansion project.
A. to B. with C. for D. about E. at

34. What do you want me to do now? I'm….withdrawing and keeping quiet.
A. for B. with C. up D. off E. on

35. I am looking….seeing your family.

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A. ahead at B. forward to C. forward on D. for to E. ahead to

From the words or group of words lettered A to D, choose the word or group of words which best completes each of the following sentences.

36. When the little girl hurt herself she ------ her mother for sympathy.
(a) Looked up (b) forced (c) appealed for (d) turned to

37. The ---------- applauded the lecturer.
(a) Crowd (b) congregation (c) spectator (d) audience

38. The new Eko Bridge in Lagos should help to greatly ease the terrible traffic----------
(a) Compression (b) conversions (c) congestion (d) convergence

39. Able and ----------, he eventually reaped his reward.
(a) Awkward (b) industrial (c) officious (d) industrious

40. The lecturer felt that it would be---------- to let women compete or posts normally filled by men.
(a) Inadequate (b) impolite (c) inferior (d) in appropriate

In questions below, choose the word(s) or phrase which best fills the gap(s)

41. Jubril found that thieves had entered his house in his absence. He went to the police to report the....
(A) Break out (B) break up (C) break in (D) Break into

42. After the accused was found guilty by the court, his counsel... before sentence was passed
(A) Begged for mercy (B) made a plea for mitigation
(C) made an ovation (D) made a plea for litigation

43. Four persons accused of currency.....are being held by the security agents.
(A) Trafficking (B) traviking (C) trafficking (D) traffiking

44. Gone are the days when he... enjoy patronage.
(A) Would (B) will (C) used to (D) could

45. He did not attend the final burial ...
(A) Rite (B) rights (C) rites (D) right

46. The officer was compelled to... the suspect's car.
(A) Seize (B) cease (C) sieze (D) sease

47. A number of doctors are not so well disposed to .....in government hospitals these days....they?
(A) working/do (B) work/are (C) working/are (D) work/aren't

48. If you are going to the market, may I... please?
(A) Follow you (B) come with you
(C) Come by you (D) come as your second

49. Wada said that two of his chickens....eggs yesterday morning.

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(A) Layed (B) lied (C) laid (D) lain

50. Thank you for the party, we really...
(A) Enjoyed ourselves (B) enjoyed
(C) enjoyed very much (D) enjoyed too much.

In questions below, choose the option nearest in meaning to the word(s) or phrase underlined

51. The culprits will **surrender** their loot to the customs officials.
(A) Give away (B) Give out (C) Give in (D) Give up.

52. The discussion became **animated**.
(A) Specialized (B) lively (C) intellectual (D) unruly

53. Rich citizens are often **niggardly** in their ways.
(A) Beggarly (B) sordid (C) miserly (D) pompous

54. The musician's popularity is beginning to **decline**.
(A) Change (B) wane (C) slide (D) disappear

55. Olu promised to **look out for** her next time he is in town
(A) watch for (B) visit (C) greet (D) take care of

56. Finally, I assured him that I would not **go back on my word**.
(A) Return to a place (B) return to a certain word when reading
(C) re-use my word (D) fail to keep my promise

57. The speaker **took his audience down memory lane** before he went to the topic of his lecture.
(A) Took his audience on a journey through a street called Memory Lane
(B) recalled events from the past
(C) told a tale about a place called Memory Lane
(D) gave an outline of his lecture

Select the word that has the same pattern of stress as the given word

58. EDUCATION
(A) Duplicity (B) conjectural (C) economics (D) elaborate

59. HONOUR
(A) Human (B) hyena (C) humane (D) hotel

60. Identify the word that has a different stress pattern from the others.
(A) Discourse (B) intimate (C) accelerate (D) integral

61. Identify the word that has the stress on the second syllable.
(A) Always (B) result (C) reproduce (D) understand

Choose the option opposite in meaning to the word(s) or phrase in italics.

62. Common sense requires that one should be ***decorous*** at formal gatherings.
(A) Courteous (B) careful (C) impolite (D) incurious

63. The string was ***taut***.

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(A) Stretched (B) loose (C) firm (D) tight.

64. The diminutive figure bounces over the track with ***unfathomable*** lightness.
(A) Irresistible (B) predictable (C) invigorating (D) impressive.

65. The teacher announced that the class would be making a ***fleeting*** visit to the Zoo.
(A) Long (B) routine © brief (D) guided

66. We intend to make the reception a ***diurnal*** event.
(A) An annual (B) a weekly (C) a nightly (D) a short.

67. The project is designed to ***alleviate*** poverty in the country.
(A) Exacerbate (B) assuage (C) eradicate (D) tackle.

68. The permanent Secretary left his job ***under a cloud***
(A) With a clear record (B) on a sunny day
(C) In disgrace (D) on a cloudy clay.

69. It is surprising that this politician has now turned ***renegade***
(A) Militant (B) loyal (C) quiet (D) corrupt.

70. Hypertension is a ***debilitating*** disease that everyone should prevent.
(A) a horrible (B) an enervating (C) a mortal (D) an energizing.

71. The striking workers have vowed not to return to work until the decision is ***rescinded***
(A) Implemented (B) changed (C) dismissed (D) incorporated

72. It is rare for a leader and his deputy to ***see eye to eye***.
(A) Reproach each other (B) disagree
(C) be of one mind (D) respect each other.

Choose the option nearest in meaning to the word(s) or phrase in italics

73. The man was able to persuade his ***wilful*** and obstinate daughter to follow the career he chose for her.
(A) Intelligent but arrogant (B) hardworking and intelligent
(C) unyielding and obdurate (D) obscure and odious.

74. That punch by the young boxer proved to be ***fatal***.
(A) Effective (B) belated (C) hard (D) deadly

75. The boy was told that lie would need ***several*** more pints of blood if he was to survive.
(A) Plenty (B) much (C) many (D) some

76. In spite of her grim situation, the young widow smiled dutifully at the visitor's ***pleasantries***
(A) Unkind comments (B) sad stories
(C) condolence messages (D) jocular remarks.

77. The presence of the security men in the area will provide a ***moment of respite*** for the residents.

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(A) Enduring reprieve (B) temporary relief
(C) lasting security (D) soothing relaxation.

78. Though David's condition is ***serious***, his life is not in immediate danger.
(A) grave (B) nasty (C) dangerous (D) hypertensive.

79. The essay topic is ***nebulous.***
(A) Clear (B) incorrect (C) vague (D) distinct

80. I have always believed that my mother is very ***impassioned*** woman.
(A) Impartial (B) emotional (C) Impassive (D) emotive.

81. My father was at the ***apogee*** of his career when he was retired
(A) Terminal point (B) least productive stage
(C) redundant stage (D) highest point.

82. The party's gathering was thrown into a state of ***euphoria*** after the election result was announced.
(A) Pleasure (B) confusion (C) sadness (D) excitement

Select the option that best explains the information conveyed in the sentence

83. The politician's inflammatory remarks were heavily criticized.
(A) The politician's provocative remarks were heavily criticized
(B) The politician's tribalistic remarks were heavily criticized
(C) The politician's bombastic remarks were heavily criticized
(D) The politician's rude remarks were heavily criticized

84. The events of last Friday show that there is no love lost between the Principal and the Vice- Principal.
(A) They dislike each other (B) They like each other
(C) They cannot part company (D) They work independently.

85. Though he is our elected representative, he often takes a rather jaundiced view of our problems.
(A) He takes a rather hazy view of our problems
(B) He takes a sickly view of our problems
(C) He takes an unfavorable position concerning our problems
(D) He takes a rather forceful view of our problems.

86. If he were here it could be more fun.
(A) There was no fun because he was not present
(B) He did not show up and so the occasion lacked much fun
(C) He was being expected to supply more fun
(D) He was expected but did not show up to liven up the occasion.

Fill each gap with the most appropriate option from the list provide

87. Without our relentless campaigns, we might....victory in the race

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the national assembly.

for (A) Never had been (B) never have been
(C) have never be (D) be never sure of.

The Governor rejected the bill and withheld his...

88. (A) Access (B) accent (C) assent (D) ascent

The new school is not provided with... for science practical's.

89. (A) An equipment (B) enough equipment
(C) equipment's (D) enough equipment's

We are all hungry; we... anything to eat Since, morning.

90. (A) Didn't have (B) haven't had © never had (D) hadn't had

In questions below, choose the options NEAREST IN MEANING to the underlined

91. The meeting was **cancelled** because of the convocation.
(A) brought up (B) called off (C) broken off (D) phased out.

92. Our town is so small that we are always meeting our schoolmates **accidentally.**
(A) Coining across (B) falling into (C) knocking up (D) running into

93. Can you **give a good explanation** for your behavior?
(A) Account for (B) call for (C) clear up (D) give up.

94. **Be careful**! We are approaching the crossroads.
(A) Look up (B) watch out (C) look out (D) look in.

95. Thousands of students **are candidates** for the examination but only very few pass.
(A) come into (B) go into (C) enter for (D) turn up for.

96. He **went through fire** before he qualified as a doctor
(A) Had a fire accident (B) made a lot of fire
(C) suffered a lot (D) required a lot of fire

97. Once I have finished all **my homework, I am permitted** to watch television.
(A) I can watch television at any time.
(B)I can only watch television after doing, my homework.
(C) Television comes first, then homework second
(D) I can only finish my homework after permission to watch television

In question below, choose the expression which best completes each sentence

98. The manager said that unless the employees worked harder the factory would have to be closed. The manager said that
(A) The employees were not working hard, and so the factory would be closed (B) the employees should not close early so that

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they could produce more (C) the factory would be shut if the employees did not increase their output (D) the factory was closed because the employees did not work hard enough

99. The student who went home without an exeat has apologized... his misconduct
(A) on (B) at (C) for (D) about.

100. The man has atoned... his Sins.
(A) upon (B) on (C) for (D) against

101. The Headmaster was interviewed in connection....the expansion project.
(A) to (B) with (C) for (D) about

102. What do you want me to do now? I'm…withdrawing and keeping quiet.
(A) For (B) with (C) up (D) on

From the alternatives provided in questions below, select the one which most appropriately completes the sentence.

103. I meant... a pencil but there was no one... them.
(A) buying/selling (B) to buy/to sell
(C) buying/to sell (D) buy/to sell (E) to buy/selling

104. Mrs. Okoro... in this school Since 1975.
(A) Taught (B) is teaching (C) was teaching
(D) teaches (E) has been teaching

105. The Governor has…..to the people on many occasions.
(A) Broadcast (B) been broadcast © broadcasted
(D) been broadcasted

106. Paulina arrived late, she... the right route.
(A) Cannot have taken (B) could not have taking
(C) could not had taken (D) could not have taken

In the question below, the word in capital letters has an emphatic stress. Choose the option that best fits the expression in the sentence

107. The fire destroyed **MANY** lives.
(A) Did the fire destroy the village?
(B) Did the fire destroy some houses?
(C) Did the fire destroy any lives?
(D) Did the fire spare any lives?

108. The electricity in **OUR** premises comes from a generator.
(A) Is the electricity in your compound supplied by a generator?
(B) Is the electricity in your neighbor's premises supplied by a generator? (C) Does the electricity in your premises come from NEPA? (D) Does everybody in your street receive

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electricity from generators?

109. Identify the word that has a different stress pattern from the others.
(A) Interrupt (B) Contribute (C) Harmattan (D) Entertain

110. Identify the word that has a different stress pattern from the others.
(A) Interlocutor (B) Opportunity (C) Ambiguity (D) Actualization

Read the following passage and answer question

'You all know how friendly we are with Okperi. Do you think that any Umuaro man who goes to prison there will come back alive? But that apart, do you forget that this is the moon of planting? Do you want to grow this year's crops in the prison house in a land where your fathers owe a cow? I speak as your elder brother. I have travelled in Olu and I have travelled in Igbo, and I can tell you that there is no escape from the white man. He has come.

When suffering knocks at your door and you say there is no seat left for him, he tells you not to worry because he has brought his own stool. The white man is like that. Before any of you here was old enough to tie a cloth between the legs I saw with my own eyes what the white did to Abame. Then I knew there was no escape.

As daylight chases away darkness so will the white man drive away all our customs? I know that as I say it now it passes by yours ears, but it will happen. The white man has power which comes from the true God and it burns like fire. This is the God about Whom we every eighth day... Unachukwu's opponents were now shouting that this was a meeting of an age group that they had not assembled to join with him in chewing the seed of foolishness which they called their new religion.

'We are talking about the white man's road, said a voice above the others.

'Yes, we are talking about the white man's road, the roof and walls of a house falling; the ceiling is not left standing. The white man, the new religion, the soldiers, the new road - they are all part of the same thing. The white man has a gun, a machete, a bow and carries fire in his mouth. He does not fight with one weapon alone. ***(Taken from Chinua Achebe's Arrow of God)***

111. 'There is no escape from the white man' in the passage means that the
(A) white man will send the people to prison
(B) white man can kill all the people with his gun
(C) people are only trying to run away from the white man
(D) people must accept the white man.

112. Unachukwu's speech in this passage shows that
(A) Is a coward (B) wants his people
(C) loves the white man (D) is wise with experience

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Read the following passage and answer question

Insects can be classified into fourteen separate groupings, or orders. Butterflies and moths belong to the Lepidoptera order. Lepidoptera means "scale wings", from the Greek words "lepido" which means "scale" and "ptera" which means "wings".

Lepidoptera is one of the largest and most diverse insect's orders. The only order with more different species is coleopteran, that of beetles. So far, scientists have observed approximately 150,000 different species of butterflies and moths. Each species is distinguished by the unique arrangement, colour, and pattern of its scales. Worldwide, there are about 28,000 butterfly species. The rest of the species compriSing Lepidoptera are species of moths. Though butterflies and moths both have scaled wings, there are some important differences between them. Butterflies are distinguished by their brightly coloured wings. Moths' wings are usually less bright. Butterflies are usually active during the day, while mothers are active at night. Butterfly antennas are swollen at the tip, while a moth's antennae are feathery.

113. How many insect orders are there?
(A) 2 (B) 14 (C) 3 (D) 150

114. Which of the following is true?
(A) Butterflies and moths belong to different order
(B) Butterflies and moths are both Lepidoptera
(C) Butterflies are insects; while moths are not
(D) Butterflies fly faster than other Lepidoptera

115. You would expect to find the kind of information in this passage in
(A) a scientific environment
(B) a social studies text
(C) neither of these (D) both of these

Read the following passage and answer question

In America well-being of the others, the protection of our privacy, the safety of our borders, or the quality of our thinking.

While censorship is not the way of this land, we must take into account the effect of musical lyrics that influence young listeners. How often do we find ourselves Singing a tune or repeating a phrase from a song instinctively, without stopping to ponder the meaning of the words? When these words are demeaning to any group of people or when they incite violence, we are unknowingly repeating phrases of hate. How long does it take until those phrases become worn into our patterns of thought and we find ourselves believing the words we mindlessly hummed?

116. A used in the passage, the word demeaning most nearly means
(A) Distasteful (B) complimentary (C) insulting (D) delightful

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117. The author implies that the most important aim of the right to free speech is
(A) The ability to disagree with Congress
(B) the ability to say whatever you want to say whenever you want
(C) The right to express our opinions freely
(D) The right to listen to violent music

118. The author attempts to persuade the reader with
(A) Statistics (B) impassioned generalizations
(C) historical quotations (D) anecdotes and examples

119. This passage is most likely from
(A) Speech given to a radio station
(B) textbook on the constitution
(C) magazine article on American music
(D) editorial in a school newspaper

120. The passage seems to imply that
(A) Our mind is dull in receiving data
(B) our subconscious is sometimes the most active
(C) our songs are harmful
(D) our rights are very exclusive

Read each passage carefully and answer the questions that follow.

Those who are familiar with it will tell you that Ludo, like human life itself, is a game both of chance and skill. You need skill in deciding how to make the most advantageous use of the figures, which turn up on the die when you cast it. Since each player has at least four alternative ways of uSing his figures, two players with equal luck may fare differently, depending on how cleverly each one uses his figures. The element of luck, again as in human life, plays a dominant role however. For no matter how skillful a player may be in uSing the figure he gets on the die, he has a slim chance of winning if he continually throws low figures. While a combination of ones and twos may be useful in checking the advance of one's opponents, it will not take one home fast enough to win. On the other hand, consistent throws of sixes and fives, with even the very minimum of skill will help a player to home all his four counters before any of the three other players, unless, of course, he has no idea of the game at all.

111. It is implied in the passage that two players may fare equally if they
(A) have equal luck (B) apply similar skill to figures
(C) apply similar skill to similar figures
(D) have equal skill

112. It is implied in the passage that in Ludo threes and fours are
(A) Very high throws (B) medium throws
(C) low throws (D) very low throws

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13. According to the passage, a player with consistently high throws will
(A) Almost certainly win a game (B) certainly win a game
(C) almost certainly not win a game
(D) deliberately not win a game

Read each passage carefully and answer the questions that follow.

Farming is the most important aspect of agriculture that has attracted attention within the last few years. Agriculture has several other aspects like fishery, livestock and poultry. All these are also important in that they have to do with the production of food items which human beings consume for survival. In many parts of the world today, farming has been regarded as the mainstay of the economy. Crops such as cocoa, rubber and cotton have been produced in such commercial quantity that they are sold to other countries. Some countries have better comparative advantage in producing certain farm crops than other countries. In these other countries, there is the need to spend a lot of money on agriculture, particularly farming.

Most farmers use outmoded tools. A lot of them have no place to store their crops, most of which are always destroyed by insects and pests before harvest time. All these have adverse effects on their productivity. The government can do a lot to help farmers. Farmers' co-operative societies can be encouraged and loans can be made available to farmers through government institutions like banks and finance corporations. Farmers can be taught how to build good storage structures for their produce. All these and a lot more can help to improve the conditions of farming in these countries.

114. A lot of crops harvested are wasted because farmers
(A) Allow insects and pests to destroy their crops
(B) do not have enough money to invest in harvesters
(C) do not have good storage facilities
(D) harvest too much at a time

115. Read each passage carefully and answer the questions that follow.

It is customary nowadays among fashionable ladies and gentlemen to acquire strange and sometimes quaint clothes which are scarcely ever used: Sometimes it may be an approaching festival; sometimes a two hours' ceremony and sometimes to honour a dead colleague - something triggers off the modern craze to sew new materials whose use does not outlast the moment of craze. And so, people who just occupy small apartments in their parents' homes, or have rented one room in a densely-peopled house find that more than two-thirds of their rooms are filled with bongo trousers which they

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cannot wear, worn out jeans which stink, or specially made clothes for occasions that are not recurrent.

Although plagued by the problem of school fees for their children, parents have had to swallow their own phlegm and humour of their children who need special clothes for important events. Newly employed youths soon find that their comrades are getting married, and new and special attire must be used to grace the occasion. University students see matriculation ceremonies or induction ceremonies into club membership as special reasons to make new attire which - you may be sure - they would not wear on another occasion that parallels the one for which these clothes were made.

Medical doctors may soon find another cause for the incidence of high blood pressure among the youth. The desire to acquire new clothes is one strong possible cause, but a more subtle one which haunts like a ghost is the problem of choice of what to wear. The youths have so stuffed their apartments, wardrobes, drawers and trunks with so many clothes that the greatest problem they face is the choice of what to wear.

A suitable title for this passage is

(A) Fashion craze
(B) Fashion craze among the youth
(C) University students and induction ceremonies
(D) Parents and the money for fashion craze

Read each passage carefully and answer the questions that follow.

It may be argued that museums as an institution and an agency for transmitting cultural heritage are an artificial creation, so far as objects are removed from their natural or proper environments and put into museums which are different environment altogether. However, it seems that museums themselves have come to be accepted and recognized as the best equipped institutions devised by man for the assemblage of cultural objects and their presentation and preservation for the present and future generations.

The artificial character of museums is however being gradually transformed into a cultural reality. Thus, just as one goes to the theatre for plays and other performing arts; the mosque, the church or the shrine for worship; the library for the printed word;today,it is to the museum one goes to see evidence of man's material outfit. For, no other institution or place so readily comes to mind as museums do when evidence of material culture is sought. Herein lies the importance of museums as cultural institutions and an agency for transmitting culture.

113. Museums are an artificial creation because

(A) they are an agency for transmitting cultural heritage
(B) natural or proper environments are removed and put into museums

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(C) objects are removed from museums to natural or proper environments

(D) objects are removed from their natural or proper environments and put into museums

117. According to the passage, which of the following is NOT part of the main functions of museums?

(A) Preservation (B) Generation

(C) Presentation (D) Assemblage

Read the passage carefully and answer the questions that follow it.

You would think that the common cold should be easy enough to study, but it is not so easy as it looks. Colds often seem to spread from one person to another, so it is often assumed that the cold must be infectious, but there are some puzzling observations which do not fit in with this theory. An investigator in Holland examined some eight thousand volunteers from different areas, and came to the conclusion that in each group the colds appeared at the same time. Transfer of infection from case to case could not account for that. Yet at the Common Cold Research Unit in Salisbury the infection theory has been tested out; two series of about two hundred people each were inoculated, one with salt water and the other with secretions from known cold victims. Only one of the salt-water groups got a cold, compared with seventy- three in the other group.

In the British Medical Journal the other day, there was a report of a meeting 'The Common Cold-Fact and Fancy', at which one of the speakers reported a study of cold made in Cirencester over the last five years. Three hundred and fifty volunteers had kept diary records of their colds and on an average each had seven every year, with an annual morbidity of seven days. So nearly one-fifth of our lives is spent in more or less misery, coughing and sneezing. Some widely held beliefs about the common cold have turned out not to be true. It seems that old people are just as liable to colds as the young. Sailors in isolated weather ship have just as many colds while on board and not in contact with colds as the young. Sailors in isolated weather ships have just as many colds while on board and not in contact with the outside world as when on shore. It is truism that common illnesses pose more problems than the rare. The rare disease is by comparison much easier to handle. There are not so many cases and all of them have been intensively studied. Someone has read up all the literature about the disease and published a digest of it. There will be more facts and fewer fancies.\

118. The Cirencester volunteers kept a record of their colds through

(A) The British Medical Journal

(B) personal diaries

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(C) morbidity rates
(D) Temperature recordings

Read the passage carefully and answer the questions that follow it.

Whenever I have had to ask myself the question why I have not left this country for good, many answers rush to my mind, each striving to be recognized as being the most cogent. I am reminded of the popular slogan that 'this country belongs to us all', for which reason every Nigerian must join hands in trying to salvage it. I try to dismiss the argument by reasoning that it is foolhardy attempting to lend a helping hand where one's services are apparently not required. Then I am reminded that if I left the country in a hurry just because of our political instability and economic hardships, my commitments to my family and extended family at home would suffer. I reply by saying that as soon as I got settled abroad; I would arrange for my family to join me. Other financial problems at home would be taken care of by my regular remittances. Would I then never think of going back Home in future? Not until the situation in the country improved considerably, I would answer. And who did I expect to carry on with the task of national rehabilitation when the likes of me are all out of the country? Those who messed up the country in the first place, I would argue. And so on. This dialogue of self has been going on for the last ten years or so; meanwhile, I am yet to leave the country.

When I wonder how many people share my kind of mental experience, I realize that we must be very few. For not many have the slightest opportunity of absconding from the country; they do not have the place to run to nor do they have the means of escape. Even among the elite who consider this possibility, the uncertainty of a future outside their fatherland intimidates. And so we all end up staying and mumbling.

119. The expression 'each striving to be recognized as being the most cogent' means each
(A) Trying to prove its superiority
(B) determined to prove that it is the most acceptable
(C) resolved not to be dislodged
(D) attempting to how that it is the brightest.

Read the following and answer question

It was part of her nefarious plot! Of that I had no doubt. She would slowly deprive me of my delicious slumber until finally, exhausted, I gave in to her wretched demands. She would claw her ways into my dreams, she could growl and complain, but no, I would not give in. I pulled the covers close over my head and rolled over. I was the stronger of we two. I was the determined one. I was the human, and she the beast. She must have understood my determination, for

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mercifully, the whining stopped. My breathing grew deeper and I returned to my wonderful sleep. Until moments later a crash awakened me. I bolted out of bed and there she was, in the kitchen guiltily lappily kitty treats off the floor. The mischievous beast had jumped onto the countertop and knocked the bag of food onto the floor. Bad kitty I scolded, pushing her away from the mess of chow. But the sweet face, that little sandpaper tongue licking her chops somehow softened me.

120. The word 'nefacious' as used in the first sentence in the passage means

(A) prankish (B) illegal (C) wicked (D) vicious

ANSWERS TO GNS 101

1. **Option B**- A slight sign of hope
2. **Option A**- Destroy completely
3. **Option C**- Advice is either accepted or rejected and advice has no plural form
4. **Option E**- To relate cordially with each other
5. **Option B**- Furniture and equipment have no plural forms.
6. **Option C**- Order and positions of adjectives: exceedingly beautiful comes before adjective of colour WHITE while FLOWING is an '-ing' word that describes the action of main noun, gowns.
7. **Option B**-Question tag...shouldn't they be blamed?
8. **Option B**-Past tense of loses.
9. **Option B**-Acts as a representative
10. **Option E**-Probe into activity
11. **Option C**-Object of the noun The nation
12. **Option B**-To end relationship
13. **Option C**-Subject-verb agreement; present tense
14. **Option B**-To be beyond
15. **Option C**-Enable someone to do something
16. **Option B**-loss of its value
17. **Option E**-Third person Singular verb in the present complementing the verb will come.
18. **Option D**-Reporting speech suggesting something should have happened.
19. **Option A**-The action is in the past and lights are turned on or off
20. **Option E**
21. **Option B**-past participle of lie
22. **Option D**-Gerund

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23. **Option C** -Noun in form of gerund
24. **Option D** -one who receives guests
25. **Option C** -living on a street for a period of time
26. **Option A** -Comparative form of hot
27. **Option C** -simple past tense complementing the verb was
28. **Option B** -complementing the verb wish.
29. **Option A** -to +gerund serving as noun
30. **Option C** -Quantity of money
31. **Option D** -Apologize for a misdeed
32. **Option C** -atoned for a Sin.
33. **Option B** -something is connecting with
34. **Option A** -That Is what I support
35. **Option B** -We look forward to something
36. **Option D**
37. **Option D**
38. **Option C**
39. **Option D**
40. **Option D**
41. **Option C**
42. **Option B**
43. **Option C**
44. **Option C**
45. **Option C**
46. **Option A**
47. **Option C**
48. **Option B**
49. **Option A**
50. **Option B**
51. **Option C**
52. **Option B**
53. **Option C**
54. **Option B**
55. **Option B**
56. **Option D**
57. **Option B**
58. **Option B**
59. **Option D**
60. **Option A**
61. **Option B**

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62. Option C
63. Option B
64. Option B
65. Option A
66. Option C
67. Option A
68. Option A
69. Option B
70. Option D
71. Option A
72. Option C
73. Option C
74. Option D
75. Option B
76. Option D
77. Option B
78. Option A
79. Option C
80. Option B
81. Option D
82. Option D
83. Option A
84. Option A
85. Option C
86. Option D
87. Option B
88. Option C
89. Option B
90. Option B
91. Option B
92. Option D
93. Option A
94. Option B
95. Option C
96. Option C
97. Option B
98. Option C
99. Option C
100. Option C
101. Option B
102. Option A
103. Option E
104. Option E
105. Option A
106. Option D
107. Option D
108. Option B
109. Option C
110. Option A
111. Option D
112. Option D
113. Option B
114. Option B
115. Option A
116. Option C
117. Option C
118. Option D
119. Option D
120. Option B

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GNS 102

Course Synopsis

Methodology of history, sources of Nigerian history, pre-colonial societies, Nigerian early contact with the world, scramble for Africa, recolonization of Nigeria after independence.

1. The word history was derived from the Greek word "Historial" meaning
   A. Story telling B. Inquiry
   C. Past D. Information
2. The main gist of history is
   A. Remembering the past B. Man and his environment
   C. Fear of the past D. Man and his future
3. The central issue in history is
   A. Change B. Courses C. Causes D. Effect
4. Sources in history refers to
   A. Where a river takes its course
   B. Where a man was born
   C. Records from which information about the past events can be obtained
   D. Records from which information about future events can be obtained
5. An example of a primary source is……
   A. Archeology B. Journals
   C. Oral tradition D. Oral flavor
6. One of the merits of oral tradition is:
   A. The tendency to forget important facts
   B. That the materials are available everywhere
   C. It tends to study communities rather than individual
   D. It is too cumbersome
7. A limitation of Archeology as a source of Nigerian history is that
   A. Archeological materials are found everywhere
   B. The chronology derived from archeology is usually imprecise.
   C. It provides provides concrete evidence of human achievement and activities dating back to thousands of years
   D. It is important for all aspect of the periods of Nigerian history
8. Which of the following groups are regarded as centers of ancient colonization?
   A. Igbo- oyo - benin- nok

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B. Oyo-Benin - Nok - Ile Ife
C. Nok- Illorin - Benin - Igboukwu
D. Nok-Ife- Benin - Igbo Ukwu

9. The scramble for Africa suggests
A. Struggle among European nations to possession over African territories
B. Fight against the European countries
C. The creation of peace in Africa.
D. Inviting non-Africans to Africa.

10. An example of tertiary source is
A. Archeology B. Rumour C. Oral tradition D. Newspaper

11. The source of histories that is most abundant and exists in every part of the country is
A. sources B. Oral tradition C. Newspaper D. Rumour

12. One of the disadvantages of.....is that chronology is imprecise
A. Anthropology B. Biology C. Archaeology D. Geography

13. The sources that are not evenly distributed in time and space are
A. Oral Tradition B. Written
C. Tertiary sources D. Anthropology

14. The term History can be viewed from two dimensions one which is
A. History is a process B. History is story telling
C. History as information D. The study of man in general.

15. One of the major limitations of Oral Tradition is:
A. The tendency to forget important facts
B. That the materials are not easily available everywhere
C. it tends to study communities rather than individuals.
D. it is cumbersome.

16. An Advantage of Archeology over other sources is that
A. Archeological materials are found everywhere
B. The chronology derived from archeology is usually precise
C. It provides powerful concrete evidence of human achievements and activities' dating back to thousands of years
D. it is important for all aspects of the periods of Nigerian History-political, economic and social.

17. The Nok civilization is a transition culture between the
A. Stone Age and Metal Age
B. Metal Age and Wood Age
C. Stone Age and Iron Age
D. Iron Age and Wood Age

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18. Which of the following nations did not take part in the scramble of Africa?
A. Portugal B. United states C. Belgium D. France

19. The scramble of Africa suggest
A. Creating peace in Africa
B. Fight against the European countries
C. Struggle among European nation to possession over African taunters
D. Fight among the European countries for food.

20. The main objectives of British colonization was
A. Economical B. Political C. Religion D. Social

21. Colonization simply means
A. Marginization B. Protection C. Anarchy D. Domination

22. In what year was Lord Luggard sent to Nigeria from London High commissioner of the protectorate of Northern Nigeria.
A. 1960 B. 1946 C. 1840 D. 1900

23. The annexation of Lagos by British took place in
A. 1914 B. 1867 C.1962 D. 1860 E. 1900

24. In what year was the Amalgamation of the Northern and Southern Nigeria was credited to
A. 1914 B. 1814 C. 1960 D. 1951

25. One of these is not from Western Europe
A. United State B. Germany C. Britain D. France

26. The successful Amalgamation of the Northern and southern Nigeria was credited to
A. Lord Luggard B. Queen Elizabeth II
C. Nnamdi Azikwe D. Obafemi Awolowo

27. Indirect Rule was not successful in the
A. East B. West C. North D. Mid-West

28. In what year was the Aba women Riot
A. 1928 B. 1930 C. 1920 D. 1929

29. Who established the West African Pilot Newspaper?
A. Tafawa Balewa B. Nnamdi Azikwe
C. Obafemi Awolowo D. Herbert Macaulay

30. The head of Oyo political system was
A. Oba B. Balogun C. Alafin of Oyo D. Oyo

31. In a traditional Oyo empire, the leader of Oyo Mesi and also a prime minister was
A. Bashorun B. Alafin C. Balogun D. Council of chiefs

32. The person who is said to have founded Oyo Empire as well as Benin Monarchy was

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A. Oba of Ife B. Oba Dosunmu C. Alafin D. Oranmiyan

33. The expression to total commitment to the independence of one territory or state is
A. Nationalism B. Capitalism
C. Communalism D. Socialism

34. Reason for the introduction of indirect rule were this but
A. The importance of Emirs and council chiefs
B. The use of educated People
C. Looked number of Personnel D. Economical

35. The major issue under the Clifford's constitution of 1992 was
A. Self-determination B. Independence
C. Democratic Government D. Legislature and Executive councils

36. In what year was slave trade abolished
A. 1901 B. 1835 C. 1807 D. 1809 E. 1860

37. In what year was Lagos declared a colony of the British?
A. 1865 B. 1959 C. 1826 D. 1861

38. The part of the country where warrant chiefs were used by parties of a way of indirect rule was
A. Yoruba Land B. Tia Land C. Hausa Land D. Igbo Land

39. The constitutional Arrangement put in place to prevent an Alafin from abuSing power is referred to as
A. Checking and Balancing B. Balances
C. Checks D. Checks and Balances

40. Another name by which Atlantic Slave trade is Known is the
A. Quadrangular Trade B. Tricycle Trade
C. Triangular Trade D. Man to Man Trade

41. The Trans Saharan was between the people of Western Sudan and
A. East Africa B. South Africa C. North Africa D. Nigeria

42. The man in Niger Delta area who was replaced with Williams's dapper pepple by British was
A. Jaja of Opobo B. Nana Olomn C. Alali D. Ororanwen

43. The formal declaration of the northern protectorate was made on
A. 1st January 1800 B. 1st January 1914
C. 1st January 1900 D. 1st January 1831

44. Complete the statement, Imperialism is the highest stage of
A. Socialism B. Colonialism C. Racialism D. Capitalism

45. Indirect Rule was a total failure in the
A. West B. South South C. North D. East

46. One of the factors that assisted in the struggle against colonial rule in Nigeria was

A. Lobbying B. Strike Action C. Newspaper D. Emails

47. The World War II
A. Eroded Nigerian pride B. Demystified the theory of white man supremacy C. Demystified the theory of Black Man Supremacy

48. Which of the kings of Lagos coded his territory to the British?
A. King Bamgbose B. King Dosunmu
C. King Karoko D. King Akintoye

49. The Agents of the British who served as middle man in the wholesale and retail business during the colonial era was the
A. Belgians B. Lebanese
C. French D. South Africans

50. The Second World War started in
A. 1939 B. 1940 C. 1944 D. 1945

51. Atlantic Slave trade started around
A. 15th Century B. 16th Century C. 17th Century D. 18th Century

52. During the period of slave trade, one of the following was a remarkable center in Africa
A. Ife B. Arochukwu C. Bonny

53. The slaves were acquired mainly through
A. Religious Crises B. Wars and Raids C. Traditional beliefs

54. One major problem of Oral Tradition is
A. Failure of Human memory B. Acting data's and events
C. Remembering story tellers

55. Folklore, songs and proverbs are example of
A. Written History B. Archeology C. Oral Tradition

56. What aspect of history deals with Relics?
A. Traditional History B. Modern History C. Archeology

57. Long before colonization, African state were identified with
A. Kingdoms B. Country C. Units D. State

58. Which constitutional development in Nigeria led to regionalism?
A. Clifford B. Richard
C. Macpherson D. 1999 Constitution

59. The rain forest area of Nigeria covers all but
A. Bauchi B. Benue C. Gongola

60. Who among these Nationalist was a Pan Africanist?
A. Leopold Sanghor B. Lord Luggard C. Kwane Nkurumah

61. In which year did the Egba and ijebu blocked the roads that linked Ibadan with Lagos in order to deny Ibadan access to fire crises?
A. 1865 B. 1866 C. 1864

62. Long before Oil was found in Nigeria, the largest producers of palm oil in Nigeria was
A. Hausas B. Yoruba's C. Igbos

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63. In which State in Nigeria do we have Ndoni?
A. Lagos B. Anambra C. Rivers

64. One of these rulers put up early resistance to the important of British rule in Nigeria
A. Jaja of Opobo B. Oni of Ife C. Obi of Onitsha

65. The Oyo Empire comprises of all but
A. Alafin B. Ogboni C Bashorun D. Amujale

66. Which King was dethroned on the excuse that he was a slave trader?
A. Akintoye B. Kosoko C. Akintola

67. The system of Administration which was based on the use of the British Officials was called
A. Direct Rule B. Indirect Rule C. Australia D. Sweden

68. The Atlantic Slave Trade made a good number of Africans to work in faraway foreign lands such as
A. west Indices B. Switzerland C. Australia D. Sweden

69. Which part of Nigeria is associated with Aristocracy?
A. Yoruba B. Igbo C. Hausa D Fulani

70. Which of the Benin gods was credited with Magical powers and Military Competence?
A. Ewedo B. Uzama C. Ewura

71. Ogosi in Benin kingdom symbolized
A. God of the soil B. Rule of the sky C. God of fertility

72. In which year was slave trade abolished
A. 1807 B. 1809 C. 1819

73. The Benin Conference took place in
A. 1887-88 B. 1884-85 C. 1874-75 D. 1886-89

74. Which of these personalities was not a pan Africanist?
A. Obafemi Awolowo B. Leopold Senghor
C. Winston Churchill D. Nnamdi Azikwe

75. The Atlantic Chatter was signed by one of the following periodities
A. Regan B. Blair C. Smith D. Roosevelt

76. The first 3 political parties in Nigeria did not include
A. NCNC B. PDP C. NPC D. AG

77. The two group who blocked the road which linked Ibadan to Lagos in order to deny Ibadan access to fire arms were
A. Egbado and Ijebu B. Remo and Ijebu
C. Egba and Ijebu D. Ijebu and Ohori

78. The ruler who had the habit of emitting fire and smoke from his mouth was
A. Ewuare B. Oduduwa C. Sango D. Alafin

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79. The use of ..... Gave Oyo army an advantage over her neighbor's
A. Amazon B. Amazons C. Calvary D. Cavalry

80. Which of these did not assist in the struggle for independence in Nigeria?
A. NCBWA B. WASU C. NPN D. Labour party in Britain

81. The acronym UNO means
A. United Nigerian Organization
B. United Nation Organization
C. United National Organization

82. The berlin Conference was convened by
A. King Leopald B. Bismarck C. John Harry D. Gieldstone

83. In Nok society, what is common is
A. Iron B. Wooden materials C. Timber D. Cotton

84. One of the merits of Oral Tradition is
A. The tendency to forget important facts
B. That materials are available everywhere
C. It tends to study communities rather than individuals
D. It's too cumbersome

85. The name Nigeria was coined by
A. Lord Luggard B. Flora Shaw
C. Nnamdi Azikwe D. Clifford

86. When did the Nigerian civil war started
A. May 20 1966 B. May 31 1969
C. January 15 1966 D. May 30 1967

87. In which geopolitical zone in Nigeria do we have Ndoni?
A. South South B. North West
C. south East D. North Central

88. The concept Apartheid is credited to
A. Benin Republic B. South Africa
C. Darfur in London D. Chad

89. The international African association was formed at the instance of
A. Mungo Park B. David Livingstone
C. Bismarck D. King Leopold

90. The world's first civilization took place in
A. Rome B. Egypt C. Mesopotamia D. Africa

91. The current life expectancy in Nigeria is
(A) 55 (B) 47 (C) 39 (D) 51 (E) 45

92. Yumu and Zabara are ethnic groups in
(A) Kebbi Sate (B) Benue State
(C) Niger State (D) Kano State (E) Edo State

93. Mr Dele Giwa was killed through a letter bomb on

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(A) October 19, 1986 (B) September 17, 1987
(C) October 19, 1986 (D) September 17, 1986
(E) October 19, 1987

94. The following are spices except
(A) Rye (B) Saffron (C) Ginger (D) Cloves (E) Nutmeg

95. Desmond Tutu was awarded the Nobel Peace Prize in
(A) 1983 (B) 1987 (C) 2001 (D) 2000 (E) 1984

96. Victoria is the capital city of
(A) Somalia (B) Morocco (C) Seychelles
(D) Burundi (E) Lesotho

97. The Director-General of the Nigerian Institute of Advanced Legal Studies is
(A) Prof. Dalhatu Musdapher (B) Prof. Pat Utomi
(C) Prof. Epiphany Azinge (D) Justice Nikki Tobi
(E) Prof. (Mrs) Bolanle Awe

98. Centre of Unity is to Abuja as State of Hospitality is to
(A) Rivers (B) Cross River © Katsina
(D) Nassarawa (E) Sokoto

99. The capital of Uruguay is
(A) Bangkok (B) Montevideo (C) Bern (D) Manila (E) Uru

100 .....was the Chief Justice of Nigeria between 1995 and 2006
(A) Justice Idris Lagbo Kutigi
(B) Justice Mohammad Lawal Uwais
(C) Justice George Sodeinde Sowemimo
(D) Justice Salihu Modibo Alfa Belgore
(E) Justice Mohammed Bello

101. The capital of Iran is
(A) Iranian (B) Dublin (C) Baghdad (D) Teheran (E) Budapest

102. The full meaning of UEFA is
(A) Union of European Federation Associations
(B) United European Football Associations
(C) Union of European Football Associations
(D) United English Football Associations
(E) Union of English Football Associations

103. Nelson Mandela was awarded the Nobel Peace Prize in
(A) 1992 (B) 1993 (C) 1994 (D) 1995 (E) 1996

104. Ibeno Beach is in
(A) Lagos State (B) Cross River State
(C) Akwa Ibom State (D) Taraba State (E) Niger State

105. The June 12 Presidential election was annulled byPresident Ibrahim Babangida on

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(A) June 12 1993 (B) June 14 1993
(C) June 18 1993 (D) June 23 1993 (E) June 27 1993

106. Gombe State belongs to the.....geo-political zone in Nigeria
(A) South East (B) South West
(C) North Central (D) North East (E) North West

107. The full meaning of OECD is
(A) Organization for Economic Co-operation and Development (B) Organization of Economic Co-operation and Development
(C) Organization of Economic Community and Development
(D) Organization for Economic Community and Development (E) Order of the Economic Community and Development

108. Paparada Square is in
(A) Ilorin (B) Lokoja (C) Kaduna (D) Lagos (E) Sokoto

109. The former Eastern Region was proclaimed a sovereign nation, Biafra by Odumegu Ojukwu on
(A) May 30, 1967 (B) June 15, 1966 (C) April 6, 1968
(D) January 10, 1965 (E) April 21, 1969

110. Oduduwa status is located in
(A) Abeokuta (B) Ibadan (C) Ogbomoso
(D) Ilorin (E) Ijebu Ode

111. The Kruger National Park is in
(A) South Africa (B) Tunisia (C) Cameroon
(D) Poland (E) U.S.

112. The official residence of the Secretary-General of the United Nations is in
(A) Washington D.C. United States
(B) New York City, United States
(C) Birmingham, United Kingdom
(D) Atlanta Georgia, United States (E) London

113. Dares Salaam is the capital of
(A) Tunisia (B) Turkey (C) Zimbabwe
(D) Sudan (E) Tanzania

114. Shanga and Kyenga are ethnic groups in
(A) Sokoto State (B) Bauchi State (C) Niger State
(D) Kwara State (E) Niger State

115. FESTAC started in
(A) October 1976 (B) October 1978 (C) November 1977
(D) November 1978 (E) June 1979

116. Which of these was never a Senate President in Nigeria?
(A) Iyocha Ayu (B) Chuba Okadigbo (C) Pius Anyim
(D) Ameh Ebute (E) Umaru Dikko

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117. The following are spices except
(A) Rye (B) Saffron (C) Ginger (D) Cloves (E) Nutmeg

118. The capital of Iran is
(A) Iranian (B) Dublin (C) Baghdad
(D) Teheran (E) Budapest

119. The Executive Secretary of the National Universities Commission is
(A) Prof. Peter Okebukola (B) Prof. Segun AdeSina
(C) Prof. Julius Okojie (D) Prof. Jubril Aminu
(E) Prof. Dibu Ojerinde

120. The United Nations Charter was formed on
(A) 1 February 1946 (B) 26 June 1945
(C) 24 October 1945
(D) 15 March 1943 (E) 10 January 1939

121. Abayon, Adim and Adun are ethnic groups in
(A) Taraba State (B) Cross River State
(C) Bauchi State (D) Rivers State (E) Adamawa State

122. Barack Obama was awarded the Nobel Peace Prize in
(A) 2000 (B) 2003 (C) 2004 (D) 2007 (E) 2009

123. The capital of Greece is
(A) Greek (B) Athens (C) Rome (D) Jerusalem (E) Syria

124. Assop Falls can be found in
(A) Plateau State (B) Kano State
(C) Taraba State (D) Sokoto State (E) Niger State

125. The Secretary-General of the United Nations between 1972 and 1981 was
(A) Javier Perez de Cuellar (B) Alger Hiss (C) Kofi Annan
(D) Kurt Waldheim (E) Ahmed Salim

126. Ken Saro-Wiwa and eight others were executed in
(A) 1994 (B) 1995 (C) 1996 (D) 1997 (D) 1998

127. Gombe State belongs to the.....geo-political zone in Nigeria
(A) South East (B) South West
(C) North Central (D) North East (E) North West

128. Albert Lutuli was awarded the Nobel Peace Prize in
(A) 1960 (B) 1970 (C) 1947 (D) 1909 (E) 1934

129. Ronald Reagan, the former US President, was a
(A) Democrat (B) Republican (C) Democratic-Republican
(D) Federalist (E) Whig

130. The full meaning of UEFA is
(A) Union of European Federation Associations
(B) United European Football Associations
(C) Union of European Football Associations
(D) United English Football Associations

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(E) Union of English Football Associations

131. Gurara Falls is located in
(A) Niger State (B) Anambra State (C) Imo State
(D) Edo State (E) Adamawa State

132. Obudu Cattle Ranch is in
(A) River State (B) Cross River State (C) Bayelsa State
(D) Akwa Ibom State (E) Delta State

133. Alau Dam and Alan Lake are located in
(A) Calabar (B) Warri (C) Okitipupa
(D) Maiduguri (E) Ebonyi

134. Maseru is the capital city of
(A) Mauritius (B) Rwanda (C) Lesotho (D) Tunisia (E) Gambia

ANSWERS TO GNS 102

1. Option B(Historian means Inquiry)
2. Option B(Man and his Environment)
3. Option A(Change)
4. Option C(Record from which information about the past events are obtained)
5. Option B(Oral Tradition)
6. Option B
7. Option B
8. Option D
9. Option A(scramble means struggle to take over)
10. Option A
11. Option B(passed from generation to generation)
12. Option C
13. Option B
14. Option A
15. Option A(important facts are forgotten)
16. Option C
17. Option C(stone Age and Iron Age)
18. Option B
19. Option C
20. Option A(Growth in Economy)
21. Option D(Domination)
22. Option D
23. Option C
24. Option A(1914)
25. Option A(USA)
26. Option A
27. Option C
28. Option D
29. Option B
30. Option C
31. Option A

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32. Option D
33. Option A
34. Option A
35. Option B
36. Option C
37. Option D
38. Option D
39. Option D
40. Option C
41. Option C
42. Option A
43. Option C
44. Option D
45. Option D
46. Option C
47. Option B
48. Option D
49. Option B
50. Option A
51. Option A
52. Option C
53. Option B
54. Option A
55. Option C
56. Option C
57. Option A
58. Option B
59. Option C
60. Option B
61. Option C
62. Option A
63. Option C
64. Option A
65. Option D
66. Option B
67. Option B
68. Option A
69. Option B
70. Option A
71. Option B
72. Option A
73. Option B
74. Option C
75. Option D
76. Option B
77. Option C
78. Option C
79. Option D
80. Option D
81. Option B
82. Option B
83. Option A
84. Option B
85. Option B
86. Option DI.
87. Option A
88. Option B
89. Option A
90. Option B
91. Option B
92. Option C
93. Option A
94. Option A
95. Option E
96. Option C
97. Option C
98. Option E
99. Option B
100. Option B
101. Option D
102. Option C
103. Option B
104. Option C
105. Option D
106. Option D
107. Option A
108. Option B
109. Option A
110. Option E
111. Option A
112. Option B
113. Option E
114. Option A
115. Option C
116. Option E
117. Option A
118. Option D
119. Option C
120. Option B
121. Option B
122. Option E
123. Option B
124. Option A
125. Option D
126. Option B
127. Option D
128. Option A
129. Option B
130. Option C
131. Option A
132. Option B

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GNS 103

Course Synopsis

Social problems, sociological approach to study social problem, problem of indefinite prejudice, discrimination and ethnicism, problem of environment and energy culture

1. Sociology is a discipline that belongs to the family of
   A. Humanities B. law C. Social Science D. Sciences
2. Sociology can literally be defined as
   A. Animal Science B. Human science C. Science Of Society d. Gender science
3. Sociology was coined by one of these founding fathers
   A. Anguste Comte B. Karl Max C. Maxweber D. Herbert Spencer
4. Karl Max is known for his works on ….and …..
   A. Class and conflict B. Upper class and lower class C. Peace and struggle D. workers and leaders
5. …….is one of the branches of sociology?
   A. Zoology B. Scientology C. Neurology D. criminology
6. ……he says all Ibos are aggressive?
   A. Yoruba B. Hausa C. Prejudiced D. Stereotvied E. none
7. …..is how culture is acquired
   A. Socialization B. Discrimination C. Social Problem
8. ……. Is socially standardized way of thinking and acting that we acquire as members of a society
   A. Norm Culture C. Language D. A and B E. All of the above
9. ……. These are broad, shared ideas regarding what is desirable, correct and good.
   A. Social Structure B. Social Problems C. Values D. None of the above
10. …..all Nigerians have it
    A. Problems B. Prejudice C. Corruption D. Culture D. All of the above
11. The first Nigerian to obtain a doctorate degree in Sociology was
    A. Nathaniel Akindayo Fadipe
    B. Nathaniel Folorunsho Faierehunmi
    C. Nathaniel Akinremi Fadipe
    D. Nathaniel Akinkumi Fatimoroti

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12. The following are regarded as father of sociology except
    A. Emile Durkheim
    B. Herbert Spender
    C. Angriste Conte
    D. Adams Smith
13. A marriage system of one wife and two or more husband is regarded as
    A. Polygymy B. Polyandry C. Polygamy D. Polyandry
14. In most societies sexual intimacy is approved within marriage
    A. True B. False C. Partly time D. none of the above
15. The knowledge of sociology can help you achieve the following except
    A. Understand society
    B. Understand human behavior
    C. Understand social interaction
    D. Understand pediatrics
16. ....persons who inspires people because of their extraordinary qualities
    A. Chairman B. Cheer Leaders C. Vice chancellors
    D. Lecturers E. Charismatic
17. .....is the process through which people get to know and use the names of their groups is called
    A. Socialization B. Religion C. Education D. Family E. Peer pressure
18. ..... to the view, religion legitimize the existence of social inequalities in societies
    A. Symbolic interactionist B. Functionalist
    C. Radial view D. Conflict view
19. .....perfectionists tends to make others uncomfortable for example, a very brilliant student is likely to be disparaged has been proud
    A. Expectation of deviance
    B. Tolerance of deviance
    C. Deviance designations
    D. Explanation of deviance
    E. Conflict of deviance
20. .....have liasez faire or live and let live attitude towards the lifestyle of other people.
    A. Culture exposition B. Culture Shock C. Cultural Relativism
    D. Reverse Culture E. Discriminatory Culture
21. ..... you may receive a pat in the back if you deviate from this

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A. Folkways B. Assumpture norms C. Collective norms
D. Percripture norms E. Discriminatory norms

22. ..... Characterized by excessive conformity and submissiveness to authority figure and inflexibility in the repression of impulsive desires.
A. Personality B. Authority Figure C. Divided Personality
D. Inflexibility Personality E. Authoritarian Personality

23. ..... Attitude based on limited personal experience but learned through interaction with people of similar mind.
A. Secondary deviance B. Primary deviance
C. Symbolic behavior D. Prejudice E. Discrimination

24. ..... they are generally capitalized on their members' sensitivity to group's approval.
A. Peer Group B. Social Group C. Symbolic Group
D. Parent E. Adults

25. .....assumes that human beings are non-rational.
A. Psychology B. Philosophy C. Economics
D. History E. Sociology

26. ..... States of dissatisfaction ariSing from a sense of discrepancy between the aspirations of people and the means of realizing these ambitions.
A. Anormic B. Bliss C. Emphoria
D. Social Problem E. Social comphet

27. Culture is inborn and not learnt
A. True B. False C. Partly time D. None of the above

28. One of the major characteristic of culture is that it is.....
A. Dialectic B. Disensual C Dynamic D. Diametric

29 ... are the transmitted knowledge and behavior shown by some group of people.
A. Socialization B. Accumulation C. Culture D. Attitude

30. Among other things, culture helps us to do the following except
A. Identify who we are and what we hold to be true
B. Define the acceptable behavior within a given setting
C. Identify your value and belief systems D. live the way we want

31. Material culture is that aspect of culture that we can
A. touch and handle B. Perceive and embrace
C. see and smell D. Hear and sense

32. Which of these is an element of culture?
A. Organization B. standard C. System D. custom

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33 ... Are important norms in a group or society that when violated attract severe consequences

A. Languages B. Values C. Mores D. Customs

34 ... refers to the diversity of cultures across societies, and places

A. Cultural Diversity
B. Cultural Visibility
C. Cultural Vulnerability
D. Cultural Viability

35. Afemia language is found in which state in Nigeria?

A. Taraba B. Imo C. Edo D. Abia

36. When you feel that your culture is superior to other cultures, what team describes your situation

A. Ethnocentrism B. Zenocentrism
C. Ethnophobia D. Zenophobia

37 ... is an experience that takes place when an individual is introduced to a new culture

A. Culture surprise B. Culture shock
C. Culture relativity D. Culture difference

38. Subculture exists within what is known as a .... Culture

A. Dominant B. Domineering C. Divided D. Diverse

39. Family is an example of Cultural.....

A. Peculianty B. Homogeneity
C. Universality D. Heterogenaty

40. When rate of change in material culture is not eficuralent to the rate of change in non-material culture it is called.....

A. Cultural delay B. Cultural difference
C. Cultural lag D. Cultural determine

41. The overwhelming influence of western culture on the cultures of developing countries is called.....

A. Cultural sophistication B. Cultural Dominance
C. Cultural imperialism D. Cultural influence

42. Social problems can be completely eradicated in the society

A. True B. False C. Partly True D. None

43. Some here argued that .....is the social problem that has limited the development of Nigeria

A. Prostitution B. armed Robbery
C. Cultism D. Corruption

44. .... Is the deprivation from the basic necessities of life?

A. Unemployment B. Poverty C. Violence D. Tribalism

FOR A PRIVATE TUTOR/INSTRUCTOR IN ANY SUBJECT PLEASE CONTACT MAGIC (07032824197) PIN (7E4274131)

45. In your own view, what is not a solution to unemployment in Nigeria?
A. Job Creations B. Empowerment of youth and citizens by the Government C. Entrepreneurship Education
D. Giving Money to youths

46. …….. is a social problem associated with suicide bombing and killing innocent people.
A. Banding B. Civil Wars C. Blooding fighting D. Terrorism

47. Terrorism in Nigeria is caused by this factor
A. Porous Border B. Religions or political fundamentalism
C. Injustice and society inequality D. All of the above

48 …… is a deliberate use of an illegal drug or of too much of prescribe drug.
A. Drug Mixture B. Drug Misuse
C. Drug Abuse D. Drug Meladinanistration

49. Illiteracy is not a social problem in Nigeria.
A. True B. false C. Partly true D. None

50. Tribalism is a social problem in Nigeria
A. False B. Partly true C. True D. None

51. ……is allegiance to a social group or the distribution of resources, benefits and privileges to one group than others in the society.
A. Jingoism B. Favouritism C. Tribalism D. Egotism

52. … is a new social problem common among educated and working class people in Nigeria.
A. Double parenting B. Single parenting
C. Polygamy D. None

53. Marxist theory of class struggle is an example of which theoretical approach?
A. The Structural functional approach
B. The social-conflict approach
C. The symbolic interaction approach D. None

54. The following are sociologized perspective's on social problems except
A. Functionalist B. Interactionism
C. Feminism D. Post modernism

55. Conflict theory is normally associated with the works of…..
A. Auguste Conte B. Emile Durkheim
C. Max Weber D. Karl Max

56. When a social condition is labeled as being problematic, this refers to…..
A. Feminist theory B. Interactionism Perspective
C. Functionalist Theory D. Labeling Theory

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57. The particular theory consider women and girls as victims of social problems in society
A. Feminist theory B. Women Empowerment
C. Gender Discrimination D. Girls Empowerment

ANSWERS TO GNS 103

1.	Option C	29.	Option C
2.	Option C	30.	Option D
3.	Option A	31.	Option A
4.	Option A	32.	Option D
5.	Option D	33.	Option C
6.	Option C	34.	Option A
7.	Option A	35.	Option C
8.	Option A	36.	Option A
9.	Option C	37.	Option B
10.	Option D	38.	Option B
11.	Option C	39.	Option C
12.	Option D	40.	Option C
13.	Option B	41.	Option B
14.	Option A	42.	Option D
15.	Option D	43.	Option D
16.	Option E	44.	Option B
17.	Option A	45.	Option D
18.	Option B	46.	Option D
19.	Option A	47.	Option C
20.	Option C	48.	Option B
21.	Option A	49.	Option C
22.	Option B	50.	Option C
23.	Option B	51.	Option B
24.	Option B	52.	Option B
25.	Option A	53.	Option D
26.	Option D	54.	Option D
27.	Option B	55.	Option D
28.	Option C	56.	Option A

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MTS 101/MTS 105

Course synopsis

Elementary set theory, Algebra of sets, Venn diagrams and application, Real numbers, Indices, logarithms, Surd and polynomials, remainder and factors theorems, Partial fraction, inequalities, Quadratic & Cubic equations, simultaneous equation, series and sequence(AP) and (GP), Binomial expansion and theorem, matrices and complex numbers.

1. If A = [1, 2, 3, 4] and B [a, b, c, d] then
   [a] A = B [b] A is equivalent to B
   [c] A and B are complementary [d] A is a Singleton
2. Set A is said to be equal to set B if
   [a] A⊆B [b] /A/ = /B/
   [c] -A⊆B and A⊆B [d] A=B
3. If A stands for the compliment of A then find $[AvB]^1$
   [a] $A^1 \cap B^1$ [b] $B^1 U A^1$
   [c] $A^1 \cap B$ [d] $B^1 \cap C$
4. In a class of 42 students, each student offers at least mathematics and physics. If 22 students offer physics and 28 students offer mathematics, find how many students offer physics only?
   [a] 6 [b] 8 [c] 12 [d] 14
5. Given that for sets A and B, in a Universal set [Ω], A⊆B then
   $A n[AnB^1]$
   [a] A [b] ϕ [c] B [d] Ω
6. If S = [x:X2 = 0, X > 4] then S is equal to
   [a] 0 [b] [0] [c] [ϕ] [d] ±-2
7. Determine element of $S = [xEZ/2x^3 - 3y^2 - 5x + 6 = 0]$
   [a] [1, -3/2,2] [b] 1, 2] [c] [-3/2,3] [d] [1, -3/2]
8. Determine $U = [xEN/x^2 - 7x6 + = 0$ and $3x = 9$
   [a] X = [1, 2, 3] [b] 1, 2, -3] [c] 1, 2] [d] 2-3]
9. Determine $U = [XER/x^2 = 16$ and $3x = 9$
   [a] 0 [b] 3,4,-4 [c] 3 [d] -4,4
10. $-1 \leq X \leq 4$ is a set containing
    [a] [-1, ..., 4] [b] -1 .....3] [c] 10, ...3] [d] 10,.....4]
11. Given a set $S = [x/xER$ and $x^2 + 1 = 0]$ then members of S are
    [a] [1,2] [b] ϕ [c] [1] [d] [0]
12. Let P and Q be two finite sets such than n [PUQ]=54,n[PnQ]=8 and

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n [Q]=27, N[P]=?

[a] 26 [b] 32 [c] 35 [d] 86

13. Which is a subset of [a,e,i,o,u]

[a] [a,e,i,n] [b] [a,i,u,f] [c] [m,a,e,u] [d] Φ

14. Let S= [1,3,5,7,9], T= [XEZ/X^3-$6x^2$+11x-6-0] then SnT is

[a] [1,3] [b] [2,5,7] [c] [1,3,9] [d] [5,9]

15. In a class of 40 students, each student at least offers one of physics and chemistry. If the number of students that offers physics is three times the number that offer chemistry. Find the number of students that offer physics only.

[a] 25 [b] 10 [c] 15 [d] 5

16. Out of 25 teachers, 16 are married and 15 are women. If 6 of the men are married, how many of the women are not married?

[a] 6 [b] 10 [c] 5 [d] 9

17. Which of the following is equivalent to $[P^1 n[Q \cup Q^1]]^1$ [T]

[a] P [b] P^1 [c] Q [d] Q^1 [e] PnQ

18. Given that for sets A and B, in a universal set E, $A \subseteq B$ then $A \cap [A \cap B]^1$ is

[a] A [b] Φ [c] B [d] E

19. Which of the following sets is equivalent to $[P \cup Q] n [P \cup Q^1]$

[a] P [b] $P \cup Q$ [c] $P \cap Q$ [d] Ø

20. How many subsets will a set containing 5 elements here?

[a] 25 [b] 32 [c] 36 [d] 64

21. Given that 1/[√5] +1/[√5+1] p/q r, find the value of the constant p,q,r

[a] -5,1/4,9/20 [b] -920,5,1/4

[c] 1/4,9/20,5 [d] -9/20,5-1/4

22. If $9^{2x+1} = 81^{x-2}/3^x$ find x

[a] -10 [b] 20 [c] -20 [d] 10

23. If $\log^q_2 = s - \log_2 p^2$. find q when p =q

[a] 27/32 [b] -32/27 [c] -27/32 [d] 32/27

24. Solve the equation $2\sqrt{x} - \sqrt{(4x-11)} = 1$

[a] 9 [b] -9 [c] 3 [d] -3

25. Simplify $\sqrt{48} - \frac{9}{\sqrt{3}} + \sqrt{75}$ =

[a] $5\sqrt{3}$ [b] $6\sqrt{3}$ [c] $8\sqrt{3}$ [d] 18 3

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26. If $2 \log y^x + 2 \log x^y = 5$, find the two possible values of $\log y^x$
[a] (2,2) [b] (2,3) [c] (3,4) [d] (1/2, 2)

27. Find x of 1/3 of $27^x = 9^{2x}$
[a] 1 [b] 2 [c] -1 [d] -2

28. Evacuate $\dfrac{\log_3 0.004}{\text{Log}_3^{1x} - \log 3^2}$
[a] 1 [b] -1 [c] 2/3 [d] -2/3

29. Simplify $\dfrac{1}{\sqrt{5}+\sqrt{3}} - \dfrac{1 \times 1}{\sqrt{5}-\sqrt{3}\sqrt{2}}$
[a] $\sqrt[3]{5}$ [b] $\sqrt[2]{3}$ [c] -2 [d] -1

30. Find the value of x if $\log_{10}^{x2} + \log_{10}^{x4} + \log_{10}^{x5} + \log_{10}^{x16} + \log_{10}^{x16} + \log_{10}^{x32} = 63$
[a] 1/10 [b] 1 [c] 10 [d] 10^2

31. Solve for x 1f $25^x + 3(5)^x - 4 = 0$
[a] 1 or -4 [b] 0 [c] 1 [d] -4 or 0

32. What is $\log_1^{32}$?
[a] 0 [b] 1 [c] 2 [d] 3 [e] 2^5

33. $\text{Log}_7^2 = 0.356$ and $\log_2^3 = 0.566$. Find the value of-$2\log_7 (15/7) - 2\log_7 (^7/_3) + \log_7(^{25}/_{12})$
[a] 1.278 [b] -1.278 [c] 1.287 [d] -1.287

34. Simplify $(1 - \sqrt{3})^{-2}$
[a] $\frac{1}{2} + \sqrt{3}$ [b] $\frac{1}{2} - \sqrt{3}$ [c] $1 + \frac{1}{2}\sqrt{3}$ [d] $1 - \frac{1}{2}\sqrt{3}$

35. Find the value of XEN such that $\log_{10}(3x\,2 + 8) = 1 + \log_{10}(^x/_2 + 1)$
[a] 1 [b] 2 [c] 3 [d] 4

36. Find x if $\alpha^2 = T$
[a] $\text{Log}^{\alpha/T}$ [b] $\text{Log}^{\alpha 2/T}$ [c] $\text{Log}^{\alpha 3/T}$ [d] $\text{Log}^{\alpha 4T}$

37. Simplify $\sqrt{50} - \sqrt{18} = \sqrt{32}$
[a] $2\sqrt{6}$ [b] $\sqrt{2}$ [c] $6\sqrt{2}$ [d] $\sqrt{6}$

38. Simplify $\text{Log}_a(a^2 - x^2)$
[a] $2 + \text{Log}_a(1 - x^2/a^2)$ [b] $3 + \log_a(1 + x)$
[c] $\text{Log}_a(1 - x^2/a^2)$ [d] $\text{Log}_a(x)$

39. Express $\dfrac{3\sqrt{5} - \sqrt{3}}{2\sqrt{5} + 3\sqrt{3}}$ in form of $a\sqrt{15} + b$
[a] $^9/_7\sqrt{15} + {}^{11}/_7$ [b] $^{13}/_7\sqrt{15}^{-9}/_7$ [c] $^{11}/_7\sqrt{15}^{-39}/_7$ [d] $^{19}/_{13}\sqrt{15}^{23}/_{13}$

40. Simplify $\dfrac{3\sqrt{abc^{-4}}}{4\sqrt{abc}}$

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[a] $\frac{b^3}{a^3+c^4}$ [b] $\frac{b^{12/13}}{a^{5/12}+c^{19/22}}$ [c] $\frac{b^4}{a^8c^9}$ [d] $\frac{b^7}{a^2c^2}$

41. If $(x^2y^{-3}z)^{1/6}(x^{-1}y^4z^3)^{-1} = x^ry^sz^t$ what is the value of wrt s
[a] -10 [b] 25/4 [c] -5/4 [d] -5/2

42. Simplify $\frac{3(2^{n+1})-4(2^{n-1})}{2^{n+1}-2^n}$
[a] 4 [b] 2^{n-1} [c] ¼ [d] 2^{n+1}

43. Evacuate $\frac{\log_5(0.04)}{\log_3 18-\log_3 2}$
[a] 1 [b] -2/3 [c] 2/3 [d] -1

44. Given that $\log_4(y-1)+\log_4(\frac{1}{2}x)=1$
and $\log_2(y+1)+\text{Log}_2=2$ solve for x and respectively
[a] 2,3 [b] -3, -2 [c] 3,2 [d] -2,-3

45. If $\log_{10}{}^2 = x$ express $\log_{10}{}^{125}$. In terms of x
[a] $2-3x$ [b] $2+3x$ [c] $2(1-x)$ [d] $2(1+x)$

46. Without using tables, solve the equation $8x^2 = \frac{2}{25}$
[a] 4 [b] 6 [c] 8 [d] 10

47. Given $\log 10^x = 2$, $\log_{10}{}^{2x-1}$, evaluate $\log_{10/3x}\sqrt{y}$
[a] $\frac{1}{15}$ [b] $2\sqrt{2/3}$ [c] $\frac{10}{3}$ [d] 10

48. Evaluate $\frac{\text{Log } 3\frac{1}{16}}{\text{Log } \frac{7}{4}}$
[a] 2 [b] $\frac{7}{4}$ [c] Log 2 [d] Log $\frac{7}{8}$

49. Find n if $\log_2{}^4 + \log_2{}^7 - \log_2\log_2{}^n = 1$
[a] 10 [b] 14 [c] 27 [d] 28

50. Write the equation $2\log_2{}^x - x\log 2^{(1+y)} = 3$ in a form nor involving logarithm
[a] $2x-x(1+y)=3$ [b] $2x-x)1+y)=8$
[c] $x^2=8(1+y)^1$ [d] $x^2-x(1+y)^2=8$
[e] $x^2-x(1+y^2=8x$

Polynomials, Remainder Theorem and Factors Theorem.

51. Obtain the quotient and remainder by dividing $2x^2-3x+1$ by x^2+x-2
[a] $q(x)=3x^2-2x+4$, $e(x)=2$
[b] $q(x)=4x-5$, $r(x)=12x-4$
[c] $q(x)=2x-2$, $r(x)=x-3$
[d] $q(x)=x^2-x+1$, $r(x)=0$

52. If $(x+1)$ and $(x-4)$ are factors of the polynomial $f(x)=x^3+px^2+qx+12$ where P and Q are constants. Find the values of P and Q
[a] $p=-6, q=5$ [b] $P=2, q=5$ [c] P =

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60. If p $\left(\frac{1 - \sqrt{5}}{2}\right)$

[a] X^2+x+1 is a factor of p(x)
[b] P(x) is divisible by x^2-x+1
[c] X-l is a factor of P(x)
[d] X^3-1 is a factor of p (x)

61. The p, where l=n, n-1, n-2,... 1,2,3,0 are called

[a] The roots of p(x)
[b] The variable of p(x)
[c] The coefficient of P(x)
[d] The indeterminate of p(x)

62. If P(x) is divided by q(x)=ax+b where a and b are constant what is the remainder?

[a] Q(-b/a) [b] P(-b/a)
[c] P(a/b) [d] P(-a/b)

63. What is the remainder when p(x) is divided by (x-a) (x-b)? Where a and b are constant.

[a] $\frac{(p(a)-p(b)x}{a-b}$ [b] $\frac{(x-b)-(x-a)p(b)}{a-b}$
[c] $\frac{(x-a)p(a)+(x-b)p(b)}{A-b}$ [d] $\frac{(x+b)p(a)-(x-a(p(b)}{a-b}$

64. If the polynomial f(x) of degree > is divided by ax+b remainder is

[a] $f(-{}^{a}/_{b})$ [b] $F({}^{a}/_{b})$
[c] $F(-{}^{b}/_{a})$ [d] F(b/a)

65. What is the remainder when $2x^2+6x-8$ is divided by (x-1)

[a] 0 [b] -1 [c] 1 [d] -2

66. Find the unknown coefficient if (x-2) is a factor of $ax^2-12x+4$

[a] 5 [b] 6 [c] -6 [d] -5

67. If a polynomial F(x0 of degree ≥ 1 is divided by (ax+b), then if (ax+b) is a factor of F(x) then the remainder is

[a] 0 [b] F (-b/a) [c] F (a/b) [d] -F (b/a)

68. Given that 6r+1=A (2r+1) (2r+3) + b(2r+3) + B(2r-1)(2r+3) + C(2r-1)(2r+1) determine A,B and C

[a] $A={}^{1}/_{2}, B={}^{1}/_{2}, C=-1$ [b] A=3, B=5,C=4
[c] $A={}^{1}/_{3}, B={}^{2}/_{3}, C=4$ [d] A=4, B=1,C=3.

69. Find a and b if $h(x)=3x^4+ax^3+12x^2+bx+4$ is divisible by (x-1)and leave a remainder of 18, when divided by x+2

[a] A=20-,b=12 [b] A=18,b=14
[c] a=15,b=17 [d] A=20,b=39.

70. When a polynomial p(x) is divided by x-1, , x=2 respectively, the remainder are 3 and 6. Find the polynomial that is the remainder

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when(x) is divided by (x-1)(x+2)
[a] 5+x [b] 3-x [c] 4-x [d] 6+x

71. Find the value of k for which $X^2+(k+9)x-k^2+15=0$ has equal root
[a] K=-1or7 [b] K=2or8 [c] K=-3or 5 [d] K=1or -7

72. Find the value of K for which the equation K(x-1)(x-2)=x has real roots.
[a] -2<x<0or3<x<8 [b] -6<x<2or1<x<9
[c] X<-3-7orx>-2+7 [d] $X<-3-\sqrt{8}$ or $x>-3+\sqrt{8}$

73. When the expression Pm^2+qm+1 is divided my (m-1) it has a remainder and when divided by (m+1) the remainder is 4. Find p and q respectively
[a] -1,2 [b] 1,2 [c] 2,1 [d] 2,-1

74. If (x-1), (x+1) and (x-2) are factor of polynomial ax^3+bx^2+ax find a,b,c respectively.
[a] ½,-1,-½ [b] -½, 1, ½
[c] ½ ,1, -½ [d] ½ , 1, ½

75. For what value of p does the equation $x^2+9(4+p)x$ have equal root.
[a] 2,-10 [b] 2,10
[c] -2,10 [d] -2,-10

76. Find the set of value of K for which the line y=kx-4 intersects curve $y=x^2-2x$ at two distinct point
[a] $-6\leq k\leq 10$ [b] $K\geq$ or $k\leq -4$
[c] -6<k,<2 [d] k<2 or K<-6

77. For which value of m will one of the root of the $x^2+(5m+4)x+(5m+4)=0$ be five times distinct point
[a] 3/5 [b] 16/5
[c] 3/25 [d] 16/25

78. If(x-2) and (x+1) are factors of $x^3-3x-2=0$ find the third
[a] x-1 [b] x+2 [c] X-2 [d] x+1

79. If one factor of x^3-8^{-1} is $(x-2)^{+2}$, the other factor is
[a] $X^2+2^{-1}x-4^{-1}$ [b] $X^2-2^{-1}x-4^{-1}$
[c] $X^2+4^{-1}x+2^{-1}$ [d] $X^2+2^{-1}x4^{-1}$

80. Factorize a^3+a+a^2+1
[a] $a(a^2+a+1)$ [b] $(a^2+1)(a+1)$
[c] a(a+1)(a-1) [d] $(a^2+1)(a^2+1)$

81. Solve the equation $x^3-5x^2-x+5=0$
[a] -1,1,5 [b] -1, -1, 5 [c] 1,-1,-5 [d] -1,-1,-5

PARTIAL FRACTIONS.

82. Resolve $\frac{3+2x}{(2-x)(3+x^2)}$ into partial fraction

[a] $\frac{1}{x-2} + \frac{X}{x^2+3}$ [b] $\frac{1}{x-2} + \frac{x}{x^2+3}$

[c] $\frac{1}{2-x} + \frac{x}{x^2+3}$ [d] $\frac{1}{2-x} + \frac{x}{x^2+3}$

83. Resolve $\frac{3(x^2-3)}{X^4+x-2}$ into partial fraction

[a] $1 + \frac{2}{X-1} + \frac{-3}{x+2}$ [b] $3 + \frac{-2}{x-1} + \frac{-1}{x+2}$

[c] $-3 + \frac{-2}{x-1} + \frac{3}{x+2}$ [d] $3 + \frac{2}{x-1} + \frac{1}{+2}$

84. Resolve $\frac{1}{X^4+5x^2+6}$ into partial fraction

[a] $\frac{x+1}{x^2-2} + \frac{x-1}{x^3+3}$ [b] $\frac{x+2}{x^2-2} + \frac{x-3}{x^2+3}$

[c] $\frac{1}{x^2-2} + \frac{-1}{x^2+3}$ [d] $\frac{-1}{x^2-2} + \frac{-2}{x^2+3}$

85. Resolve $\frac{1}{x(x+1)}$ into partial fraction

[a] $\frac{1}{x} - \frac{1}{x+1}$ [b] $\frac{-1}{X} + \frac{1}{x+1}$

[c] $\frac{-1}{x} - \frac{1}{x+1}$ [d] $\frac{x}{2x} - \frac{1}{x-1}$

86. Resolve into partial fraction $\frac{2}{X^2-1}$

[a] $\frac{1}{x-1} - \frac{1}{x+1}$ [b] $\frac{1}{x+1} + \frac{1}{x-1}$

[c] $\frac{1}{x-1} + \frac{1}{x+1}$ [d] $\frac{x}{x-1} - \frac{1}{x+1}$

87. Resolve $\frac{3x^3}{1+x^3}$ into partial fraction

[a] $\frac{1}{1+x} + \frac{2x-1}{1-x+x^2}$ [b] $\frac{1}{1+x} + \frac{3x}{1+x+x^2}$

[c]1 $\frac{2}{2+x} + \frac{2}{1-x+x^2}$ {d] $\frac{1}{x-1} + \frac{2}{1-x+x^2}$

88. Express $\frac{1}{x^3-1}$ in I partial fraction

[a] $\frac{1}{3}\left(\frac{1}{x-1} - \frac{x+2}{x^2+x+1}\right)$ [b] $\frac{1}{3}\left(\frac{1}{x-1} - \frac{x-2}{x^2+x+1}\right)$

[c] $\frac{1}{3}\left(\frac{1}{x-1} - \frac{x-2}{x^2-x+1}\right)$ [d] $\frac{1}{3}\left(\frac{1}{x-1} \frac{- x+2}{x^2+x+1}\right)$

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89. Simplify $\frac{x^2+y^2+xy}{x+y} - \frac{x^2+y^2-xy}{x-y}$

[a] $\frac{x^2+y^2}{(x-y)^2}$ [b] $\frac{2x^3-y^2}{x^2}$

[c] $\frac{2y^3}{y^2-x^2}$ [d] $\frac{2x^2-2y^2}{x^2+y^2}$

90. Simplify $\frac{(2m-u)^2-(m-2u)^2}{5m^2-5u^2}$

[a] $\frac{3}{5}$ [b] $\frac{2}{5}$ [c] $\frac{2m-u}{5m+u}$

[d] $\frac{m-2u}{m+5u}$

91. Find p if $\frac{x-3}{(1-x)(x+2)} = \frac{p}{1-x} + \frac{Q}{x+2}$

[a] -2/3 [b] -5/3 [c] 5/3 [d] 2/3

INEQUALITY

92. Find the range of value of X for which

$\frac{2(x-1)}{3} - \frac{3(2x+1)}{4} \geq \frac{x-2}{5}$

[a] $X \geq 16$ [b] X-62 [c] $X \geq \frac{-61}{62}$ [d] $X \leq \frac{-61}{3}$

93. Solve the inequality $18 \leq \frac{3}{X}$

[a] $O<x \leq 1/6$ [b] $O<x<1/6$ [c] $O \leq x \leq 1/6$ [d] $O \leq x \leq 1/6$

94. Solve the inequalities $2X^2>5x-3$

[a] $1<x<3/2$ [b] $X>3/2$ or $x<1$

[c] $X<3/2$ or $x<1$ [d] $X>3/2$ or $x \leq 1$

95. Find the ranges of values of x for which

$\left\{2 - \frac{1-x}{3} < 5\right\}$

[a] $-2<x<1$ [b] $-20<x<10$

[c] $X<10$ or $x<20$ [d] $X<10$ or $x>20$

96. If $\frac{1}{x-2} > 3$ then x =

[a] (2,7/3) [b] (-2,7/3) [c] (2,7/3] [d] (2,-7/3)

97. Solve for x $\left|\frac{2x+3}{3x-4}\right| < 5$

[a] $x<1$ or $x>23.13$ [b] $X<2$ or $c<5$

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[c] X<6 or x>1 [d] X<2 or x>16

98. The modulus form of -3<2x<5 is
[a] /x-2/<3 [b] /2x +1/<3
[c] /2x-1/<3 [d] /x-1/<2

99. The solution of the quadratic inequality $(x^2 + x-12) \geq 0$ is
[a] $x \leq -4$ or ≥ 3 [b] $X \geq -3$ or ≤ 4
[c] $x \geq 3$ or $x \geq -4$ [d] $X \leq 3$ or $x \leq -4$

100. Find the range of values of x which $3x^2 + 10x - 8 \leq 0$
[a] $2/3 \leq x \leq 4$ [b] $-4 \leq x \leq 2/3$
[c] $-2/3 \leq x \leq 4$ [d] $-4 \leq x \leq -2/3$ [e] $-4 \leq x \leq 4$

101. Determine the real number satisfying x (3/x+x)>2
[a] X>-1 [b] x<1 [c] All real numbers x
[d] X<2 [e] X<-1

Quadratic & Cubic equations & Simultaneous equation

102. Factorize $6x^3 - 11x^2 + 6x - 1$ completely
[a] (x +1) (2x+1) (3x-1) [b] (6x+1) (x-1) (x+1)
[c] (x-1) (2x-1) (3x-1) [d] (X-1) (2x+1) (3x+1)

103. Find the value of (α,β) given that $x^4 + 12x^3 + 46x^2 + \alpha x + \beta$ is the square of a quadratic expression.
[a] (60,25) [b] (25,-60)
[c] (10,25) [d] (15,25)

104. Find the range of values of K>o for which $x^2 + kx + 4 = 0$ has real roots
[a] K = 4 [b] K > 4
[c] $K \geq 4$ [d] K < 4

105. Find the value of K for which $9x^2 + 24x + k$ has equal roots?
[a] 16 [b] 12
[c] 10 [d] -16

106. The equation $2x^2 + (k + 3)x + 2K = 0$ has equal roots. Find the value the constant K
[a] 3 or -7 [b] -1 or 0
[c] 9 or 1 [d] -9 or -1

107. For what values of the constant k does the equation $(k-1)x - kx^2 - k$ have equal roots?
[a] $^1/_3$ or -1 [b] -1 or 3 [c] -1 or -3 [d] 0 or $^1/_2$

108. If α and β are the roots of the equation $3x^2 - 4x + 5 = 0$. Find the value of $\alpha/\beta + \beta/\alpha$
[a] 46/15 [b] 16/15
[c] -14/15 [d] -6/15 [e] -70/27

109. If the roots of $2x^2 + 5x + 3 = 0$ are α and β, what is the value of $\alpha^2 + \beta^2$

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[a] [illegible] [b] 3 ¼ [c] [illegible] [d] -9 ¼

110. Given that α and β are the roots of the equation, $\alpha+\beta=3/2$, $\alpha\beta=-1/2$, find the equation

[a] $X^2-3x+2=0$ [b] $X^2-2x+3=0$
[c] $X^2+3x-2=0$ [d] $X^2+2x-3=0$

111. The quadratic equation when roots of the equation $2x^2-3x-1=0$. Find the equation when roots are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$

[a] $X^2-3x+2=0$ [b] $X^2+3x-2=0$
[c] $X^2-3x+2=0$ [d] $X^2+3x+2=0$

112. Solve the equation $x+y=1$, $x^2+y^2=13$

[a] X = -2 or 3, y = 3 or -2 [b] X = 2 or -3, y = -3 or 2
[c] X = 3 or 2, y = 2 or -3 [d] X = -3 or-2, y = 2 or 3

113. Which of the following is a solution to the equation $x+y=10$, $2xy+y^2=36$

[a] X = -2, y = 12 [b] X = -2, y=8
[c] X = -8, y = 2 [d] X= 8, y = 2

114. If α and β are the roots of the equations $x^2-2x-5=0$. Find the equation where roots are $\alpha^2\beta$ and $\alpha\beta^2$

[a] $X^2-10x-125=0$ [b] $x^2+10x-125=0$
[c] $X^3-10x-125=0$ [d] $X^3+10x-125=0$

SERIES AND SEQUENCE, A.P & GP

115. Find the sum of the first three terms of G.P, when term is 27 with six term as 8

[a] 128 ¼ [b] -128 ¼
[c] -128 [d] 128

116. Find the sum of 17 terms of the series 49, 44, 39,..?

[a] 153 [b] 207 [c] 192 [d] 149

117. Find the geometric means between 26 and 46.

[a] 12,27,72 [b] 27,9,3
[c] 3,9,27 [d] 3,9,36

118. Find the geometric means between -81 and 1

[a] 18,27,72 [b] 3,9,27
[c] 3,9,36 [d] 27,9,3

119. Insert 5 arithmetic means between -3 and 21

[a] 1,5,9,13,17 [b] 2,6,10,14,18
[c] 3,7,11,15,19 [d] 4,8,12,16,20

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120. Find three geometric means between 4/27 and 12
[a] 4/9, 4/3,4 [b] 4/9,-4/3,4
[c] -4/9, 4/3,4 [d] 4/9, 4/3,-4

121. If the 6th term of an A.P is 11 and the first term is 1. Find the difference
[a] 12/5 [b] 5/3 [c] -2 [d] 2

122. A sequence {Ur} is defined as $Ur = ar + br^2$. If Ur = 4 and $U_2 = 6$. Find a and b, write your answer as (a, b)
[a] (1,5) [b] (-5,1) [c] (5,-1) [d] (-1,5)

123. Given the series $Sn = 1 + \sqrt{3} + 3 + 3\sqrt{3} \ldots\ldots + 81\sqrt{3}$ Find n
[a] 10 [b] 11 [c] 9 [d] 8

124. The arithmetic means of 2 numbers is 5 and the geometric means of the number is 3. Find the numbers and with your answer as x, y.
[a] (3,7) or (7,3) [b] (1,-9) or (-9,-1)
[c] (1,9 or (9,1) [d] (3,6) or (6,3)

125. The harmonic mean of two numbers x and y is defined as
[a] $\frac{x+y}{2}$ [b] $\frac{2xy}{X+y}$ [c] $\frac{X+y}{2xy}$ [d] $\sqrt{Xy}$

126. The first term of a geometrical progression is twice. Its common ration, find the sum of the first two terms of the progression. If the sum of the first two terms of the progression, and as it sum to infinity to be 8.
[a] 8/3 [b] 50/9 [c] 72/25 [d] 8/5

127. The sum to infinity of the series 1+3/4+9/49+27/243+81/240+ is
[a] 7/4 [b] 7/3 [c] 37/343 [d] 81/2401

128. In a family, the ages of children arranged from the youngest to oldest are 2, 6, y, 14 and z. If the sequences of age is in an arithmetic progression, what is the ratio z:y
[a] 9:4 [b] 4:9 [c] 9:5 [d] 5:9

129. If the 6th term of an arithmetic progression is 11 and the first term is 1, find the common difference.
[a] 12/5 [b] 5/3 [c] -2 [d] 2

130. Find the sum of the 20th term of an arithmetic progression whose first term is 7 and last term is 117
[a] 2480 [b] 1240 [c] 620 [d] 124

131. Find the sum of the first twenty terms of the arithmetic progression Log a, $Loga^2$, $Loga^3$.....
[a]$Log_a 20$ [b]$Log_a 21$ [c]$Log_a 200$ [d]$Log_a 210$

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132. A man is able to give ₦50:00 of his salary in a particular year. After this, every year he saved N20:00. More that the preceding year. How long does it take him to give N4, 370?
[a] 23 years [b] 19 years [c] 63.4 years [c] 216 years

133. Find n given - $\frac{1}{2}^{14}$ is the nth term of 8, 4, 2.....
[a] 18 [b] 17 [c] 16 [d] 10

134. The sum of the progression $1+x+x^2+x^3+$.....
[a] $\frac{1}{1-x}$ [b] $\frac{1}{1+x}$ [c] $\frac{1}{X-1}$
[d] $\frac{1}{X}$ [e] none

135. P+1, 2p-10,1-4p^2 are three consecutive terms of an arithmetic progression, find the possible values of p
[a] -4,2 [b] -3,4/11 [c] -11/4,2 [d] 5,-3

136. The sum of first three terms of a geometric progression is half its sum to infinity. Find the positive common ratio of the progression
[a] ¼ [b] ½ [c] 1/3 [d] ½

137. If k + 1, 2k-1, 3k + 1, are three consecutive terms of a geometric progression. Find the possible values of the common ratio
[a] 0,8 [b] 1,5/3 [c] 2,3 [d] 1,1

Binomials Expansion

138. Find the coefficient of x^2y^2 in the expansion of $(2x+3y)^4$
[a] 36 [b] 81 [C] 96 [d] 216

139. Calculate the coefficient of x^6 in the binomial expansion of $(1/2+x)^8$
[a] 28 [b] 8 [c] 7 [d] 4

140. Find the coefficient of x^8 in the binomial expansion of $(x+3)^{12}$
[a] 495 [b] 1336 [c] 40095 [d] 64152

141. Find the coefficient of X^5 in the expansion of $(2x-1)^8$.
[a] 1792 [b] 896 [c] 448 [d] -896 [e] -1792

142. What is the coefficient of x^3 in the expansion of $(4x^2\pm3X+1)$ (X^2-4x+1)?
[a] 7 [b] 4 [c] 1 [d] -16 [e] -19

143. What is the coefficient of the 3rd term in the expansion of $(2x+\frac{3y}{4})^3$
[a] 27/64 [b] 27/8 [c] 8 [d] 9 [e] 12

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144. The constant term is the expansion of $\frac{(x-1)^6}{x}$

[a] -20 [b] 15 [c] 60 [d] 120

145. Use Pascal triangle to evacuate $(1.002)^5$ correct to six decimal place

[a] 1.000100 [b] 1.001004

[c] 1.100040 [d] 1.100040 [e] 2.010440

146. if $x = \begin{pmatrix} 1 & 2 \\ 0 & 3 \end{pmatrix}$ and $y = \begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}$ find xy

[a] $\begin{matrix} 10 & 7 \\ 12 & 9 \end{matrix}$ [b] $\begin{matrix} 2 & 7 \\ 4 & 17 \end{matrix}$ [c] $\begin{pmatrix} 10 & 4 \\ 4 & 6 \end{pmatrix}$ [d] $\begin{pmatrix} 4 & 3 \\ 10 & 9 \end{pmatrix}$

147. If $\begin{pmatrix} 3 & 1 \\ 2 & x \end{pmatrix} \begin{pmatrix} 2 \\ 3 \end{pmatrix} = \begin{pmatrix} y \\ 10 \end{pmatrix}$ Find x and y

[a] 2,9 [b] 6,9 [c] 9,2 [d] 9,2 [e] 2,6

148. If $A = \begin{pmatrix} 2 & 1 \\ -3 & 0 \end{pmatrix}$ and I is a 2x2 unit matrix

evaluate $A^2-2A+41$

[a] $\begin{pmatrix} 1 & 4 \\ 4 & 1 \end{pmatrix}$ [b] $\begin{pmatrix} -3 & 0 \\ -3 & 0 \end{pmatrix}$

[c] $\begin{pmatrix} 9 & 4 \\ 0 & 1 \end{pmatrix}$ [d] $\begin{pmatrix} 1 & 0 \\ -3 & 1 \end{pmatrix}$ [e] $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

149. Calculate the determinate of $\begin{pmatrix} 2 & 4 \\ 2 & 8 \end{pmatrix}$

[a] 8 [b] 6 [c] -6 [d] -8

150. Calculate the determinant of the matric

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 2 & 0 & -1 \end{pmatrix}$$

[a] -67 [b] -57 [c] -3 [d] 3

151. Find the values of x for which

$$\begin{vmatrix} 3-x & 9 \\ -1 & 1+2x \end{vmatrix} = 0$$

[a] 2 or 3 [b] 4 or-3/2 [c] 4 or -2/3 [d] 3 or 2 [e] 3/2 or -4

152. If $\begin{vmatrix} 4 & 3 & 2 \\ -1 & 4 & x \\ 2 & -2 & 3 \end{vmatrix}$ 17 find the value of x

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[a] -3 [b] -2 [c] 3 [d] 6

153. Find the non-zero positive value of x which satisfies the equation

$$\begin{vmatrix} X & 1 & 0 \\ 1 & x & 1 \\ 0 & 1 & x \end{vmatrix} = 0$$

[a] 2 [b] $\sqrt{3}$ [c] $\sqrt{2}$ [d] 1

ANSWERS

1. **Option B**

   A Can only be separated to B Since A and B has nothing complementary in nature, A=B is when a contains E and B contains A i.e. each set is an improper subset of each other while a Singleton is a set with only one element.

2. **Option C**

   If A B = proper subsets, then B≤A i.e. B is contained in A. ≤ Therefore

   A≥B = B≥A

3. **Option A**

   Assume A = [1,2,3] , B = [3,4,5] therefore (AUB) = [1,2,3,4,5] = Universal set U then if A' = [4,5:. B' = [1,2] then A' n B' [ϕ], AUB' = [12,4,5] = 3 (AUB)' =3 = A' n B'

4. **Option D**

   P - Physics

   M - Mathematics

   N (P) + n (m)-(pnm) =pUm

   22 + 28-x =42

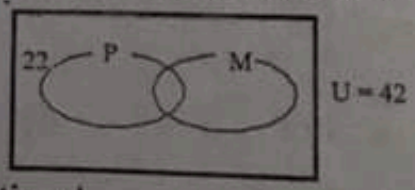
   50-42=x

   X =8

   :. No of student that offers Physics only

   N(p) – p n m = P only

   22 – 8 = 14 Students offered physics only.



5. **Option A**

   If A≤B then A is a proper subset of B hence A is find in E only.

   Then if A = [1,2,3] & B = [1,2,3,4]

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[a] AUB = [1,2,3,4]

$A' = [4]$, $B' = [\varnothing]$

$A'UB' = [\varnothing]$:.$[AnB]' = [\varnothing]$

An $(AnB)' = [1,2,3]$ Option A

6. **Option C**

If $x^2 = 0$, $x > 4$:. $x = 0$ $x > 4$

Hence S = empty set Since X = 4

It is not option D because means empty set or [ ] there is nothing like $\{\varnothing\}$

7. **Option A**

Equation X εZ $2X^3 - 3xx^2 - 5x + 6 = 0$

Try $x = 1 = 2(1)^3 - 3(1)^2 - 5(1) + 6 = 0$ {x = 1 factor 1 εZ }

Try $x = 2 = 2(2)^3 - 3(2)^2 - 5(2) + 6 = 0$ {x = 2 factor 2 εZ }

Try $x = -3/2 = 2(-3/2)\,3 - 3(-3/2)\,2 - 5(-3/2) + 6 = 0$ {x = $-3/2$ factor $-3/2$ εZ}

:. N Z. S = {1,-3/2,2}

8. **Option B**

If X is an element of N.:. $x^3 - 7x + 6 = 0$

Let x = 1:. $(1)^3 - 7(1) + 6 = 0$

Let x = 2:. $(2)^3 - 7(1) + 6 = 0$

Let x = 3:. $3^3 - 7(3) + 6 = 12 = X = 3$

Let x = -3:. $(-3)^3 - 7(-3) + 6 = 0$

xε n/X {1,2-3}

9. **Option B**

$X^3 = 16$ & $3x = 9$

$X = \pm 16$ x $x = 9/3$

$X = \pm 4$v $x = 3$

:. U = {3,4,-4}

10. If $|- \leq X \geq 4|$:.$|- < x, x, 4|$.

Therefore x greater than one equal to -1.

Hence the set becomes {-1,.....4}

11. **Option B**

Let $X^2 + 1 = 0$ hence $x^2 = \sqrt{-1}$:. X = - 1 =i

12. **Option C**

(p U q = n (p) + n (q) – n (p n q)

54 = n (p) + 27 -8

N (p) = 35

13. **Option D**

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A subset must contain value or members present in the original set. (N.B) is a subset proper.

14. **Option A**

$X^3 - 6x^2 + 11x - 6 = 0 = [T]$

$X^3 - 6x^2 + 9x + 2x - 6 = 0$

$X^3 - 4x^2 - 2x^2 2 + 8x - +3x6 \longrightarrow$ 1st Factor

$X^3 - 2x^3 - 3x^3 + 4x^3 + 8x - 6 \longrightarrow$ 2nd Factor

$X(x - {}^2 2x + 3) - 4(x^3 - 2 - 3/2) \longrightarrow$ 3rd Factor

Also $x^3 - 5X^2 - X^2 + 5x + 6x - 6 = 0 \rightarrow$ 4th Factor

USing 4th Factor

$X^3 - 5x^2 - x^2 5x + 6x - 6 = 0$

$X(x^2 - 5x + 6) - 1(x^2 - 5x + 6) = 0$

$(x-1)(x^2 - 5x + 6) = 0$

$(x-1)(x^2 - 2x - 3x + 6) = 0$

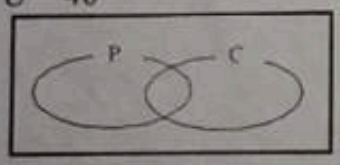
$(x-1)(x-3)(x-2) = 0$

$N = 1,3,2 \qquad T = \{1,2,3\}$

$\therefore SnT = \{1,2,3\}$

15. **Option C**

U = 40



If n (P) = 3n (p n c)

N (C) = (np)

Find (np)

Hence $(p \cup c) = n(p) + n(c) - (p \cap c)$

$= n(p) + 2n(p) - Pnc$

$= 3(pnc) + 2np - Pnc$

$= 2(pnc) + 2np = 40$

$\therefore (pnc) - {}^{np}/_{1}$

Hence $\frac{2(np)}{3} + \frac{2np}{1} = 40$

$2n(p) + 6np = 120$

$8np = 120$

$Np = \frac{120}{8} = 15$

16. **Option C**

In this, marriage, men and wom... are involved and as a man cannot' a woman, the three can't be intersected. Thus it is a set problem that

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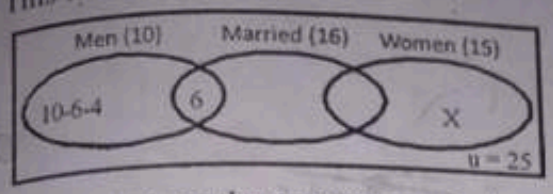
involves 3 elements but with no intersection of the three.
This is shown below:



Let x = women that are not married
From 25 teachers given 15 are women
∴ Men = (25-15) = 10
Thus 4 + 16 + x = 25
(Men only + Married + women only = Union)
∴ X = 25-20 = 5

17. **Option A**
$\{P^1 \text{ n } (Q \text{ U } Ql)\}^{1+} = (p)\text{ 'n' } (Q \text{ U } Q^1)^1 = \text{ PU } (Q^1 \text{ n } Q) = \text{PU0} = P = (A)$

18. **Option B**
A ≤ means A is subset of B i.e. all a are in B Thus an B = A
∴ An $(A \text{ n } B)^1$, An $(A)^1 = A \text{ n } A^1 = \varnothing B$

19. **Option A**
$(P \text{ U } Q) \text{ n } (P \text{ u } Q^1) = [PUQ) \text{ nP}] \text{ U } [(PUQ) \text{ n}Q^1]$
$= [(PnP) \text{ U } (P \text{ n } Q] \text{ U } [(Q^1 \text{ n } Q)$
$= [PU (P \text{ n } Q)] \text{ U } [(P \text{ n } Q^1)] \text{ U } \square]$
$= P \text{ U } (P \text{ n}Q^1$
= P as P n Q is less than P

20. **Option B**
Elements (e) 5 = 5
But $N = 2^3$, N $2^5 = 32$

21. **Option C**
$$\frac{1}{\sqrt{5}} + \frac{1}{\sqrt{5+1}}$$
By getting the summation and limit of the denominator
$$\frac{\sqrt{5+1}+\sqrt{5}}{\sqrt{5}(\sqrt{5}+1)} \quad \frac{5+15}{5+\sqrt{5}} \times \frac{5-5}{5-\sqrt{5}}$$
$$= \frac{-5+9\sqrt{5}}{20} = \frac{1}{4} + \frac{9\sqrt{5}}{20} = p + q\sqrt{r}$$
∴ P = ¼ , q = $^9/_{20}$, r = 5

22. $9^{2x-1} = 81^{x-2} / 3^x$
$4^{4x-2} = 3^{4x-8+x}$
4x– 2 = 4x –8+x
X= 10

23. **Option D**
$\text{Log}_2{}^9 5 - \text{Log}_2 P$

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$Log_2^{q} = 1Log_2^{2/3} - Log_2 P^2$

If p = q

$\therefore Log_2^{q} = Log_2^{2/3} - Log_2 P^2$

$Log_2^{q} = 5 Log_2^{2} 4Log_2 P^2$

$Log_2^{q} = 1 (Log 2/3)$

$Log_2^{q} - Log_2^{q} - Log_2^{2/3} = 0$

$Log_2^{q} - Log_2^{2/3}$

Q = 2/3

By comparison $q = 2^5/3^3 = 3^2/_{27}$

24. **Option A**

$2\sqrt{x} - \sqrt{4x} - 11 = 1$

$2\sqrt{x} = 1 + \sqrt{4x \quad 11}$

Square both sides

$4x = (1 + \sqrt{4x} - 11)^2$

$\underline{4x = 1} + 2\sqrt{4x\ 11+) + (4x - 11)}$

$4x = 4x - 10 + 2\sqrt{4x - 11}$

$4x = 4x - 10 + 2\ 4x - 11$

$4x = 4x - 10 + 2\ 4 - 11$

$10 = 2\sqrt{4x - 11x}$

Squaring both sides

$100 = 4(4x - 11)$

$^{100}/_4 = 4x - 11$

$25 + 11 = 4x$

X = 9

25. **Option B**

$\sqrt{48} - \frac{9}{\sqrt{3}} + \sqrt{75}$

$\frac{\sqrt{3 x 48} - 9 + \sqrt{3 x 75}}{\sqrt{3}}$

Rationalizing the denominator

$\frac{\sqrt{3 x 3x 48} - 9\sqrt{3} + \sqrt{3}x3 x 75}{\sqrt{3}}$

$12\sqrt{3} - \frac{9\sqrt{3} + 15\sqrt{3}}{\sqrt{3}}$

$\frac{18\sqrt{3}}{\sqrt{3}} = 6\sqrt{3}$

26. **Option D**

$2 Log_x^{x}\ 2 Log_x^{x} = 5$

Correcting Log_x^{x} to Log_x^{x}

$2 Log_x^{x} + 2 log_x^{x} = 5$

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$\text{Log}_x^{\,?}$

$2 + \text{Log}_x^{\,?} - \text{Log}_x^{\,?} = 52\ \text{Log}_x^{\,?}$

Let $\log_x^{\,?} = A$

$2A^2\ 5A + 2 = 0$

USing General Formula

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$A = 2$ or $\frac{1}{2}$

$\therefore \text{Log}_x^{\,?} = 2$ or $\frac{1}{2}$

27. **Option C**

$1/3 \times 27^x = 9^{2x}$

$\frac{27^x}{3} = 3^{2x}$

$27^x = 3^{2x+1}$

$X = -1$

28. **Option B**

$\text{Log}_5^{0.04} = \text{Log}_5 (^4/_{100})$

$\text{Log}_5^{18} - \log_5^2 \qquad \log_3^{18} - \log_3^2$

$= \text{Log}_5(^4/_{100})$

$\text{Log}_3 (^{18}/_2)$

$\therefore \text{Log}_5 (^4/_{100} = \log_3 (^{18}/_2) = \log_3 25^{-1} \log_3^{\,?}$

$= \frac{2\log_5^5}{2\log_3^3} = -1$

29. **Option D**

$$\frac{1}{\sqrt{5}+\sqrt{3}} - \frac{1}{\sqrt{5}-\sqrt{3}}\left\{\frac{1}{\sqrt{3}}\right\}$$

$$\frac{\sqrt{5} - \sqrt{3} - \sqrt{5} - \sqrt{3} \times 1}{\sqrt{5}\ 2 - (\sqrt{3})\ 2\sqrt{3}}$$

$= \frac{-2\sqrt{3} \times 1}{2\sqrt{3}} = \frac{-2\sqrt{3}}{2\sqrt{3}}$ (rationalizing)

$= \frac{-4 \times 9}{4 \times 9} = -1$

30. **Option C**

$\text{Log}_{10}^{x} + \text{Log}_{10}^{x2} + \text{Log}_{10}^{x8} + \text{Log}_{10}^{x15}$

$\text{Log}_{10}^{x32} = 63$

$(1 + 2 + 4 + 8 + 16 + 32)\ \text{Log}_{10}^{x} = 63$

$63\ \text{Log}_{10}^{x} = 63$

$\text{Log}_{10}^{x} = 1$

$X = 10^1 = 10$

31. **Option B**

$25^x + 3\ (5^x) - 4 = 0$

$5^{2x} + 3\ (5^x) - 4 = 0$ Let $5^x = A$

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$A^2 + 3 - 4 = 0$

$A = -4$ or 1

$A = 5^x = -4,\ 5^x = 1$

Taken log to both sides $\text{Log}5^x = \log(-4)$

$X \log_{10}^{x} - 2\log_{10}^{-2} = \log_{10}^{(-4-5)}$

$X\log_{10}^{-2} = \log_{10}^{2}$

Log_{10}^{3}

$= \text{Log}_{10}^{-0}$ (No Ratio)

And $5^x = 1 :. 5^x = 5^0 :.\ X = 0$ (Ratio)

32. **Option A**

Log_1^{32}

Change base to bas 10

$\text{Log}_{10}^{32}\ \ \text{Log}_{10}^{32} = 0$

Log_{10}^{1}

(NB) $\text{Log}_e^1 = 0$ & $\text{Log}_{10}^1 = 0$

33. **Option D**

$-2\text{Log}_7 (^{15}/_7) - 2\log_7 (^7/_3) + \text{Log}_7 (^{25}/_{12})$

$\text{Log}_7 (^{15}/_7)^{-2} - \text{Log}_7(^7/_3) + \text{Log}_7(^{25}/_{12})$

$\text{Log}_7 (^7/_{15})^2 - \log_7 (^3/_7)^2 + \text{Log}_7(^{25}/_{12})$

$\text{Log}_7(^{49}/_{125}) - \text{Log}_7(^9/_{49}) + \text{Log}_7(^{25}/_{12})$

$\text{Log}_7 (^{49}/_{225} \times {}^9/_{49} \times {}^{25}/_{12})$

$\text{Log}_7(^{1}/_{12}) = \text{Log}_7(^1/_{3\times 2^2})$

$= \text{Log}_7 (3^{-1} \times 2^{-2})$

$= \text{Log}_7^{3}(-2\log_7^{2})$

$= -0.566 - 0.712$

$= -1.278$

34. **Option C**

$$\frac{(1 - \sqrt{3})^{-2}}{(1 - \sqrt{3})(1 - \sqrt{3})} = \frac{1}{4 - 2\sqrt{3}} \times \frac{4 + 2\sqrt{3}}{4 - 2\sqrt{3}} = \frac{4 + 2\sqrt{3}}{4}$$

$= 1 + ½\sqrt{3}$

35. **Option B**

$\text{Log}_{10}(3x^2 + 8) = 1 + \text{Log}_{10}(^7/_2 + 1)$

$\text{Log}_{10}(3x^2 + 8) = \text{Log}_{10} 10 + \text{Log}_{10}(^7/_2 + 1)$

$\text{Log}_{10} (3x^2 + 8) = \text{Log}_{10} 10 + \text{Log}_{10}2 \times \text{Log}_{10} 1$

Where $\text{Log}_{10} 1 = 0$

$\text{Log}_{10} (3x^2 8) = \text{Log}_{10}(10x) - {}^0$

$\text{Log}_{10} (3x^2 + 8 - 10x) = 0$

$3x^2 - 10x + 8 = 0$

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$X = {}^{4}/_{3}$, or ${}^{2}/_{1}$

Move by $10^{0} = 0$:. X = 2 or 4/3

36. **Option B**

$a^{2-x} = T$

$a^{2} - a^{x} = T$:. $a^{2} = T$:.

$\frac{a^{2}}{a^{2}} = T$

Taken by of both sides

$\text{Loga}\ (a^{2}?T) = \text{Log}_{a} a^{x}$

$X = \text{Log}_{a}\ (a^{2}/T)$

37. **Option C**

$\sqrt{50} - \sqrt{18} + \sqrt{32}$

$\sqrt{2 \times 25} - \sqrt{2 \times 9} + \sqrt{1 \times 8}$

$5\sqrt{2} - 3\sqrt{2} + 4\sqrt{2}$

$6\sqrt{2}$

38. **Option C**

$\text{Log}_{10}\ (a^{2-}x^{2})$

$\text{Log}_{a}\ a^{2} - \div \text{Log}_{a} X^{2}$

$\text{Log}_{10}\ (a^{2-}X^{2}) = \text{Log}_{10}\ (1 - x^{2}/a^{2})$

$\text{Log}_{a}\ a^{2} \div \text{Log a}\ (X^{2}/a^{2})$

$\text{Log}_{a}^{1}\ \text{Log}_{a}(x/a)^{2}$

$\frac{\text{Log}_{a}^{1} : 2\text{log}_{a}\ {}^{(x}/_{a})}{\text{Log}_{a}(1 - x^{2}/_{a2})}$

39. **Option C (Rationalize)**

40. **Option B**

$\frac{3\ \ abc^{-4}}{4a^{3}b^{-3}\ C} = \frac{(abc^{-4})\ {}^{1}/_{3}}{(a^{3}\ b^{-3}\ c)^{1/4}} =$

$\frac{a\ {}^{1}/_{3}\ b\ {}^{1}/_{3}\ C\ {}^{1}/_{3}}{a^{3/4}\ b^{-3/4}\ C^{1/4}}$

Hence $\frac{a^{4-9/12}\ b^{4+9/12}\ c^{-16-3/12}}{A^{-5/12} b^{13/12}\ c^{-19/12}}$

$\frac{B^{13/12}}{a^{-5/12}\ c -^{-19/12}}$

41. **Option A**

$X^{2c\ 3/4}\ Y^{-33/4}\ Z^{3/4} X^{-1}\ Y^{-4}\ X^{-5}$

$X^{5/2}\ Y^{-3-16/4}\ Z^{3-20/4}$

$X^{-5/2}\ Y^{-25/4}\ Z$

$r = {}^{5/2} s^{-25/4} t = {}^{17/4}$

$R + 25 = {}^{5/21} - 2\ ({}^{25/4}) = -10$

42. **Option A**

$\frac{3\ (2^{n}.\ 2) - 4\ (2^{n}.2^{-1})}{2^{n}.\ 2-2^{n}} = \frac{6\ (2^{n}) - 412\ (2^{n})}{2^{n}..2-2^{n}}$

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$\frac{6(2^n) - 2(2^n)}{(2-1)2^n)} = \frac{4(2^n) = 4}{(2^n)}$

43. **Option D**

$= \text{Log}_5 (^4/_{100}) =$

$\text{Log}_5 0.04$

$\text{Log}_3 18 - \text{Log}_3^2 \quad \text{Log}_3 {}^{18}/_2$

$\text{Log}_5 (^2/_{10})^2$

$\text{Log}_3 9$

$= \text{Log}_5 (^2/_{10})^2 \div 2\text{Log}_3 3$

$2\text{Log}_3^{1/5} \div 2$

$\frac{2\text{Log}_5 5}{2} = -1$

44. **Option B**

$\text{Log}_4 (y-1) + \text{Log}_4 (1/2x) = 1$ .....(1)

$\text{Log}_2(y-1) + \text{Log}_2(x) = 2$..... (2)

Correct to same base

$\text{Log}_2 2 (y-1) + \text{Log}_2 2 (x/2) = 1$

$\frac{1}{2} \text{Log}_2 - y - 1 + \frac{1}{2} \text{Log}_2 {}^x/_2 = 1$

$\frac{1}{2} \text{Log}_2(y-1) + \frac{1}{2} \text{Log}_2 {}^x/_2 = 2x + 1$

$\text{Log}_2 (y-1) \text{Log}_2 {}^x/_2 = 2$

$\text{Log}_2(y-1) \text{Log}_2 {}^x = 2$

$\text{Log}_2 (y-1-y-1) \text{Log}_2 ({}^1/_2 \div X)\ {}^2/_2$

$\text{Log}_2 ({}^{-1}/_{y-1}) + \text{Log}_2 ({}^1/_2 \times \frac{1}{2} = 0$

$\text{Log}_2 ({}^{-1}/_{y-1}) = 0$

$2y + 2 = y - 1$

$2y - y = -+2 :. Y = -3$

$\text{Log}_2 (-3+1) + \text{Log}_2 x = 2$

$\text{Log}_2^{-2} + \text{Log}_2 x = 2$

$1 + \text{Log}_2 x = 2$

$\text{Log}_2 X = 1 :. X = 2^1 = -2 \quad y = -3, x = -2$

45. **Option C**

$\text{Log}_{10}^2 = X :. \quad \text{Log}_{10} 12.5 = \log_{10} {}^{25}/_2$

Hence $\log_{10} 25 - \log_{10} 2$

$\text{Log}_{10} 52 - \log_{10} 2 = 2\log_{10} 5 - 2$

$= \log_{10} 2 - \text{Log}_{10}^4$

$2 - 2x$

$2(1-x)$

46. **Option A**

Combining Terms $X^{-2} = {}^2/25\ ({}^1/_8)$

$X^2 = {}^2/_{100} = {}^1/_{100} = {}^1/_{10}^{-2} = 10^{-2}$

$X = 10$

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47. **Option A**

$Log_{10}^{5} = 1 \therefore = 10^1 = 5$

$\frac{Log_{10} 4}{3x} = \frac{Log_{10} y}{3x3x} = \frac{½ \log_{10} y}{3(5)} = \frac{½ \times 2}{15} = 1$

48. **Option A**

$\frac{Log3 (^1/_{16})}{Log\ ^7/_4} = \frac{\log^{49}/_{16}}{\log\ ^7/_4} = \frac{\log (7/84)^2}{\log\ ^7/_4}$

49. **Option B**

$Log_2 4 + Log_2 7 = Log_2 n$

$Log_2 (4x\ 7/12)\ Log_2 n$

50. **Option C**

$3 = 3\log_2 2$

$2 \log_2 x - x\ Log_2 4 (1+y) = 3\ Log_2 2$

$Log_2 x^2\ Log_2 (1+y)^x = Log_2 3$

$X^2 = 8 \therefore X^2 = 8 (1 + y)^x$

51. **No Answer**

$2 \longrightarrow Q\ (x)$

$X^2 + x - 2 \overline{)2x - 3x + 1}$

Division $2x^2 = 2x - 4$

$5 + 5 \longrightarrow r\ (x)$

Hint (dividing 2 x 2 by x2 and multiply by divisor subtract the new polynomial by formulae).

$2x^2 - 3x + 1 = (x^2 + X - 2)\ (2) + (-5x + 5)$

$9\ (x) \qquad r\ (x)$

52. **Option A**

Factor $(x + 1)(x-4)$, $F\ 9x) = X^3\ px^2 - qx+2$

USing Remainders theorem substitute factors solution into above equation.

If $x = 1 \therefore \quad F(x) = (-1)^3 + p(-1)^2 + q$

$(-1) + 12$

$F(x) = p-q = 11$.....(1)

If $x = 4 f(x) = (4)^3 + p(4)^2 + q(4) + 12$

$= 16p + 4q = -76$ .....(2)

Solving Equ (1) and (2) Simultaneously

$P = -6$ and $q = 5$

53. **Option C**

$F(x) = 2x + 1$, $q(x) = x + 3$

$D(q(x) = 2(x + 3) + 1$

$F(q(v) = 2x + 1$

54. **Option D**

$X^3 - 3 \times 2^2 + ax + 2 = (x+1)(x^2 + bx + 2)$

If factors of the equation equal $x + 1, -1$. Substitute into the L.H.S of the equation.

$X^3 - 3x^{+2} + ax + 2 = 0$

$(-1)^3 - 3(-1)^2 + a(2) + 2 = 0$

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A = -2

Now during the L.H.S using long division of polynomial after substitution (a)

$$X^2 - 4x + 2$$
$$X + 1\overline{)x3 - 3x2 - 2x + 2}$$
$$\underline{X^3 - X^2}$$
$$-4x^2 - 2x + 2$$
$$\underline{-4x^2 - 4x}$$
$$2x + 2$$

Therefore $X^2 - 4x + 2 = X^2 + bx + 2$

$\therefore B = -4$ (a = -2, b = -4

55. **Option C**

$6x^3 - 11X^2 + 6x - 1$

$6x^3 - 9x^2 + 2x^2 + 3x + 3x \times 1$

$(6x^3 - 9x^2 + 3x^2) + (2x + 3x \times 1)$

$3x(2x^2 - 3x + 1) - 1(2x^2 + 3x + 1)$

$(3x-1)(2x^2 - 3x + 1) \longrightarrow$ factorize

$(3x-1)(2x-1)(x+1)$

56. **Option B**

Solving the R. H .S (Right Hand Side)

$a(x-2)(x+1) + b(x+1)(2x^2+1) + c(2x^2(x-2)$

$a(x^2 + x - 2x - 2) + b(2x^3 + x + 2x^2 + 1)c(2x^3 - 4x^2)$

$a(x^2 + x - 2) + b(2x^3 + x + 2x^2 + 1)c(2x^3 - 4x^2)$

$a = 1, b = -2, c = 3$ (By alterations)

$x^2 - x - 2) = 4x^3 - 2x^2 - 4x^2 - 2 + 6x^3 - 12x^2$

$-15x^2 + 2x^3 - 3x - 4$

Equivalent

$(2x^2 - 15x^2 - 10 = 2^{x3} - 15x^2 - 3x - 4)$

57. **Option C**

$X^3 + 1$

$(x+1)(x+1)(x+1) = (x3 + 3x2 + 3x + 1) + 3x + 1)$

$X^3 + 1 = (x^3 + 1) - (3x^2 + 3x)$

$= x^3 + 1 = (x^3 + 1) - (3x^2 + 3x)$

$= (x^3 + 1) - (3x^2 + 3x + {}^3/_4)$

Using $b^2 - 4ac$

$32 - 12c = 0$;. C = ¾ perfect sphere

$= (x^3 + 1) - (12x^2 - 12x + 3)$

$= (x^3 + 1) - 3(4x^2 - 4x + 1)$

$= (x^3 + 1) - 3(4x^2 - 4x - 1 + 2)$

$= (x^3 + 1) - 3(2x^2 + 2x^2 - 2x^2 - 2x - 1 + 2)$

$= (x^3 + 1) - 3(2x^2 - 2x - 2 - 2x^2 - 2x - 1)$

$= (x^3 + 1) - 3(2x^2 - 2x + 2) + (2x^2 - 2x - 1)$

$= (x^3 + 1) - 3(2(x^2 - x + 1) + (2x - 1) - 1(x - 1)$

By correcting p= -3, q = +1, -1

58. **Option A**

The order of the equation p(x) is the first power of the equation = n

59. Since the polynomial p(x) = 0 always, the equation has infinitely many solutions (not nots). Therefore the roots maybe real or complex.

60. **Option B**

If P $\frac{(1-5)}{2}$

Therefore $\frac{1-\sqrt{5}}{2}$ is a fraction of the polynomial. Hence by substituting the value of $x = \frac{1-\sqrt{5}}{2}$ into the obtaining be able to here $\frac{(1-\sqrt{5})}{2}$ back

Hence if F (x) = ax + b.

F ($^{b}/_{a}$) = 0 where $^{-a}/_{b}$ = x .: a ($^{a}/_{b}$) a + b = 0

Hence $P\left(\frac{1-5}{\sqrt{2}}\right) = x2 - x + 1 \left(\frac{1-\sqrt{5}}{2}\right)^2$

$-(1-\sqrt{5}) + 1 = -2 - \frac{1-\sqrt{5}-2}{2}$

$P\left(\frac{1-\sqrt{5}}{2}\right) = (^{b}/_{a})$

Since p (X) = x2 – x + 1, $x = \frac{(1-\sqrt{5})}{2}$

61. **Option C**

Since P, where L = n, n -1, n -2 ... 1, 2, 3.

$P_5 = P_5^{x5} + P_{n-1}^{x\,n-1} + p_1^{x1} + p_2^{x2}$

Hence Since $P_n P_{n-1}$ = n, n-1 power

Therefore P, = integers = not = coefficient of P (x)

62. **Option B**

P (x) divided by q(x) =ax + b

:. ax + b = 0

X = -b/a, a + b = 0

R = p (x) = P (-ba) ⟶ Remainder

63. **Option B**

If p (x) divides by (ax + b)

R = P (x) = P (-b/a)

Now (x –a) (x –b) =

Where (x –a) = a hence Øx - Øb = 0

R=Ø*b* / Ø = *b*

X – b= A hence AX – Aa = 0

AX = Aa :. X + $^{Aa}/_{A}$ = a

{P(a) = x = a} {P(b)x =b}

Using (x –a) =) Since b = X = a

(B –a) = 0

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$^{(p(a)-p(b))}/_{a-b}$ = 0 by alteration

64. **Option C**

If f (x) is a polynomial degree 1 divisor (ax + b)

F (x) such that ax + b = 0

ax = - b-, X = $^{-b}/_{a}$

F (x) = F $^{(-b}/_{a})$ = 0

65. **Option B**

Finding the remainder on $2n^3 + 6n - 8$, divisor = (x – 1)

using remainders there in X -1 = 0 :. X =1

Substitute X = 1 into F (x) = $2n^3 + 6n - 8$

Hence F (1) = $2 (1)^3 + 6 (1) - 8$

= 8 – 8 = 0

66. **Option A**

If x -2 = 0 :. X =2

Substitute x = 2 into ax^2 12x + 4

Hence a $(2)^2$ – 12(2) + 4 = 0

a = 5

67. **Option B**

(The same as Qn 64)

68. **Option A**

69. **Option D**

H (x) = $3x^4 + ax^3 + 12x^2 + bx + 14 = 0$

Where x -1 = 0 :. X =1

H (1) = $3 (1)^4 + a (1)^3 + 12 (1)^2 + b (1) + 14 = 0$

= a + b = 19 ..... (1)

If x + 2 = 0 :. X = -2

If h (x) = $3 (-2)^4 + a (-2)^2 + 12 (-2)^2 + b (-2) + 14 = 0$

8a + 2b = 82 .....(2)

Solving 1 and 2 simultaneously

a= 20, b = -39

70. **Option A**

X -1 + 3 +qx = px

X + 2 + qx + px

X + 2 +6 + qx = px

X + 8 +qx = px

X + 2 + x + 8 = px + qx

$2x = -10$

$X = -5$ hence $x + 5 = 0$ [p(x)-q(x) equal]

71. **Option A**

$X^2 + (k - a)x + k^2 + 15$

$B^4 - 4nc = 0$ (real and equal roots)

$(k - q)^2 - 4(1)(k^2 + 15) = 0$

$K^2 + 18k + 81 - 4k^2 - 60 = 0$

$K^2 - 4k^2 + 18k + 81^2 - 60 = 0$

$K^2 = 6k - 7 = 0$

$K = -1 - r1$

72. **Option D**

$K(x-1)(x-2) = x$

$K(x^2 - 3x + 2) = x = 0$

For the equation to have a real not $b^2 - 4ac > 0$

$Kx^2 - 3xk + 2k - x$

$Kx^{23k+1}/_k + 2k = 0$

$B^2 - -4ac > 0$

$(^{3k+1}/_k)^2 - 4(2k) > 0$

$(9k^2 - 5k + 1)^2 (^{8k}/_k) > 0$

$9k^3 + 6k^2 + k - 8k^3 = 0$

$K^3 + 6k^2 + k - 8k3 = 0$

$K(k^2 + 6k + 1) = 0$

$K = 3 \pm \sqrt{8}$

$K = \pm, 8$ or $3 - 8$

$X < 3 + 8$ or $x3 - 8$

73. **Option D**

$m - 1 = 0 \quad m = 1 \;\&m + 1 = 0m = -1$

if $m = 1 \therefore p(1) + q(1) + 1 = 2$

$p + q = 1$.....(1)

if $m = -1$ $1p(-1) + q(-1) + 1 = 4$

$p - q = 1$.....(2)

Solving 1 & 2 simultaneously

$P = 2, q = -1$

74. **Option C**

At $x - 1 = 0 = 1$

$A x^{3+} bx^2 + cx^{-1} = 0$

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$A + b + c = 1$ .....(1)

At $x\ 1 = 0\ x = -1$

$-a + b - c = 1$.....(2)

At $x\ -2 = 0\ x = 2$

$8a + 4b - 2c$ i.....(3)

Solving equation (1), (2) and (3) together $A = ½, b = 1, c = -½$

75. **Option C**

$Y = kx - 4$ & $y = y^2 - 2x$

$Kx - 4 = x^2 - 2x$

$X^2 - 2x + kx + 4 = 0$

$X^2 - x(2 + k) + 4 = 0$

If $b^2 - 4ac = 0$

$(2 + k)^2 - 4(4) = 0$

$4 + 4k + k\ 6 = 0$

$K^2 + 4k - 12 = 0$

$(K-2)(k+6)$

$-6 < k < 2$

76. **Option D**

$5m + 4 = \alpha + \beta$

$5m + 4 = \alpha\ \beta$ If $5(\alpha + \beta) = \alpha\beta$

$5(5m + 4) = 5m +$

$25m + 20 = 5m + 4$

$M = {}^{16}/_{25}$

77. **Option D**

For X^3 at most 3 factors are expected

Since two are given, the third can be guessed.

$\therefore X^3 - 3x - 2 = (x-2)(x+1)(a+b)$

$X^3 = xx\ a$ and $-2 = -2.1.B$

$A = {}^{x}/_{x} = x$ & $b = {}^{-2}/_{-2} = 1$

$\therefore$ The third factor $= (x - 1)$

78. **Option D**

$X^3 - 8^{-1} = x^3 - (2^3)^{-1} = x3\ (2^{-1})^3$

(N.B) $(a-b)(a^2 + ab + b^2) = (a^3 - b^3)$

$\therefore X^3 - 8^{-1} = X^3 - (2^3)(2^{-1})^3 = (X - 2^{-1})$

$X^2 + x.2^{-1} + (2^{-1})]$

$= (X - 2^{-1})(x^2\ 2^{-1}\ x + 4^{-1})$

79. **Option B**

$A(a^2 + a + 1) = a^3 + a + a$ A is wrong

$A(a + 1)(a-1) = (a-0)(a+)(a-1)$

Thus $O \times 1$ $x-1 = 0$ which is not $= 1$ as in the question i.e C is wrong.

$A(a^2 + 1)(a + 1) = a^4 + a^2 + a^2 + 1$ i.e D is wrong

80. **Option A**

$F(x) = x^3 - 5x^2 - x + 5$

Factors of 5 are 1 and 5

$F(1) = 1^3 - 5(1)^2 - 1 + 5 = 0$ $\therefore (x - 1)$ is a factors

$F(5) = 5^3 - 5(5)^2 - 5 + 5 = 0$ $\therefore (x - 5)$ is a factors

$X^3 - 5x^2 - x + 5 = (x - 1)(x - 5)(x + 1)$

i.e $(x - 1)(x - 5)(x + 1) = 0$

$x = 1 = 0$ or $x - 5 = 0$ or $x + = 0$

$x = 1$ or 5 or -1

81. **Option A**

$$\frac{3 + 2x}{(2-x)(3+X^2)} = \frac{A}{2-x} + \frac{BX + C}{3x + x^2}$$

$3 + 2x = A(3 + x^2) + (Bx + C)(2 - x)$

Let $x = 0$

$3 + 2(0) = A(3 + 0^2) + (B(a) + c)(2 - 0)$

$A = 1$

$$\frac{3 + 2x}{(2-x)(3+x)} - = \frac{1}{(2-x)} \cdot \frac{BX + C}{3 + x^2}$$

$$\frac{3+2x}{(2-x)(3+x^2)} - \frac{1}{(2-x)} + \frac{BX + C}{3 + x^2}$$

$$\frac{(3+2x) - (3+x^2)}{(2-x)(3+x^2)} = \frac{3-3+2x-x^2}{(2-x)(3+x^2)} = \frac{2x - x}{(x)(3+x^2)}$$

$$\frac{2x - x^2}{(2-x)3(+x^2)} = \frac{BX+C}{(3+x^2)}$$

$$\frac{X(2-x)}{(2-x)(3+x^2)} = \frac{BX+C}{(3 + x0^2)}$$

$X = Bx + c$

$B = 1, c = 0$

$$\frac{3 + 2x}{(1-x)(3+x^2)} = \frac{1}{2-x} = \frac{x}{3 + x^2}$$

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82. **No Answer**

83. **Option C**

$$\frac{1}{X^4+2x^2+3x^2+6} = \frac{1}{x^2+(x^2+2)+3(x^2+2)} = \frac{1}{(x+3)(x^2+2)}$$

$$\frac{1}{(x^2+3)(x^2+2)} = \frac{Ax+B}{x^2+3} = \frac{BX+C}{x^2+2}$$

$1 = (x+B)(x^2+2) + (Bx+c)(x^2+3)$

$1 = Ax^2 + 2Ax + Bx^2 + 2B^2 + 2B + Bx + 3Bx^3 + Cx^2 + Bc$

Coefficient of x^3, $x^2 = 0$, $x = 0$

$Ax^2 + Bx^2 = 0$ $A = B$

Coefficient $2ax + Bbx = 0$

$2b + Bc = 1$ ..... (1)

$2A + 3B = 1$ .....(2)

$2A = 3B$

$A = \frac{3b}{2}$ $\therefore B = \frac{2A}{3}$

$\frac{X+2}{X^2+2}$ $\frac{X+3}{x^2+3}$

Combining 1 & 2 if A = B

$2A + 3B = 2B + 3B = 5B = 0$ $B = 0$

$2B + Bc = 1$

$C = \frac{1}{3}$

If A = B, B = c, A = c = 1/3

$\frac{1}{3(x^2+3)}$ $\frac{1}{3(x^2+2)}$

84. **Option A**

$\frac{1}{X(x+1)} = A + B$

$1 = A(x+1) + B(x)$

$X = 0$

$1 = A(0+1) + B(0)$

$A = 1$

Hence put $x = 1$

$B = -1$

$\frac{1}{X(x+1)} = \frac{1}{x} + \frac{1}{x+1}$

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85. **Option A**

$\frac{2}{X2-1} + \frac{2}{(x-1)(x+1)} = A + Bx + C$

$x - 1$

$2 = A(x-1) + Bx + c(x^2 - 1)$

$2 = Ax - Bx + Bx^2 + cx^2 c - A$

$2 = (A - B)x + x^2 + (Bx + c) - 1(c - A)$

If $x = 0$

$2 = -AB\,x - c$

$2 = -A - c$ [An Incomplete Equation]

So we use

$$\frac{2}{(x-1)(x+1)} = \frac{A}{x-1} + \frac{Bx+C}{(x-1)}$$

$2 = A(x+1) + B(x-1)$

$X = 1$

$2 = 2A$

$A = 1$

Lex $x = -1$ $\therefore B = -1$

$$\frac{2}{(x-1)(x+1)} = \frac{1}{(x-1)} - \frac{1}{x-1}$$

86. **No option**

87. **Option A**

1 -1 where $x^3 - 1 = (x-1)(x^2 + x + 1)$

$$\frac{1}{x^3-1} - \frac{1}{(x-1)} = \frac{1}{(x^2+x+1)} = \frac{A}{x-1} + \frac{B}{x^3+x+1}$$

$1 = A(x^2 + x + 1) + B(x - 1)$

Let $x = 1$

$A = 1/3$

$1 = Ax^2 + Ax + A + Bx - B$

$1 = 1/3x^2 + 1/3x + 1/3 + Bx - 3B$

$3 = x^2 + x + 1 + 3Bx - BB - 3B$

$X - 2 = x^2 + 3B\,x - B$

Let $x = -1$

$B = 1/3$

88. **Option C**

$$\frac{X^2 + y^2 + xy}{X + y} \quad \frac{x^2 + y^2 + xy}{x - y}$$

$$\frac{(x-y)(x^2 + y^2 + xy) - (x+y)(x^2 + y^2 - xy)}{(x+y)(x-y)}$$

$$= \frac{(x^2 - y^2) - (x^2 + y^2)}{(x+y)(x-y)} \quad \text{(as in polynomial)}$$

$$= \frac{(x^2 - y^2) - (x2 + y^2)}{(x+y)(x-y)} = \frac{-2y}{X^2 - y^2} = \frac{2y}{y^2 - x^2}$$

89. **Option A**

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$$\frac{(2m-u)^2-(m-2u)^2}{5m2-5u2}=\frac{(4m^2-4mu+u^2)-(m-4mu+4u^2)}{5(m2-u2)}$$

$$\frac{4m^2-4mu+u^2-m^2-4mu+4u^2}{5(m-u)(m+u)}$$

$$\frac{3m^2-3u^2}{5(m-u)(m+u)}=\frac{3(m^2-3u^2)}{5(m-u)(m+u)}$$

$$\frac{3(m-u)(m+u)}{5(m-u)(m+u)}$$

$$= 3/5$$

90. **Option A**

$P\ \frac{x-1}{x+2}$ with $1-x=0$ or $x=1$

$\therefore P = 1-3 \quad = 2/3$

1 -2

91. **Option C**

$$\frac{2(x-1)}{3} - \frac{3(2\times 1)}{4} \geq \frac{x-2}{5}$$

Finding the L . C . M

$$\frac{40(x-1)-45(2x-+-1)-12(x-2)}{60} > 0$$

$40x - 40 - 90x - 45 - 12x + 24 \geq 0$

$= \quad x > \frac{-61}{62}$

92. **Option A**

$18 \leq \frac{3}{X}$

$\therefore X \leq \frac{3}{18}$

$\therefore \quad X$

(N . B) the sign changes as a result of the value Ob compared to the initial but Since $x \geq 0$ then $x \geq 1/6$

Hence $0 < x \leq 1/6$

(ii) Multiply each side by a value does not after the inequity.

93. **Option B**

$2X^2 > 5X - 3$

Solving the equation Algebraically

$(2x-3)(x-1) > 0$

$X < 1$ or $x < 3/2$

94. **Option B**

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$/2 - \frac{1-x}{3}/ < 5$ and $/2 - \frac{1-x}{3}/ < -5$

$6 - (1-x) < 15$ $\quad$ $6-(1-x) > 15$

$X < 10$ $\quad$ $x > 20$

$-20 < x < 10$

95. **Option A**

$\frac{1}{X-2} > 3$ and $x - 2 > 0$

$1 > 3x - 6$ $\quad$ $x < 2$

$X = \frac{7}{3}$, $\quad$ $x < \frac{7}{3}$ and $x < 2$

96. **Option A**

$\frac{2x+3}{3x-4} < 5$

$\frac{2x+3}{3x-4} < 5$ and $\frac{2x+3}{3x-4} < -5$

$X > 23$ $\quad$ $x > 1$

$X < 1$ or $x > 23$

13

97. **Option C**

$-3 < 2x < 5$

$-2/2 < x < 5/2$

$2x < 5$

$2x < 4 + 1$

$2x < 1 < 4$

98. **Option A**

$X^2 + x - 12 \quad 0$

$(x-3)(x+4) \quad 0$

$X > 3$ or x 4

99. **Option B (Just like question 98**

100. **Option D**

$X \frac{3}{X} + x > 2$

$X > 2$ and $3 + x > 2$

$X > 2$ and $3 + x^2 < 2x$ i.e $x^2 - 2x + 3 < 0$

No real nots as $b^2 < 4ac$

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101. **Option C**

$6x^3 - 11x^2 + 6x - 1$

$6x^3 - 9x^2 + 2x^2 + 3x + 3x - 1$

$(6x^3 - 9x^2 + 3x) - (2x^2 + 3x - 1)$

$3x(2x^2 - 3x + 1) - (2x^2 + 3x + 1)$

$(3x - 1)(2x^2 - 3x + 1)$

$(3x-1)\ 2x - 1\ (x - 1)$

102. **Option C**

By correction $x^4 + 12x^3 + 16x^3 +$

$\alpha x + \beta = (\alpha + \beta)^4$

Using pascal triangle

$(\alpha + \beta)^4 = \alpha^4 + 4\alpha^3\beta^1 + 6\alpha^2\beta^2 + 4\alpha\beta^3 + \beta^4$

Equating them together (15.25)

103. **Option C**

From $x^2 + kx + 4 = 0$ $a = 1, b = k, c=4$

For real roots $b^2 \geq 4ac$

$K^2 \geq 4 \times 1 \times 4$, $K^2 \geq 16$ or $k \geq 4$

104. **Option A**

From $9x^2 + 24x + k$

$a = 9, b = 24, c = k$

For equal roots $b^2 = 4ac$

$\therefore 24x^2 = 4x \times 9 \times k$

$K = {}^{48}/_{3} = 16$

105. **Option C (see Question 104)**

106. Option A (See Question 104)

107. **Option C**

From $3x^2 - 4x + 5 = 0$

$A = 3, b = -4, c = 5$

$\alpha + \beta = -{}^{b}/_{A} = {}^{4}/_{3}$ $ab = {}^{c}/_{a} = {}^{5}/_{3}$

$\frac{\alpha + \beta}{\beta\ \alpha} = \frac{\alpha^2 + \beta^2}{\alpha\beta} = \frac{(\alpha+\beta)^2 - 2\alpha\beta}{\alpha\beta}$

$= \frac{(4/3)^2}{9} - 2\frac{(5/3)}{5/3} = -\frac{14}{9} \times \frac{3}{5} = -\frac{14}{15}$

108. **Option B**

$2x^2 + 5x - 3 = 0$

$A = 2, b = -5, c = 3$

$a + b = {}^{-b}/_{A} = {}^{-5}/_{2}$ $\therefore ab\ {}^{c}/_{a} = {}^{3}/_{2}$

$a^2 + B^2 = (a + B)^2 - 2ab = \left[\frac{-5}{2}\right]^2 - \left[\frac{3}{2}\right]$

$= \frac{25}{4} - 3 = 3\frac{1}{4}$

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109. **Option A**

$A + B = 3$, $a\ b = 2$

The equation is $x^2 - 5x +- p = 0$

Where, = sum of root, p = products of roots

The equation is $x^2 - 3x + 2 = 0$

110. **Option B**

From $2x^2 - 3x - 1 = 0$ $a = 2, b = -3, C = -1$

$\alpha + \beta = \frac{-b}{A} = \frac{3}{2} = \frac{-1}{2}$

Sum of roots $= \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta}$ $\frac{3/2}{½} = -3$

Product of roots $= \frac{1}{\alpha} + \frac{1}{\beta} = \frac{1}{\alpha\beta} = \frac{1}{½} = -2$

The new equation is $x^2 - 5x + -p = 0$ i.e $x^2 + 3x - 2 = 0$

111. **Option A**

$X + y = 1$, $y = 1 - x$ .....(1)

Put Equ (i) in (ii) $x^2 + (1-x)^2 = 13$

$X^2 + 1 - 2x + x^2 = 13$

$2x^2 - 2x + 1 - 13$ or $2x^2 - 2x - 12 = 0$

$X = 3$ or -2

$Y = -2$ or 3

112. **Option D (See question 111)**

113. **Option B**

$X^2\ 2x - 5 = 0$ $a = 1\ b = -2, c = -5$

$\alpha + \beta = \frac{-b}{A} = 2$ $\alpha\beta = \frac{c}{a} = -5$

New sum of roots $= \alpha^2\beta + \alpha\beta^2 = \alpha\beta(\alpha+\beta) = 5(2) = -10$

Products of roots $= (\alpha^2\beta)(\alpha\beta^2) = \alpha^3\beta^3$

$= (aB)^3 = (-5)^3 = -125$

Quadratic equation $= x^2 - 2x - p$

$= x^2 + 10x - 125 = 0$

114. **Option A**

For G.P $= ar^{n-1}$ Where $n > 1$ and $n = 3$

For $T_3 = ar^3 = 27$ .....(1)

$T_3 = ar^5 = 8$..... (2)

Solving Equ (1) and (2) simultaneously.

$r = 2/3$ a =

Sum of first three terms $S_n = \frac{a(r^n - 1)}{R - 1}$

$S_n = 128\ ¼$

115. **Option A**

Common difference (44-49) = - 5 & 39 – 44 – 5

This indicate it is an A.P series

Now the sum of an A.p $= n\,[2a + (n-1)\,d]$.....(1)

Putting an the parameters

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Sn = 153 Units

116. No Answer

117. **Option D**

GM = n x_1 X_2 x X x_3

:. 81 = 3^4, 3^3 3^2, 3

118. **No Option**

119. **Option A**

A.M = n x_1 x. x_2 = 24/27-12 =. 16/ 9 = 4/3

= 4/27, 4/9. 4/3, 4.12

120. **Option B**

a + 5d = 11 ..... (1)

a = 1

d = 2

121. **Option C**

$U^1 = ar + br^2$

$U^1 = 4 = a + b$ .....(1)

$U^2 = 6 = 2a + 4b$ .....(2)

Solve (i) and (ii) simultaneously

a = 5, b = -1

122. **Option D**

N(a + 1)

$S_n = n\frac{(a+1)}{2}$ or $\frac{n}{2}$ (2a + (n -1) d

Since common difference = common ratio= 3, hence the series is a Geometric progression

Hence $S_n = a(\sqrt{r^2} - 1)$ $a\sqrt{=1}r = 3$

:.81 3 = $1\sqrt{3^n . 1)}$

3 - 1

103.70 = 1. 73^n take log of both side

Log 103.70 = n Log 1.73

n = 8. 34

123. **Option C**

X + y =5 :.X + y = 10 → Arithmetic Mean

$\sqrt{2}$

Xy = 3 :.Xy=3 → Geometric Mean

Combining (1) and (2)

Y = 1 or 9 x = 1 or 9

124. **Option B**

Harmonic mean = $\frac{1}{1/x}$ $^{1-x}/_{1-x}$

For x and y = $\frac{2}{1/x + 1/y}$ = $\frac{2(xy)}{x+y}$

125. **Option D**

$S_\infty = \frac{1}{}$ if a 2r S_∞ = 8

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$8 = \frac{r-1}{2r}$

$r-1$

$\therefore r = 8/5$

126. **Option A**

$S_\infty = \frac{a}{r} = 3/7 \quad a = 1$

$S_\infty = \frac{r-1}{1-3/7} = 7/4$

127. **Option C**

From 2, 6, y, 14, z

3rd term = y

but 3rd term of A. P = a + 2d

$\therefore a = 2, d = 6-2 = 4$

$Y = a + 2d = 10$

$Z = 5^{th}$ term = a + 4d = 18

Ratio of z : y = 18: 10 = 9 : 5

128. **Option C**

1st term = 1 i.e = 1, 6th term = 11

i.e a + 5d = 11

$1 + 5d = 11 \therefore d = 2$

129. **Option B**

a = 7, l = 117, n = 20

$S_n = {}^{n}/_{2}(a + 2) = {}^{20}/_{2}(7 + 117) = 1240$

130. **Option D**

First term a = log a

$D = \log a^2 - \log a - \log a = \log a = n = 2$

$S_n = {}^{n}/_{2}[2a + (n-1)d]$

$S_n = {}^{20}/_{2}[2 \log a + (20 - 1) \log]$

$= \text{Loga}^{210}$

131. **Option B**

Since the man save, N 50 at first and increases this by N 20 every year the problem is an Arithmetic progression.

Thus a = N 50, d = N 20

Saving N 4,370 means summing all savings together

$S_n = {}^{n}/_{2}[2a + (n-1)d]$

$4370 = {}^{n}/_{2}[2(50) + (n+1)20]$

$20n^2 + 80n - 8740 = 0$

$n^2 + 4n - 437 = 0$

Using Quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

n = 19

132. **Option A**

From 8, 4, 2,….r = 4/8 = 2/4 = ½ i.e it's a G.P

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:.nth term = $ar^{n-1} = 8.(½)^{n-1}$

But nth term = $1/2^{14}$

:.$1/2^{14} = 8(1/2)^{n-1}$

n – 1 = 17

n - 1 = 18

133. **Option A**

In $(1+x+x^2+x^3+....)$

$= \frac{X}{1} = \frac{X^2}{x} = \frac{X^3}{x} - = x = r$

Thus it is a G.P with no specific number of elements to be addedi.e addition to infinity

$S_\infty = \frac{a}{r-1}$ a = 1, r = x

$S_\infty = \frac{1}{1-x}$

134. **Option C**

As they are corrective terms of an A.P

d = (2pc – 10) – (p + 10 = 2p – 20 - p – 1 = p -11.

d = 91 – $4p^2$) – 92p + 10) = 1 – 4p2 – 2p + 10 = 11 – $4p^2$ -2p

:. P – 11 – 11 -$4p^2$ – 2p or $4p^2$ + 2p – 11 + p – 11 = 0

$4p^2 - 3p - 22 = 0$

4x – 22 = 88, factors are 11 and -8

:. 4p = 8 or 40 = -11

P -2 or p = - 11/4

135. **Option D**

Sum of the first n term of a G.P = $\frac{a(r^{n-1})}{r-1}$

Sum of the first 3 terms = $a\frac{(1-r^3)}{r-1}$

:. $a\frac{(1-r^3)}{r-1} = \frac{1}{2}\left(\frac{1}{1-r}\right)$

$2(1-r)(1-r^3) = 1-r$

$2(1-r^3) = 1, 1-r^2 = 1/2, r^3 = 1 - ½$

r = 3 ½

136. **Option B**

R = 2k – 1 0r 3k -1

K + 1 2k - 1

$\frac{2k-1}{K+1} = \frac{3k-1}{2k-1}$

(2k – 1) (2k -1) = (3k + 1) (k + 1)

$4k^2 - 4k + 1 = 3k^2 + k + 3k + 1$

$4k^2 - 3k^2 - 4k - 4k + 1 = 0$

$K^2 - 8k = 0$

$K = 0$ or 8

$r = \frac{2k-1}{k+1} = \frac{2(0)-1}{0-1} = -1$

$r = \frac{2k-1}{k+1} = \frac{2(8)-1}{8+1} = 15/9$

137. **Option D**

X^2y^2 in expansion $= \frac{(2x)^2 (3y)^2 4c}{2}$

Coefficient of $x^2y = \frac{4 \times 3 [2^2 . 3^2 (x^2 y^2)]}{2}$

$= 216$

138. **Option C**

X^6 in $(^1/_2 + x)^8 (^1/_2)^2 x^{6}{}^8C_6$

Coefficient n $x^6 = 8 \times 8 \times ½ \times ½ = 7$

139. **Option C**

X^5 in $(x + 3)^{12} = X^8 (3)^4 (^{12}C_4)$

$^{12}C_4 = {}^{12}C_6$

Coefficient of $x8 = \frac{12 \times 11 \times 10 \times 9 \times 81}{4 \times 3 \times 2 \times 1}$

$= 40095$

140. **Option E**

X^5 in $(2x - 1)^8 = (2x)^5 (-1)^3 (^8C_3)$

$= {}^8C_3 2^5 x^5 (-1)^3$

Coefficient of $x = 8 \times 7 \times 6 \times 32 \times 3 \times 2$

$= -1792$

141. **Option E**

Expansion by multiplying by $4x^2$ the result is $4x^4 - 16n^3 + \ldots\ldots$

Multiplying by $-3x$ the result is $3n^3\ 12\ n^2 + \ldots..$

Terms with $x^3 = 16x^3 - 3n^3 = -19x^3$

142. **Option B**

$t = 3, r = t - 1 = 3 - 1 = 2$

3rd term in $(2x + 3y)^3 = {}^3C_2 (3y)^2 \ (2x)1$

$.:3^{rd}$ term $= {}^3C_2 \frac{(3y)^2 \ (2x)^1}{4}$

Coefficient $= \frac{3}{1} \times 2 \times \frac{9}{16} = \frac{27}{8}$

143. **Option A**

In the expansion of $(x - \frac{1}{X})^6$

Each term $= x^{n-r} (1/3)r (^nC_r) = X^{n-r} (^1x)r (-1)^r (^nC_r)$

And $r = t - 1$

Constant term $= x^0 = x^{6-r} x^r$ Comparing the power

$X^{5-3r} = x^0 - r = 3$

$(-1)\ 3\ {}^6C_3 + -{}^6C_3 = -6 + 5 + 4 = -20$

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144. **Option C**

$(1.002)^5 = (1 + 0.002)^5 = 1 + 0.002^1 + (0.002)^2$
$+ (0.002)^3 + (0.002)^4 + \ldots..$

Neglecting the power of 1

With pascal triangle, n = 5 = 1, 5, 10, 10, 5, 1

$\therefore (1.002)^5 = 1 + 5\,(0.002) + 10\,(0.002)2 + \quad (0.002)^3 + \ldots.$

Taking the first 3 terms to 8 decimal places

$(1.002)^5 = 1 + 0,010 + 0.00004$

$= 1.010040$

145. **Option A**

$$Xy = \begin{pmatrix} 1 & 2 \\ 0 & 3 \end{pmatrix}\begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix} = \begin{pmatrix} 2+8 & 1+6 \\ 0 & 12 \end{pmatrix} \begin{matrix} \\ 0 \end{matrix} \begin{matrix} \\ 9 \end{matrix}$$

$$= \begin{pmatrix} 10 & 7 \\ 12 & 9 \end{pmatrix}$$

146. **Option A**

$$\begin{pmatrix} 3 & 1 & 2 \end{pmatrix} = \begin{pmatrix} 6+3 \end{pmatrix} = \begin{pmatrix} 9 \end{pmatrix}$$

$$2\begin{pmatrix} x & 3 \\ 9 \end{pmatrix} = 4\begin{pmatrix} 3x \\ y \end{pmatrix} \quad 4 + 3x$$

$$4 + 3x \qquad 10$$

i.e 9 = y or y = 9

$4 + 3x = 10 \therefore X = 2$

147. **Option E**

$$Aa = \begin{pmatrix} 2 & = 2 \\ -3 & \end{pmatrix}\begin{pmatrix} 1 & 2 \\ 0 & \end{pmatrix} = \begin{pmatrix} 4 + -(3) & 2 + 0 \\ -6 + 0 & -3 + 0 \end{pmatrix} = \begin{pmatrix} 1 & 2 \\ -6 & -3 \end{pmatrix}$$

$$2A = 2\begin{pmatrix} 0 & -3 \\ 2 & 1 \end{pmatrix} = \begin{pmatrix} 0 \\ 4 \end{pmatrix} \begin{matrix} \\ 2 \end{matrix}$$

$$41 = 4\begin{pmatrix} 3 & 0 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} -6 \\ 4 \end{pmatrix} \begin{matrix} 0 \\ 0 \end{matrix}$$

$$A2 - 2a + 41 = \begin{pmatrix} 0 & 1 \\ 1 & 2 \end{pmatrix} \begin{matrix} 0 & 4 \\ -4 & 2 \end{matrix} + \begin{pmatrix} 4 & 0 \\ 0 & 4 \end{pmatrix}$$

$$-6 \; -3 \; -6 \; 0$$

148. **Option A**

$16 - 8 = 8$

149. **Option C**

$= 1\,(-5 - 0) - 2\,(-4 - 12) + 3\,(0 - 10)$

$= -3$

150. **Option B**

Determinant $= (3 - x)\,(1 + 2x) - (-9)$

$\therefore 2x^2 - 5x - 12 = 0$

X = -3/2 R4

151. **Option B**

$4(12-(-2x)-3(3-2x) + 2(2-8) = 17$

$14x = 17 - 45$

$14x = -28$

152. **Option C**

$X\,(x^2 - 1) - 1\,(x - 0) = 0$

$X^3 - x - x = 0$

$X^3 - 2x = 0$

$X(x^2 - 2) = 0$

X = 0 or + 2

X = 2

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CHM 101

COURSE SYNOPSIS

Atoms, molecules and structures, Electronic Configuration. Periodicity and building up of the periodic table. Chemical Reactions, Chemical Equations and stoichiometry Bonding and Intermolecular forces, Kinetic Theory of matter, derivation and calculation of all the laws involved. Thermochemistry and simple calculation based on Hess law. Rate of chemical kinetics, equilibra and related simple calculation. Important applications of equilibra like PH, solubility. Solubility of ionic solids. Electrochemistry and workings of various cells, corrosion.

QUESTIONS ON ATOMIC STRUCTURES, ATOMIC MOLECULES AND ELECTRONIC CONFIGURATION.

1. Which of the following series of spectra line is in the UV region?
   (a) Balmer (b) Paschen (c) Lyman (d) Pfund

Use the Notation $_Z^AX$ to answer question 2 - 4

2. A and Z respectively are
   (a) Atomic number and Mass number
   (b) Proton number and Mass number
   (c) Mass number and Atomic number
   (d) Mass number and Neutron number
3. The difference between A and Z (A - Z) will give
   (a) Number of proton (b) Number of Neutron
   (c) Number of electron (d) Mass of the Nucleus
4. A is made up of
   (a) Proton and Neutron (b) Proton ad Electron
   (c) Nucleus and Electron (d) Neutron and Electron
5. The Region outside the nucleus, where there is highest probability of finding electrons is known as
   (a) Path length (b) Ware length (c) Orbits (d) Orbitals
6. The electronics configuration of Ca^{2+} and CL are
   (a) $IS^2 2S^2 2P^6 3S^2 3p^6 4S^2$ and $IS^2 2S^2 2p^6 3S^2 3p^5$
   (b) $IS^2 2S^2 2P^6 3S^2 4S^2\ 3p^6$ and $IS^2 2S^2\ 2p^6 3S^2 3p^5$
   (c) $IS^2 2S^2 2P^6 3S^2\ 3p^6$ and $IS^2 2S^2\ 3S^2\ 2P^6 3p^5$
   (d) $IS^2 2S^2 2P^6 3S^2\ 3p^6$ and $IS^2 2S^2\ 2P^6\ 3S^2 3p^5$
7. The degeneracy of the d - orbital is
   (a) 2 (b) 4 © 5 (d) 4
8. Electron in the energy level of 3 will have the following quantum

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numbers except

(A) I = 0, 1, 2 (b) M1 = -3, -2, -1, 0,1,2,3

(C) $M_s = \pm ½$ (D) $M_1 = 1, 0, 1$.

9. Carbon occurs in nature as mixture of $^{12}_{6}C$ and $^{13}_{6}C$, if the atomic mass of $^{12}_{6}C$ is exactly 12.0u, $^{13}_{6}C$ is 13.003u and the relative atomic mass of carbon is 12.011 u. The % compositions of $^{12}_{6}C$ and $^{13}_{6}C$ isotopes in carbon atoms are respectively

(A) 95.6 and 4.4 (B) 97.3 and 3.7

© 98.9 and 1.1 (D) 99.8 and 0.2

10. Alpha particles has properties has properties similar to that of

(a) He (b) Be © Li (d) Ne

11. For the shell n = 4, the possible values of l are:

(A) 1, 2, 3, 4 (b) 2, 3, 4, 5 (c) 0,1,2,3 (d) 4,3,2,1

12. What are the possible values of m for n subshell with l = 1

(A) 0,1,2 (b) -1,0,1 (c) 1,2,3 (d) -1,2,1

13. A possible value of spin quantum no is

(A) ½ (b) 1 (c) 0 (d) 2

14. How many orbitals are found in a d subshell?

(A) 3 (b) 4 (c) 5 (d) 6

15. Which of the following is a possible set of quantum numbers for a 2p electron?

(A) 1,0,0-1/2 (b) 2,0,0,+1/2 (c) 2,0,1,-1/2 (d) 2,1,0,-1/2

16. Which of the following gives a 3-dimensional model of the atomic structure?

(A) Bohr (b) Rutherford (c) Schrodinger (d) Mendeleev.

(17) What is the maximum number of electron in the orbital that has the follow quantum numbers n = 2, l = o, m = o?

(A) 6 (b) 2 (c) 10 (d) 14

18. For the shell n = 3, the possible values for L are

(A) 1,2,3 (b) 2,1,1, (c) 0,1,2 (d) 3,2,1

19. Which of the following is a possible set of quantum numbers for a 3p electron?

(A) 3,0,0,-½ (b) 3,1,1, +1/2 (c) 3,0,1,1/2 (d) 2,1,0, - ½

20. Which of the following is an allowed combination of the n, l and m quantum numbers when n = 2

(A) 2, -1, +1 (b) 2,0,1 (c) 2,0,0 (d) 2,-1,1

21. On hydrogen atom emission spectrum a drop from higher energy level to n = 2 is designated as

(A) Lyman series (b) Balmer Series (c) Paschen Series (d) Pfund Series

22. Which of the hydrogen atom emission spectrum corresponds to the ultraviolet region of the cmr?

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(A) Lyman Series (b) Balmar Series
(c) Paschen Series (d) Pfund Series

23. Electron has dual nature because its possesses
(A) Mass and Wavelength (B) Mass and Volume
(c) Weight and density (d) Fluidity and frequency

24. The wave nature of electron gives rise to the concept of
(A) Mole (b) Orbital (c) hybridization (d) equivalence

25. "No two electrons can have the same value of each of the four quantum numbers: This is known as
(A) Hund's rule (b) Aufbau principle
(c) Pauli's exclusion principle (d) Ruther ford rule.

26. Which of the following is false?
(A) The atom of an element all has the same mass number
(B) The atoms of an element are identical, but different from atoms of other elements
(C) Mass number = atomic no + number of neutrons
(D) 1 ammu = one twelve of the mass of one atom of $^{13}{}_{6}C$.

27. The electronic configuration of CL and CL- respectively are
(a) $IS^2 2S^1 P^6 3S^2 3p^5$ and $IS^2 2S^2 p^6 3S^2 3p^6$
(b) $IS^2 2S^2 P^6 3S^2 3p^6$ and $IS^2 2S^2 p^6 3S^2 3p^5$
(C) $IS^2 2S^3 P^5 3S^1 3p^6$ and $IS^2 2S^2 p^6 3S^2 3p^6$
(d) $IS^2 2S^1 P^6 3S^2 3p^5$ and $IS^2 2S^2 p^6 3p^6$

28. Two Isotopes of silver has atomic weight of 106.91 and 108.909. If the relative atomic mass of silver is 107 the % abundance of the isotopes respectively are
(A) 6.45 and 993.55 (B) 4.45 and 95.55
(C) 6.45 and 93.55 (D) 95.55 and 4.45

29. The probability of finding the electron at a point or in a region of space is
(A) Unknown (b) Orbit (c) Quantum No (d) Orbital

30. Light scattering experiments was performed by
(A) Schrodinger (b) Louis de-Broglie
(c) Geiger Muller (d) Ernest Rutherford.

32. One mole of a chemical substance contains
(A) Faraday numbers of particles
(B) Quantum number of particles
(C) Atomic number of particles
(D) Avogadro's number of particles

32. Statement of Dalton atomic theory include the following except
(A) Atom of each element are identical
(B) Atom of different element are similar

(C) Chemical combination of atoms are in simple whole number
(D) Atom is the discrete particles of an element.

Answer to atomic structures, atomic molecules and electronic configuration

1. **Option C**
Lyman series lies in the UV region, Lyman series originates when electron moves from any outer orbit to the first orbit (n = 1)
N_2 = ..., 5, 4, 3, 2----------> n = 1

2. **Option C**
A= Mass Number
$^{A}Z_{x}$
Z= Atomic number
And $A = Z + N$
Where Z = Atomic Number
N = Neutron Number

(3) **Option B**
Since $A = Z + N$
A = Mass Number, Z = Atomic / Proton number
N = Neutron No
:. N = A - Z

4. **Option A**
Atomic mass is made up of both positively charged proton and neutral neutron in the nucleus of an atom.
A = Z + N or A = P^{+} + n.

(5) **Option D**
The orbital is the region around the nucleus of an atom where there is highest probability of locating an electron, the ware function which are solution of ware equation are commonly called orbitals

6. **Option C**
$Ca^{2+} = IS^2 2S^2 2P^6 3S^2 3p^6$
$Cl = IS^2 2S^2 3S^2 2P^6 3p^5$

7. **Option C**
The degeneracy of d orbital is 5 which are d_{xy}, d_{yx}, d_{xz}, d_{x2-y2} and d_{z2}
Proof: Since s = 0, p = 1, d = 2, f = 3 where 0, 1, 2, 3 are the Azimuthal quantum numbers, L,
M = 2L + 1 Where L = 2
ford.
M_l = 2 (2) + 1 = 5

8. **Option B**
Since the quantum numbers are n, L= 0 to L = n - 1, ml = - L to +L
Ms = +- ½

n	L	M_l	Ms
3	0	0	
	1	-1, 0, 1	
	2	-2, -1, 0, 1, 2	

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(9) **Option C**

Given Ar of $^{12}_{6}C = 12.0u$

Ar of $^{13}_{6}C = 13.003u$

Ar of c = 12.011u

Let x = % of $^{12}_{6}C$

And 100 - x = % of $^{13}_{6}C$

$$Ar(c) = \frac{12.0x + (100-x)\,13.003x}{100}$$

$$12.011 = \frac{12.0x + (100-x)\,13.003x}{100}$$

X = 98.9

:. 100 - x = 100 - 98.9

= **1.1**

10. **Option A**

α particles is a helium nucleus with Mass of 4amu and a + 2 change. It is represented as $^{4}_{2}$**He**

11. **Option C**

Azimuthal quantum number L is the number of subshell is in a shell and (it determines the shape of orbital.

(It is Integral values are

L = o to l = n - 1

L = o to l = 4-1 = 3 :. 0, 1, 2, 3.

12. **Option B**

The possible value of magnetic quantum number in for a subshell with L =1 are -1, 0, 1

If L = 1, M_l = -L to +L = 1, 0, +1

13. **Option A**

The spin quantum number is ±1/2 and it describes the spin property of the electron either clockwise or anti-clockwise.

14. **Option C**

The number of orbitals in a subshell is determined by the Magnetic quantum no, M_lSince

Value for d subshell is 2

$M_L = 2L + 1 = 2\,(2) + 1 = 5$

15. **Option D**

2P - represent the subshell L = 1

2 Represent the principal Quantum number = n=2

	s	p	d	f
L	0	1	2	2

n	L	ML	ms
2	o (s)	0	±1/2
	I(p)	-1,1,+1	±½

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The possible sets of quantum numbers for a 2p electron are 2, 1, 0, ± ½

16. **Option C**
Schrödinger describes the electron as a three dimensional waveforms rather than a point particles. He used the idea of Louis de Broglie's to develop a Mathematical Model of an atom that described the electrons as 3 Dimensional Waveforms

17. **Option B**
Given n = 3, L = 0, M = 0
The orbital is 3s and Maximum electron in the S-Orbital is 2 because the electron spin limits the number of electrons top two per orbital.

18. **Option C**

n	L	M_L
3	0	0
	1	-1,0,+1
	2	-2,1,0,+1,+2

n	L	M_L
3	0	0
	1	-1,0,+1
	2	-2,1,0,+1,+2

20. *Same as question 19*
Option D

21. **Option B**
Balmer series lies in the visible region and originates when electrons moves from any outer orbit to the second orbit
(Or first excited states)
$n_h = ...5,4,3 \longrightarrow n_L = 2$

22. **Option A**
Lyman series lies in the UV region and originates when electrons moves from any outer orbit to the ground state (n = 0) or first orbit
$n_L = ...5,4,3,2, \longrightarrow n_L = 1$

23. **Option A**
$= h/mv = h/= Q$ ***De Broglie***

24. **Option B**
The wave nature of electron gives rise to the concept of orbital. The location of electron is described in terms of probability of finding it in a certain position at any time.

25. **Option C**

26. **Option A**

27. **Option A**
$CL + e^- \longrightarrow CL^-$
$1S^2 2S^1 P^6 3S^2 3p^5 \longrightarrow 1S^2 2S^2 p^6 3S^2 3p^6$

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28. **No Answer**

$$RAM = \frac{A1\,(100 - x) + A2(x)}{100}$$

$$107.7 = \frac{106.911\,(100 - x) + 108.909x}{100}$$

$10691.1 - 106.911x + 108.909x = 10770$

$X = 39.49$

$\therefore 100 - x = 60.51$

29. **Option D**

An orbital is the Region around the Nucleus of an atom where there is highest probability of finding electron. An orbital is described by four set of Quantum numbers.

30. **Option D**

31. **Option D**

1 mole of a substance contains 6.023×10^{23} numbers of particles. This number is referred to as Avogadro's number.

32. **Option B**

Questions on Periodic Table

1. The following are the trends observed in the periodic table of elements except
   (A) Atomic radii increase down the group.
   (B) Atom size decreases across the period
   (C) Ionization energies increases across the period
   (D) Atomic size increase across the period.
2. Why does sodium not form the Na^{2+} ion in its compounds?
   (A) Because of low 1st ionization energy
   (B) Because of high electropositivity.
   (C) Because of high 2nd Ionization energy
   (D) All of the above.

Answer on Periodic Table

1. **Option D**

Atomic size increase across the period of incorrect because atomic size decreases across the period progressively with increaSing atomic number. This is because when moving across a period, an electron and proton are being added to atoms. Thus there is a greater attractive force between the nucleus and the electrons cauSing a decrease in atomic size.

2. **Option B**

Questions on Stoichiometry

Use the equation below to answer question 1 and 2

$3KMnO_4 + 5Fe + 24HCL \longrightarrow$

$5FeCL_3 + 3MnCL_2 + 3KCL + 12H_2O$

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If 156g of Fe were consume
(Fe = 56, Mn = 55, K = 39, 0 = 16).

1. What Mass of $Kmn0_4$ is consumed?
(A) 170g (b) 264g (c) 180g (d) 160g

2. How many grains of $MnCl_2$ are produced?
(A) 60.4g (b) 56.6g (d) 70.2k (d) 210g

3. $26cm^3$ of a solution containing 10.5g of impure hydrochloric acid solution in $250cm^3$ titrated against $25cm^3$ of 0.IM sodium trioxocarbonate (iv) solution. Calculate the concentration of the pure acid in mole / dm3.
(A) 0.2913M (b) 0.3923M (c) 0.1528M (d) 0.1813M (e) 0.1923M

4. Methane is converted to carbon dioxide and water when burned in a plentiful supply of oxygen (complete combustion).
$CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(l)$
If 10g of CO_2 were obtained when 16gof CH_4 were burned in a limited supply of oxygen gas, what would be the percentage yield of carbondioxide?
(A) 23% (b) 2.3% (c) 11.5% (d) 62.5%

5. Zinc reacts with heated copper (II) oxide to form zinc oxide and copper metal. If 3.0g of zinc are reacted with 3.0g copper (II) oxide, which is the excess reagent? What is the mass of copper metal formed?
(Cu = 63.5, Zn = 65.5)
(A) Zn, 0.045g (b) CuO, 2.91g (c) CuO, 2.4g (d) Zn, 2.4g

6. A standard solution was prepared by dissolving 2.6061g of Anhydrous Sodium Carbonate in deionized water and the solution diluted to $250cm^3$. A 25cm3 portion of this solution was titrated against hydrochloric acid, uSing a suitable indicator. The end point was reached after $18.7cm^3$ of acid had been added. Calculate the cone of the acid (Na = 23, CL = 35.5, C=12)
(A) 0.098m (b) 9.263m (c) 0.131m (d) 0.98m

7. How many moles of Mg_3N_2 will be produced by Reaction of 1.50mol of Mg with excess N_2? (Mg = 24, N = 14)
(A) 0.100mol (b) 0.260mol (c) 0.400mol (d) 0.500mol.

8. What mass of Li_3N will be produced by the reaction of 2.75g of Lithium metal with excess nitrogen gas? (Li = 6.9)
(A) 4.5g (b) 5.49g (c) 45.9g (d) 54.9g

9. Iron (II) Sulfate is oxidized by potassium permanganate in acid solution. The overall ionic equation is
$5Fe^{2+}(aq) + MnO_4^-(aq) + 8H^+(aq) \longrightarrow$
$Mn^{2+}(aq) + 4H_2O(l) + 5Fe^{3+}(aq)$
What volume of 0.010mol dm^{-3} Iron II sulphate will be oxidized by $25.00cm^3$ of 0.020moldm^{-3} permanganate solution?
(A) $25cm^3$ (B) $250cm^3$ (c) $2.5cm^3$ (d) $2500cm^3$

10. Calculate the Mass of sulphuric acid (The chemical produced) in the largest tennage in the world produced by the reaction of 5 metric tons (5.00×10^6g) of sulphur in the following sequence of reactions.

$S(s) + O_2(g) \longrightarrow SO_2(g)$

$SO_2(g) + \frac{1}{2}O_2(g) \longrightarrow SO_3(g)$

$SO_3(g) + H_2O(l) \longrightarrow H_2SO_4(l)$

(S = 32, 0 = 16)

(A) 1.53×10^7g (b) 1.35×10^7g (c) 5.3×10^6g (d) 3×10^6g

11. $25dm^3$g of a solution containing 3g of Impure Sodium hydroxide in $250cm^3$ was neutralized by $30cm^3$ of 0.1m tetraoxosulphate (vi) Acid Solution. Calculate the concentration of the pure NAOH in moles / dm3.

$2NaOH(aq) + H_2SO_4(a) \longrightarrow Na_2SO_4(aq) + 2H_2(L)$

(A) $0.14 mol/dm^3$ (b) $0.20 mole/dm^3$

(c) $0.24 mol/dm^3$ (d) $0.19 mol/dm^3$

12. $20.50cm^3$ of 0.IM HNO_3 was titrated against $25cm^3$ of 11.14g of $X_2CO_3.10H_2)$ per dm^3 solution. Calculate the molar Mass of the base$X_2CO_3.10H_2)$

(A) $386g\,mol^{-1}$ (b) $1.86gmol^{-1}$ (c) $286gmol^{-1}$ (d) $486gmol^{-1}$

13. Calculate the Mass of the solute present in the following solution: trioxocarbonate (iv) in $2dm^3$ of 2M solution

(A) 352g (b) 552g (c) 452g (d) 424g

14. The number of mole of sodium carbonate in 8.5g of the salt is

(A) 0.28 (b) 0.08 (c) 2 (d) 18

15. The percentage composition of sulphur(s) In $FeSO_4.10H_2)$ is

(A) 6.9% (b) 5.6% (c) 9.6% (d) 5.8%

16. Calculate the number of ions present in 2 moles of potassium on

(A) 6.02×10^{23} ion (b) 12.04×10^{23}ion

(C) 6.02×10^{2}ion (d) 12.04×10^{24}ion.

Answer to stoichiometry

1. **Option B**

$3KMnO_4 + 5Fe + 24HCL \longrightarrow 5FeCL_3 + 3MnCL_2 + 3KCL + 12H_2O$

3 Mole of $KMnO_4$ reacts with 5moles of Fe

:.5 (56g) of Fe reacts with 3 (158g) of $KMnO_4$

:. 156g of Fe reacts with $\frac{(156 \times 474)}{280}$

$= 264g\ of\ KMnO_4$

2. ***Option D***

3 Moles $KMnO_4$ produces 3 Moles $MnCL_2$

3 (158g) $KMnO_4$propduces 3 (126g) $MnCL_2$

47g $KMnO_4$ produces 378g $MnCL_2$

264g $KMnO_4$ produces $\frac{(264 \times 378)}{474}$ $MnCL_2$

$= 210.53g$

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3. ***Option E***

$V_a = 26cm^3$, $V_b = 25cm^3$, $C_b = 0.1M$

C pure A = ?

$2HCL(aq) + Na_2CO_3 \longrightarrow 2NaCL(aq) + CO_2 + H_2O$

Using $\frac{CaVa}{CbVb} = \frac{n_a}{n_b}$

$Ca = \frac{0.1 \times 25 \times 2}{26 \times 1} = 0.1923 Moldm^{-3}$

4. **Option A**

$CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(l)$

16g of CH_4 yield 44g of CO_2

Theoretical yield of CO_2 is 44g

$\% \text{ yield} = \frac{\text{Actual yield} \times 100}{\text{Theoretical yield}}$

$= \frac{10g \times 100}{44g} = \frac{23\%}{1}$

5. **Option D**

$Zn(s) + CuO(s) \xrightarrow{heat} ZnO(s) + Cu(s)$

65.5g 79.5g

No of moles of Zn $= \frac{3.0}{65.5} = 0.0458$ moles

No of moles of CuO $= \frac{3}{79.5} = 0.03774$ moles

1 mole Zn + 1 mole CuO ------> 1 mole ZnO + 1 mole Cu

0.0458 mole	0.03774mole	0.03774	0.03774
0.03774mole	0.03774mole	0.03774	0.03774
0.00806 mole	—	—	—

∴ Zn is excess reagent

$\text{Mole of Cu} = \frac{\text{Mass of Cu}}{\text{Molar Mass}}$

Mass of Cu $= 0.03774 \times 63.5 gmol^{-1}$

$= 2.4g$

6. **Option B**

$250cm^3$ Solution contains 2.6061g Na_2CO_3

$1000cm^3$ Solution contains $\frac{(1000 \times 2.6061)}{250}$

$= 10.4244 gdm^{-3}$

$\text{Molar Conc.} = \frac{\text{Mass Conc.}}{\text{Molar Mass}}$

Molar Mass of $Na_2CO_3 = 106 gmol^{-1}$

Molar Conc. in Mol $dm^{-3} = \frac{10.4244 gdm^{-3}}{106 gmol^{-1}}$

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$0.098 moldm^{-3}$

$2HCL(aq) + Na_2CO_3 \longrightarrow 2NaCL + H_2O + CO_2$

Using titration formula

$\frac{CAVa}{CBVB} = \frac{nA}{nB}$

$C_A = \frac{0.098 \times 25 \times 2}{18.7 \times 1}$

$C_A = 0.263m$

(7) **Option D**

$3Mg + N_2 \longrightarrow Mg_3N_2$

3 mol	1 mol	1 mole
1.5mol	0.5mol	0.5mol

Moles of Mg_3N_2 produced is 0.500mol

8. **Option A**

Mole of $L_i = \frac{2.75g}{6.99gmol^{-1}} = 0.3986$ mole

$3L_i + \frac{1}{2} N_2 \longrightarrow Li_3N$

3mole	0.5mole	1 mole
0.3986mole	0.066mole	0.133mole

$= 0.133mol \times 34.7gmole$

$= 4.59g$

9. **Option B**

$C_{OAG} \times V_{OAG} = n_{OAG}$

$\frac{C_{RAG} \times V_{RAG}}{0.020 \times 25} = \frac{n_{RAG}}{1}$

$\frac{0.010 \times V_{RAG}}{} = \frac{5}{}$

$V_{RAG} = 250cm^3$ of $FeSO_4$

10. **Option A**

$S(s) + O_2(g) \longrightarrow SO_2(g)$

32g of Sulphur produce 64g of SO_2

500 x 106g of Sulphur produce $\frac{(5 \times 106 \times 64)}{32}$ SO_2

$= 1.0 \times 107g\ So_2$

$SO_2 + \frac{1}{2} O_2 \longrightarrow SO_3$

64g of SO_2 produce 80g of SO_3

1.0×10^7g of SO_2 produce $\frac{(1 \times 10^7 \times 80)}{64}$ g of SO_3

$1.25 \times 10_7 gSO_3$ produces $\frac{(1.25 \times 10^7 \times 98)}{80}$ gH_2SO_4

$= 1.53 \times 10^7 gH_2SO_4$

11. **Option C**

$H_2SO_4 + 2NaOH \longrightarrow Na_2SO_4 + H_2O$

Using Titration formula

CAVA = nA

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$$\frac{CBVB}{} \quad \frac{nB}{}$$

$$CB = \frac{0.1 \times 30 \times 2}{25 \times 1}$$

CB= ***0.24 mol/dm³***

12. **Option C**
Using titration formulae
Molar mass= **286gmol⁻¹**
13. **Option D**
14. **Option B**
15. **Option C**
16. **Option B**

QUESTION ON KINETIC THEORY OF MATTER

1. Which of the following is not true of kinetic theory of gases?
A) Molecules of a gas are in constant motion moving in straight line unless they collide with the walls of the container or with another molecule
B) as the molecules collide with the walls of the container, they exert a pressure on the container
C) If the volume of the container is decreased, the molecules collide mere frequently with the container and pressure increases the case is reserve as the volume of the container is increased
D) None of the above
2. Determine the volume of ozone formed on containing $9.0m^3$ of oxygen containing 0.3mol oxygen at 1atm and 25° C to ozone at the same temperature and pressure.
A) $6.0m^3$ B) $9.0m^3$ C) $2.7m^3$ D) $25.0m^3$
3. Calculate the molar mass of a gas with a density of $2.5g/dm^3$ at 298k and $110kN/m^2$ (R=8.314 J1kmol)
A) 56.3g/mol B) 101g/mol C) 5.6g/mol D) 20.5g/mol
4. Calculate the mean square velocity of a 50g molecule at a pressure of $105N/M^2$ given that the volume of gas and number of molecules are $50m^3$ and $15m^3$ respectively
A) 5.6m/s B) 4.2m/s C) 5.5m/s D) 0.5m/s
5. Calculate the total pressure of a gas mixture that contain 2.5g of 2, 4.5g of H_2 and 5.0g of He in a 25L gas cylinder at 25°C
A) 3.00atm B) 4.00atm C) 4.448atm D) 3.48atm
6. On decomposing a $25.0m^3$ NH_3 gas according to the equation below in a cylinder with put on It was found that the volume of the cylinder increased from 100m3 at 50 N/M^3. What is the work done by the system?
A) 3750 N/M B) -3057 N/M C) -37500N/M D) 3057 N/M

Use the illustration below to answer the next two questions

Gold is attacked by few chemicals. A mix of $HN0_3$ and HCL called Agna Regia however dissolves gold by the following equation.
If 28.4g of Au were this reaction (Au=197)

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7. What is the minimum volume in mi of 12.0MHCL needed?
A) 48.0 B) 60.2 C) 30.2 D) 48.0

8. If 16.0M HNO, were used, what is the minimum volume in ML required?
A) 28.5 B) 27.0 C) 30.2 D) 48.0

9. The total volume of ml of aqua regia needed for the reaction is
A) 75.0 B) 87.2 C) 73. 0 D) 78.6

10. A solution contains $5.0x10^{-3}$ moles of H_2SO_4 dissolved in 250ml of solution
10. What is the molarity of the solution?
A) 00.4M B) 0.02M C) 0.03M D) 0.0025M

11. The molarity of H^+ ions in the solution is
A) 0.04M B) 0.02M C) 0.03M D) 0.025M

12. Gas molecules are said to be perfectly elastic because
A) The volume occupied by them are negligible
B) They move about in straight lines
C) The distance between them ate negligible

13. For how long must a current of 0.2A need to pass through solution of $AgH0_3$ to deposit 0.5mole of silver (Ag=108, 1F=96,500c)
A) 38,600s B) 9650s C) 96,500s D) 241,250s

14. A gas occupies $172cm^3$ at 30°c. At what temperature would the volume of the gas be halved?
A) 0.88k B) 0.087k C) 15k D) 152k E) 15 C

15. What are the relative rates of diffusion of hydrogen to nitrogen gases?
A) 1:4 B) 4:1 C) 8:1 D)14:1 E) 1:14

16. What volume would a gas at stp if at 430C and 720mmHg? It occupies $21.4cm^3$
A) $528cm^3$ B) $378cm^3$ C) $412cm^3$ D) $252cm^3$ E) None

17. A polar substance dissolves in_____solvent and a non-polar substance dissolves in_____solvent
A) Like poles, unlike poles B) Non polar, polar
C) Polar, non-polar D) Unlike pole, like pole

18. Gas law are combination of_____,_____,_____and____laws
A) Boy's, Avogadro, partial, gay
B) Boyle's, Charles, Avogadro and Dalton's
C) Boy's, Gay-Lussac's, Charles, Dalton
D) Boyle's, Charles, partial, Dalton

19. For an ideal gas equation T=?
A) Pn/VR B) PV/nR C) Vn/PR D) PVn/R

20. Calculate the number of molecules in 0.5 of the gas at a pressure of $2.0x10^2$kpa and a temperature exactly 300k
A) $1.2x10^{25}$ B) $3.6x10^{25}$ C) $2.4x10^{25}$ D) $4.8x10^{25}$

21. According to KMT of matter, two forces are in operation. They are
A) Centripetal and cohesive B) Disruptive and centrifugal
C) Centripetal and centrifugal D) Cohesive and Disruptive

22. In a solid matter, which of the forces predominate?
A) Centripetal B) Disruptive C) Cohesive D) Centrifugal

23. Which force predominates in a liquid matter?

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A) Cohesive B) Disruptive C) Centripetal and Centrifugal D) None

24. The force predominating in a gaseous matter is
A) Centripetal B) Disruptive C) Cohesive D) Centrifugal

25. Calculate the volume of 1.0000mol at gas at exactly 20°c at a pressure of 101.32kpa
A) 124.055dm³ B) 12.055dm³ C) 224.055dm³ D) 24.055dm³

26. In adsorption, the substance that sticks is called _____ and the surface to which it sticks to is called_____
A) Absorpate, Absorbent B) Absorb, Adsorber
C) Adsorbate, adsorbent D) Adsorber, Absorbent

27. The following are some of the basic postulate of kinetic molecular theory (KMT) of matter except
A) Matter consist of atoms or molecules in continous rapid and random motion
B) The average Kinetic energy of the atoms or molecules is indirectly related to the absolute temperature of the system
C) The particles attract and repel one another and therefore possess potential energy
D) Energy is transferred from one particle to another by collisions, but the collisions are elastic with no net loss of energy.

Answer to kinetic theory of matter

1. **Option D**
Kinetic theory of gas states that
I. The molecules of gas within a container are in state of constant rapid motion in all possible direction i.e. they move in a straight line colliding with themselves and the walls of the container.
II. Every gas consists of a very large number of tiny particle called molecules.
III. The pressure exerted by gas molecule is as a result of continuous bombardment on the surface of the container by the gas molecule
IV. The absolute temp of gas molecule is a measure of kinetic energy in gas.

2. Check our website for solution
3. **Option A**
4. **Question not clear**
5. **Option D**
6. **Option C**
7. **Option A**
8. **Option B**
9. **Option A**
Total Volume of Agna regia
=48.0ml + 27.0ml
=***75.0ml***
10. **Option B**
11. **Option A**
12. **Option B**
Collision between gas molecules is perfectly elastic with no loss of energy

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13. **Option B**
14. **Option D**
15. **Option B**
16. **Option E**
17. **Option C**
18. **Option B**
19. **Option B**
20. **Question not clear**
21. **Option D**
22. **Option C**
Cohesive force is predominating in solid matter because particles/molecules are closely bonded together.
23. **Option D**
24. **Option B**
25. **Option D**
26. **Option C**
27. **Option B**

QUESTIONS ON THERMOCHEMISTRY

1. If the specific heat capacity of Benzene is 2.4 J/g c. Calculate the temperature change when 1625J is removed from 75g of benzene initially at 25°c
A) -25°c B) 50°c C) -9°c D) 298°c
2. If the heat absorbed by 50g of NH_3 gas from the surrounding at
3 0°c was 50 at constant pressure. Determine the enthalpy change of the chemical system
A) 7500J B) 50J C) 1000J D) 70J
3. Determine the heat absorbed by 250g of water heated for 20mins and had a temperature increase of 45°c (specific heat capacity of water = 4.184j/g°c
A) 47,070j B) 25500j C) 30,500j D) 101151j
4. Determine the change in internal energy (ΔN) of a chemical system undergoing an exothermic process with a heat flow. If 10.5j and the work done by the system is 200j
A) +210.5j B) +189.5j C) -210.5j D) -189.5j
5. Calculate the work done associated with expansion of ammonia gas cylinder from $200m^3$ to $50m^3$ at a constant external pressure of $20N/M^2$
A) -600Nm B) 600Nm C) 270Nm D) -270Nm
6. It was found that the volume of the cylinder and position increased to $100m^3$ at $50N/M^2$. What is the work done by the system?
A) 3750Nm B) -3057Nm C) -3750Nm D) 3057 Nm
7. Calculate the enthalpy of reaction below
A) -8686Kj B) 8686JKj C) 8900kj D) -8990Kj

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8. In the compound SH_4 the central atom S, has bounding election in four molecule as a predicted by ***VSEPR*** is
A) Linear B) Trigonal planar
C) Tetrahedral D) Trigonal Bipyramidal

9. ***Given HCl(aq) + NaOHcaq→Nacl(aq) + H_2(cl)*** $\Delta H = -57kj$
Calculate the heat changes which would occur when $50cm^3$ of 0.01m NaOH solution and $100cm^3$ of 0.01m HCL
A) -57j B) -114j C) +57j
D) +114j E) None of the above

10. Determine the ΔH for the reaction $2NH_4NO_3 \rightarrow 2N_2(g) + 4H_20(g) + O_2(g)$
A) $-41.4kjmol^{-1}$ B) $41.4kjmol^{-1}$ C) $4.4kjmol^{-1}$
D) $414.4kjmol^{-1}$ E) None of the above

11. 0.02mole of Anhydrous NH_4CL was added to 45g of H_20. In a polysterene Cup in order to determine the standard enthalpy change of solution of NH4CL (Given $\Delta T = 1.5°c$, S.H.C of $H_2O = 4200kjkg^{-1}k^{-1}$ neglect S.H.C of the polystyrene
A) 1000kj/mol B) 2.8kj/mol C) 0.284kj/mol
D) 14.2kj/mol E) None

12. Which of the following is false on melting a solid?
A) Solids will only melt when the forces of vibration overcomes the binding forces
B) The presence of impurity in solids will raise the melting point of such solids
C) The presence of impurity may cause a solid to have a melting point
D) The presence of impurity in solids will lower the melting point on such solids
D) None

13. Given the information, calculate the lattice energy of MgCL(s).
Mg(s) +1/2CL$_2$(g)→MgCL(s)
$\Delta H°F = -128kj/mol$
$\Delta H°atom$ [Mg(s)] = +150kj/mol
$\Delta H°atom$ [1/2CL2(g)] = +121kj/mol
$\Delta H°$ IE [Mg(g)] = +736kj/mol
$\Delta H°$ EA[CL(g)] = -364 KJ/mol

A) -771 B) -862 C) 647 D) 537

14. Solid particles cannot overcome the strong forces of attraction holding them together and therefore posses
A) Vibrational, Rational and translational motion
B) Vibrational and Rotational C) Vibrational and translational
D) Translational and Rotational E) Vibrational only

15. Internal energy (E) is a state function because
A) It is the sum of all the energies of all the atoms, molecules or icons with a system which it has under the specific conditions of state
B) It is made up of coulomb energy between the electrons and the Nuclei in atoms

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C) The change in internal energy (ΔE) during the shift of a system from state I to state II is independent of path followed

D) $\Delta E = q = w$ E) It is made up of translation energy of molecules

16. What is the value of the standard enthalpy of formation ΔHF of nitrogen at 298k

A) Zero B) 298Kj C) 100kj

D) -2183Kj E) -507Kj

17. The heat content of Z is greater than that of x. Then the reaction $X \rightarrow Z$ is

A) Exothermic B) Endothermic

C) Neither exothermic nor endothermic

D) Activation complex E) Specific heat capacity

18. Given $A+B \rightarrow C+D$ $\Delta H = -1.0$kj. Calculate ΔH for the reaction $C+D \rightarrow A+B$

A) -10Kj B) 20Kj C) 503Kj

D) 10Kj E) 50Kj

19. What is the relation between ΔH and ΔE for reactions which do not involve gases?

A) $\Delta H = \Delta E$ B) $\Delta V = O$ C) $\Delta H = \Delta E + P\Delta V$

D) ΔV is constant E) ΔV is too small

20. What is Δn gas for the combination of one mole of tungsten carbide WC, when both reactants and product are at 298K?

$WC(s) + 5/2O_2(g) \rightarrow WO_3(s) + CO_2(g)$

A) 1 B) ½ C) -3/2 D) -2 E) -3/2

21. In which of the following reactions would ΔH be most nearly equal to ΔE?

A) $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$ B) $H_2(g) + CL_2(g) \rightarrow 2HCL(g)$

C) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

D) $CH_3COOH(L) + 2O_2(g) \rightarrow 2CO_2(g) + 2H_2O(L)$

E) $CL_2(g) \rightarrow 2CL(g)$

22. The enthalpy change (ΔH) for the reaction 92.38KJ at 298K. What is ΔE at 298K? ($R = 8.31KJ^{-1}$)

A) -2.0KJ B) 4.95KJ C) -87.43KJ

D) 8.314KJ E) -168KJ

ANSWER TO THERMOCHEMISTRY

1. **Option C**

Q=-1625j, m+ 75g , c= 2.4J/g°C

$Q = mc\Delta\Theta$

$\Delta\Theta = Q/mc = -9°C$

2. **Option B**

At constant pressure, $\Delta H = Qp$ i.e the change in enthalpy of a system is equal to the heat given to the system

$\Delta H = \Delta E + \Delta PV$

$\Delta H = \Delta E + P\Delta V + V\Delta P$

If $\Delta P = O$

I.e $\Delta H = \Delta E + \Delta PV$

$\Delta H = Qp$

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3. Option A
M=250g, c=4.184J/g c
ΔT=45 c
$Q=mc\Delta T$
Q=250x4.184x45
Q=47,070J

4. Option B
ΔH=-10.5J (Exothermic)
$\Delta W=P\Delta V$ = -200J
$\Delta H = \Delta U=\Delta w$
-10.5=Δu-200J
Δu=-10.5=200J
Δu=+189.5J

5.Option A
$V_1 = 20m^3$, $V_2 = 50m^3$, $P=20N/m^2$
$\Delta V = V_2-V_1 =(50-20) = 30m^3$
At constant pressure, workdone by Gas
$W = P\Delta V$
W = -20x30 = ***-600Nm***

6. Option C
Workdone by the system is negative
$V_1=25m^3$, $V_2=100m^3$, $P=50N/M^2$
At constant pressure
$W= -P\Delta V = -50(100-25)$
W= -3750Nm

7. Option D
USing Hess law of total heat summation
$\Delta H=\sum\Delta H_f$(product)-$\sum\Delta H_f$ (reactant)
$2B_5H_9 + 12O_2 \rightarrow 5B_2O_3 + 9H_2O$
$\Delta H = [5x\Delta H^oF (B_2O_3) + 9x \Delta HF^o(H_2O)] - [2x \Delta H^oF(B_5H_9) + 12\Delta HF^o(O_2)]$
= -8750-150 = **-8900KJ**

8. Option D
4 Bond pair and 1 lone pair is a trigonal Bipyramidal molecule.

9.Option E
Number of moles of HCL = cv/1000
=0.01x100/1000=0.001moles

Number of mole of NaOH=Cv/1000
=0.01x50/1000
=0.0005moles

10. **Option C**
$2NH_4NO2 \rightarrow 2N_2 + 4H_2O + O_2$
$\Delta H = \sum Hf^o(\text{product}) - \sum Hf^o(\text{reactant})$
$\Delta H = [2x\Delta H^oF(N_2) + 4x\Delta HF^o(H_2O) + \Delta HF(O_2)] - [2x\Delta HF^o(NH_4NO_2]$
$\Delta H = -1144KJ/mol + 729.2KJmol$
$\Delta H = -414.8kj/mol$

11. Check Answer on our webpage

12. **Option B**
The presence of Impurity in solids will pass the melting point of solids

13. **Option A**
Using Born - Haber cycle

14. **Option E**

15. **Option A**

16. **Option A**
$\Delta HF(N_2) = 0$

17. **Option B**
If the heat of product is greater than the heat of reactant, the reaction is said to be endothermic
Hp>Hr (Endothermic)
Hr<Hp (Exothermic)

18. **Option D**
Since $A + B \rightarrow C = D$ $\Delta H = -10KJ$
$C + D \rightarrow A + B$ $\Delta H = +10KJ$
The heat of reaction of the forward is the heat of reaction of the reverse.

19. **Option A**

20. **Option E**

21. **Option E**

22. **Option C**
$N_2(g) + 3H_2(g) \rightarrow 2NH_3$
$\Delta ngas = 2-4 = -2moles$
$\Delta H = \Delta E + \Delta nRT$
$\Delta E = \Delta H - \Delta nRT$
$\Delta E = -92380J-(-2)(8.314)(298)$
$\Delta E = -92380J + 4955.144$
$\Delta E = -87424.856J$
$\Delta E = -87.43KJ$

QUESTIONS ON CHEMICAL EQUILIBRIUM

1. For reaction ***$FeO(s)+O_2(g) \leftrightarrow Fe(s)+ CO_2(g)$***
If at 298K the equilibrium amount present are 2.5mol FeO, 0.2molFe, 3.0mol CO_2 and 4.0mol CO. calculate the equilibrium constant for the reaction.

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A)0.06 B) 0.6 C) 6.0 D) $2.1x10^{-2}$ E) 0.75

2. For the reaction in question 1 above. What would be the effect of increase in pressure on the position of equilibrium?
A) Equilibrium shift to the right
B) Equilibrium shift to the left C) No effect
D) None of the above E) All of the above

3. 2moles of HI are injected into a box of one dm3 volume at 490°C. If 0.228 mole of the HI disappeared. Calculate the concentration equilibrium constant.
A) 0.0166 B) 0.0179 C) 1.772 D) 0.228

4. The system $2N0(s) \leftrightarrow N_2(g) + 0_2(g)$ is considered to be at equilibrium when
A) The concentration of N_2 and 0_2 are equal
B) The concentration of N0 is twice that of either N_2 or 0_2
C) The concentration of N0 is equal to the combined concentration of N_2 and 0_2
D) The rate of decomposition of NO is equal to its rate of formation

5. The relationship between the Kc and Kp is
[A] $K_c=Kp(RT^{\Delta n})$ [B] $K_c=Kp(RT)$
[C] $K_c=Kp(d)$ [D] $K_c=Kp/(RT)^{\Delta n}$

6. Given that P=2.5x104 Nm^{-2} and the % dissociation of NOBr is 34% the volume of kp for the reaction:
$2NOBr(g) \leftrightarrow NO(g) + Br_2(g)$ at 298K is
A) 938.5Nm^{-2} B) 745Nm^{-2} C) 1013Nm^{-2} D) 11288Nm^{-2}

7. During the reaction $H_2(g) + I_2(g) \leftrightarrow 2HI(g)$ 0.5mole each of the H_2 and I_2 were placed in the 4L vessel at 425°c until the equilibrium was attained. The vessel was found to contain 0.44mole of HI and 0.059mole each of H_2 and I_2, the value of Kc is
A) 54.9 B) 72.0 C) 10 D) 87.2

8. What is the kp for the reaction
$CaCO_3(aq) \leftrightarrow CaO(s) + CO_2(g)$ is
[A] $Kp=[CaO][CO_2]/[CaCO_3]$ [B] $Kp = PCO_2$
[C] $Kp = [CaCO_3]/[CaO][CO_2]$ [D] $kp = [CO_2]$

9. The value of Kp at 500°C for the reaction $3H_2(g)+N_2(g) \leftrightarrow 2NH_3(g)$ is $1.50x10^{-5}$ the value of kc is
A) $6.02x10^{-2}$ B) $4.8x10^{-3}$ C) $8.01x10^{-2}$ D) $2.1x10^{-2}$

10. For the reaction
$FeO(s) + CO(g) \rightarrow Fe(s) + CO_2(g)$
What will be the effect of increase in pressure on the position of equilibrium?
A) Equilibrium shift to the right
B) Equilibrium shift to the left C) No effect
D) More of Co_2 is produced

11. What is the PH of 0.10m of *NaOH*?
A) 1.0 B) $1.0x10^{-3}$ C) 3.0 D) 13

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12. The dissociation constant of ethanoic acid at 298k is $1.8x10^{-5}$. In a buffer solution the concentration of CH_3COO-and CH_3COOH are 0.05m and 0.1m respectively. What is the PH of the buffer solution?
A) 11.28 B) 4.44 C) 3.15 D) 13

13. What is the PH of 10^{-3}M H_2SO_4?
A) 3.0 B) 10 C) 2.70 D) 2.0

ANSWER TO CHEMICAL EQUILIBRUM

1. **Option D**
At equilibrium K= $[Co_2]/[co]$=3.0/4.0=*0.75*

2. **Option C**
Effect of increase in pressure on the position of equilibrium only act on homogenous gaseous system

3. **Question not complete**

4. **Option D**
A system is said to be at equilibrium when the rate of forward reaction is equal to the rate of reverse reaction

5. **Option D**
The relationship between Kp and Kc is given by $Kp=Kc(RT)^{\Delta ngas}$
OR $Kc = Kp/(RT)^{\Delta ngas}$

6. **Option D**
Check on website for complete solution

7. **Option D**
$H_2(g) + I_2(g) \leftrightarrow 2NH_3$

I	a	b	O
c	-x	-x	+x
E	a-x	b-x	X

At equilibrium
[HI]= n/v = 0.44mol/1L = 0.44mL
$[I_2]$ =$[H_2]$ = n/v = 0.059/1L = 0.059m
Kc= $[HI]^2/[H_2][I_2]$
Kc = 87.2

8. **Option B**
Concentration of a solid sis expressed as unity 1

9. **Option A**

10. **Option C**

11. **Option D**

12. **Option B**
Using Henderson-Hasselbalch equation

13. **Option C**

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QUESTION ON CHEMICAL KINETICS

1. The half-life period for the decomposition of radium is 1,590years. Calculate the rate sec-1
   A) $5.83x10^{-10}$ sec^{-1} B) $2.58x10^{-1}sec^{-1}$
   C) $1.382x10^{-11}sec^{-1}$ D) $5.83x10^{-11}sec^{-1}$

Use the information below for the next two questions for the chemical reaction

$$5Br^- + BrO_3^- + 6H \leftrightarrow 3Br_2 + 3H_2O$$

The rate expression is given as

$$Rate = K[Br^-][BrO_3][H^+]^2$$

What are the molecularity and the order of each reactant?

2. Reactant Br
   A) 5 and 1 B) 2 and 5 C) 3 and 1 D) 1 and 4
3. Reactant BrO_3
   A) 2 and 1 B) 1 and 3 C) 3 and 2 D) 1 and 1
4. Reactant H+
   A) 6 and 1 B) 6 and 2 C) 6 and 3 D) 4 and 2
5. A first order reaction has an initial volume of 1.71ml after 9minutes the volume become 4.49ml. Calculate the rate constant if the infinity reading is 15.98ml
   A) $1.41x10^{-2}min^{-1}$ B) $2.41x10^{-2}min^{-1}$ C) $3.41x10^{-2}min^{-1}$ D) $2.54x10^{-2}min^{-1}$
6. A field order reaction is 40% complete at the end of 50mins. What is the value of the rate contact in sec^{-1}
   A) $1.82x10^{-4}sec^{-1}$ B) $1.90x10^{-4}sec^{-1}$ C) $1.70x10^{-4}sec^{-1}$ D) $1.63x10^{-4}sec^{-1}$
7. What is the general form of a rate law?
   [A] Rate = K $[A]^n[B]$ [B] Rate = KA^nB^m
   [C] Rate = $[K/A]^n [K/B]^m$ [D] Rate = R $[A,B]^{nm}$
8. What is the relationship between the specific rate constant and half-life?
   [A] $T_{1/2}$=8.314/k [B] $T_{1/2}$=9500/k
   [C] $T_{1/2}$=0.693/k [D] k=2.303/$T_{1/2}$

Use the information to answer the next two questions

The decomposition of acetaldehyde and acetine dicarboxylic acid yielded results whose plot is log T against 1/T gave straight lines with slopes
A) -9920 and B) -5070 respectively

9. Calculate the activation energy at first
   A) 54,294kcalmol^{-1} B) 45,394kcalmol^{-1}
   C) 54,382kcalmol^{-1} D) 63,200kcalmol^{-1}
10. What is the activation energy of the second?
    A) 15,000Calmol^{-1} B) 17,000Calmol^{-1}
    C) 1,000Calmol^{-1} D) 23,200Calmol^{-1}
11. The rate law of a chemical reaction was found to be $R=K(A)^{2x-1}[B]$ What is the overall order of equation if x=1
    A) 3/2 B) 2 C) 2x-1+x D) 3x-1 E) 3

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12. In a first order chemical reaction, after ups, 6moles from the initial concentration of 16moles of the reactant disappeared. Calculate the rate constant

A) $2.303S^{-1}$ B) Log $(16/10)S^{-1}$ C) $0.0470s^{-1}$ D) 20s E) $14.74s^{-1}$

Use the information below to answer the next two questions. At 25°c the half-life period for the decomposition of N_2O_5 is 5.7hrs and is independent of the initial pressure of N_2O_5.

13. Calculate the specific rate constant?

A) $0.015hr^{-1}$ B) $0.15hr^{-1}$ C) $0.013hr^{-1}$ D) $0.12hr^{-1}$ E) $0.14hr^{-1}$

14. Calculate the time required for the reaction to go 90% completion

A) 19.19hrs B) 19.18hrs C) 19.17hrs D) 19.20hrs

19. The half-life of a radioactive isotope A is 1997years. How long does it take for a sample of A to decay to 20% of its original radioactivity

A) 2638years B) 3638years C) 4638years
D) 1638years E) 5000years

20. The rate law of a chemical reaction was found to be $R=K(A)^{1/2}B^2$ What is the overall order of this reaction?

A) 3/2 B) 2 C)7/2 D) 7 E) 1

21. In a zero order of reaction

A) The rate reaction is independent of the concentration of all the reactant
B) the rate of reaction is dependent of the concentration of all the reactants
C) The rate of reaction is doubled
D) None of the above E) All of the above

22. A first order of reaction 25% complete in 30s. Calculate the rate constant k

A) $9.956x10^{-3}s^{-1}$ B) 72.25^{-1} C) $144.4s^{-1}$ D) $20s^{-1}$ E) $22s^{-1}$

23. Given the molecularity of the elementary reaction below

$2NO + O_2 \rightarrow 2NO_2$

A) Unimolecular B) Bimolecular
C) Termolecular D) Second Order E) First Order

24. The ideal of surface area becomes insignificant in

A)An homogenous system B) Heterogeneous system
C) Particles with small size D) Particle with large size
E) All of the above

25. How can the rate of reaction be reactant as well as each product of this reaction?

$2N_2O_5 \rightarrow 4NO_2 + O_2$

[A] $R=-\frac{1}{2}d[N_2O_5]/dt=\frac{1}{4}d[NO_2]/dt=d[O_2]/dt$
[B] $R=-2d[N_2O_5]/dt=4d[NO_2]/dt=d[O_2]/dt$
[C] $R=-2d[N_2O_5]/dt=d[NO_2]/dt=d[O_2]/dt$
[D] $R=-\frac{1}{2}d[N_2O_5]/dt=4d[NO_2]/dt=d[O_2]/dt$
[E] None of the above

26. A second order reaction is $2A \rightarrow product$, what is the rate equation?

A) $R=K_2(A)^2$ B) $R=K_2(2A)$ C) $R=K_2(\frac{1}{2}A)$
D) $R=K_2(A_2)$ E) None of the above

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27. A reaction follows the rate expression **R=K[A]**. If the rate is expressed in terms of $Mol^{-1} S^{-1}$ and the concentration of A is in $Mol L^{-1}$. What is the unit of first order rate constant?
A) $Mol L^{-1}$ B) K $mol L^{-1}$ C) S D) S^{-1} E) S^{-2}

28. The ideal of surface area becomes insignificant in
A) An homogenous system
B) Heterogenous system
C) Particles with small size
D) Particles with large size
E) All of the above

29. For the chemical reaction $A \rightarrow G$, it is formed that the rate of the factor of 2.25 when the concentration of A is increased by a factor of 1.5. What is the order of A of this reaction?
A) 0 B) 1 C) 2 D) 3 E) 4

30. After five half-life periods for a first order reaction what is fraction of reactant remains
A) 1/6 B) 1/5 C) 1/25 D)1/32 E) 2

31. In general, what happens to the rate of reaction as the reaction progress?
A) The rate of reaction also increases
B) The rate of reaction is quenched
C) Concentration increases
D) The rate of reaction decreases
E) All of the above

32. The slowest step in an elementary reaction is
A) Molecularity of a reaction
B) Order of a reaction
C) Rate determining step
D) Elementary step

33. Which one of the following statement is a complete false description of the rate determining step of a reaction?
A) It governs the rate of the overall reaction
B) It usually corresponds to the height activation peak in the reaction profile
C) It correspond to the slowest stage of the reaction
D) It necessarily involves the breaking of bonds in the reactant molecules

34. The rate constant of azoisopropane is $2.06x10^{-3}sec^{-1}$ at 27°C
Calculate the time required for the reaction to go to95% completion
A) 1454.50secs B) 1680.50secs C) 1983.50secs D) 1382.50secs

ANSWER TO CHEMICAL KINETICS

1. **Option C**
$T_{½}$= 1590 years, Since 1 year is 31,536,000 secs then 1590 years=$5.01422x10^{10}$secs
$T_{½}=0.693/\lambda$ where λ is the rate constant
Substituting the parameters we have
$\lambda=1.382x10^{-11}sec^{-1}$

2. **Option A**
Br^-=First order and molecularity is 5

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3. **Option D**
The reaction is first order to the concentration of BrO_3^- and hence unimolecular

4. **Option B**
The reaction is second order with respect to the concentration of H+ and hence its molecularity is6

5. **Incomplete question**

6. **Option C**
T=5mins=3000secs, k=?
A=100, a-x=100-40=60
In[a/a-x]=kt
Inputting the parameters in the above equation $k= 1.70x10^{-4}sec^{-1}$

7: **Option A**
The general form of rate low is given by rate = $K(A)^n(B)^m$ where n and m are exponents of the reaction and can only be determined experimentally

8. **Option C**
The relationship between rate constant k and half life, $T_{½}$ is given by:
$T_{½}= 0.693/k$

9. **Option B**
Since Arrhenius equation is given by
In K=-Ea/RT + In A…equ 1
LogK=-Ea/Rt+ Log A….equ 2
Comparing with the equation of a straight line
Y=mx+c
Y=Log T, m=-Ea/2.303R, x=1/T, c= log A
M=slope=-Ea/R
-Ea=9920x2.303 x 1.987Cal
-Ea=45.394Kcal/mol

10. **Option D**
M=-Ea/2.303R
Ea=23200cal/mol

11. **Option B**
Overall Order=Sum of order of reaction
$R=K(A)^{2x-1}[B]^x$
Overall order=2x-1+x=3x-1
If x=1, overall order =3[1]-1=2

12. **Option C**
A=16moles, a-x=16-6=10moles
In[a/a-x]=kt
In[16/10]=k x 10
$K= 0.0470s^{-1}$

13. **Option D**
T½=5.7hrs
T½=0.693/k=0.693/5.7
$K=0.12hrs^{-1}$

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14. **Option A**
A=100,a-x=100-90=10
2.303log[a/a-x]=kt
Since k=0.12hr-1
T=2.303/klog[a/a-x]
T=2.303/0.12log[100/10]
T=19.19hrs

15. **Option B**
Since In[a/a-x]=kt
2.303Log[a/a-x]=kt
K=2.303/tLog[a/a-x]

16. **Option B**
Given srante Arrhenius equation
dInK/dt=Ea/RT2.....equ 1
integrating equation 1
In K = -Ea/Rt +constant
In K = -Ea/Rt + In A.....equ 2
2.303LogK=-Ea/Rt+2.303LogA
LogK=-Ea/2.303Rt+LogA..equ 3
Combining equation 3 with equation of a straight line y=mx+c
Y=LogK,m=-Ea/2.303R,x=1/T,c=logA
Slope m=-Ea/2.303R

17. **Option C**
Given slope m=-5070
M=-Ea/2.303R
Ea=23200Calmol

18. **Option C**
Second order k= R/[A]2
K= mol/dm3/s / [Mol/dm3]2
=Mol/dm3/s

19. **Option C**
$T_{1/2}$=0.693/1997=0.000347yr^{-1}
If $[A]_t$=20/100 x $[A]_o$=0.2$[A]_o$
In$[A]_o/[A]_t$=kt
1/0.000347 x In[A]o/0.2[A]o
T=4638yrs

20. **Option C**

21. **Option A**

22. **Option A**
Using k=2.303/t Log[a/a-x]
K=0.00959s^{-1}

23. **Option C**

24. **Option B**

25. **Option A**

26. **Option A**
27. **Option D**
28. **Option B**
29. **Option C**
    $[1.5]^n=[2.25]$
    $[1.5]^n=[1.5]2$
    $N=2$
30. ***Try hands on this or check our web platform for solutions***
31. **Option A**
32. **Option C**
    The rate determining or limiting step is the slowest step in an elementary reaction
33. **Option B**
34. **Option A**

Question on Electrochemistry

Use the question below in answer
The next two question.
Find the Masses of product formed when a dilute Sulphuric acid solution is electrolyzed with a current of 0.6A for 90 min (H= 1.0, O=16, S=32)

1. Cathode
   (A) 0.0226g (B) 0.0336g (C) 0.0446g (D) 0.0446g (E) 0.0116g
2. At the Anode
   (A) 0.2686g (B) 0.1686g (C) 0.3686g (D) 0.4686g (E) 0.0686g
3. Find the Masses of products formed when a dilute Sulphuric acid solution is electrolyzed with a current of 0.6A for 90 minutes
   (A) Mass of H_2 formed is 0.0336g (B) Mass of Cu formed is 0.0336g
   (C) Mass of S formed is 0.0333336g
   (D) Mass of Fe formed is 0.0336g (E) Mass of Zn formed is 0.0336g.
4. Using Question three above
   (A) Mass of Au formed is 0.2686g (B) Mass of H_2O formed is 6.2686g
   (C) Mass of O_2 formed is 0.2686g (D) Mass of Cl_2 formed is 0.2686g
   (E) Mass of Br_2 formed is 0.2686g.
5. What is the Mass of Copper formed at the cathode when a current of 0.25A is passed through a Copper(ii) Sulphate solution for 1 hour (R.A.M Cu=63.5)
   (A) 0.296g (B) 0.358g (C) 0.581g (D) 159g (E) 0.578g.
6. During the electrolysis of Copper(ii) tetraoxosulphate (VI) solution using platinum electrode 0.16g of copper was deposited on the cathode. Calculate

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the volume of oxygen gas liberated at S.T.P (Cu=64, faraday constant=96500Cmol^{-1}, Molar Volume= 22.4dm^3 step)
(A) 0.028dm^3 (B) 0.28dm^3 (C) 2.9dm^3 (D) 280dm^3.

Answers to Electrochemistry

1) **OPTION A**

$H_2SO_{4(aq)} \rightleftharpoons 2H^+_{(aq)} + SO^{2-}_{4(aq)}$

$H_2O \rightleftharpoons /H/ + OH$

H^+ migrate towards cathode OH^- shows a greater tendency to be preferentially discharge at Anode

Catholic half Reaction.

$H^+ + e^- \longrightarrow H$

$4H^+ + 4e^- \longrightarrow 2H_2$

$4H^+ + 2e \longrightarrow H_2$

2 F liberates 4g of H_2

193000c liberates of H_2

(0.6 x 70 x 60) liberates $\frac{(0.6x90x60x4)}{193000}$

=0.0226g.

2. **OPTION A**

Anodic half Reaction.

$4OH^+ \longrightarrow 2H_2O + O_2 + 4e^-$

4f liberates 32g of 0_2

(4x96500) c berates $\frac{(0.6x\ 90+\ 60}{7x96500}$

=0.2686g.

3. ***Check our website for solutions***

4. **Option A**

I = 0.25A, t= hour = 3600 se

$Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$

63.5g of 63 5g

(2x 96500)C liberates 63. 5g Cu

(0.25x3600)C liberates $\frac{(0.25x3600}{(2x96500}$

= 0. 29 6g

6. Option B

a= 100, a-X = 100 – 40 = 60 t=3000sec

$\ln \frac{a}{(a-x)} = Kt$

$2.303 \log \frac{a}{a-x} = Kt$

$K = \frac{2.303}{3000} \log \frac{(100)}{(60)}$

$K = 1.7 \times 10^{-4} sec^{-1}$

Question on Intermolecular Forces

1. _____ has Intermolecular forces called _____

(A) KCl/ Vander waal (B)Co_2/Vander waal

(C) O_2/ electrostatic forces (D) Cl_2 cohensive (E) None

Answer to intermolecular forces

1. **OPTIONA**

KCl has Intermolecular forces called Vander Waal forces

QUESTION ON CHEMICAL BONDING

1. The type of Inter molecular Interaction including KCL is:

(A). Dipole –Dipole (B). Hydrogen bonding

(C). Inter atomic forces (D) Ion- dipole.

2. Which of the following does not obey octet rule?

a) CH_4 (b) Nh_3 (C) SO_2 (d) BF_4

3. The following arise as a result of permanent dipole in a molecule except

A) Inter atomic force (B) Dipole Dipole Interactions

C) Ion dipole Interaction (D) Hydrogen bonding

4) In which of the following repulsion is greatest

A) Lone pair, bond pair B) Lone pair, Lone pair

C) Bond pair, Bond pair D) None

5. Which of the following contains coordinate covalent bond?

(A) Nh_4^+ (B) Na CL (C) CH_4 (D) HCL (E) all of the above

6. _____ and _____ are examples of ionic crystals and layer crystal respectively

(A) Diamond and graphite (b) HCL and diamond

(C) NACL and graphite (D) NACL and diamond

7. The following are the properties of ionic compounds except.
(A) Good conductors of heart and electricity
(B) Mostly solids (C) Low melting and boiling point
(D) Soluble in water (E) None

8. Nitrogen gas has_____ Covalent bond
(A) Triple bond (B) No bond
(C) Dative bond (D) Double bond (E) All of the above

9. The ammonia molecule NH_3 can from NH^{4+} because
(A) Nitrogen has vacant p – orbitals to accept elections
(B) Hydrogen can donate electrons to nitrogen
(C) The nitrogen a to m has a lone pair of election
(D) All of the above

10. H_2O is a liquid at room temperature while H_2S is a gas at the same temperature; the difference is a result of _____
(A) Weaker hydrogen band in H_20 then H_2S
(B) Stronger hydrogen band in H_20 then H_2S
© Difference In atomic mass
(D) Difference In size forms 0and 5,

11. An element Y, has 5 valence electrons and forms a molecule Y_2 the what as the band owner of the Y_2 molecule.
(A) 1 (B) 3 (C) 2 (D) 4

12. In which of the following compounds is hydrogen bonding most likely to be least?
(A) HF (B) H_20 (C) NH_3 (D) PH_3

13. All chemical bands Indeed -
(A) Centrifugal fore (B) Electrostatic attraction
(C) Centripetal force (D) Gravitational force

14. Metallic bond is an attractive force between
(A) Cation and anion (B) Metal ions and delocalized election cloud
(C) Two dipoles (D) Electropositive and electronegative elements

15. The type of dipole that exists in HCL molecule is known as
(A) Instantaneous (B) Permanent
(C) Induced (D) Temporary

16. In a molecule, there is _____ type of electrons
(a) 3 (b) 1 (C) 2 (d) 5

17. In which of the following is repulsion lowest?
(A) Bond pair – Lone pair (B) Bond pair – Bond pair
(C) Lone pair – Lone pair (D) All of the above

18. For a molecule to have trigonal planar shape there must be _____
(a) 2 bond pairs alone around the central atom
(b) 3 bonds pairs alone around the central atom.
(c) 2 bond pairs and 1 lone pair around the central atom
(d) 3 lone pairs alone around the central atom

19. An element x has 5 valence elections and forms a homo nuclear diatomic macular x_2.
What is the bond order of x_2?
(a) 2 (b) 3 (c) 1 (d) 5

20. Which of the following molecular violate octet rule?
(a) HF (b) H_2O (c) NH_3 (d) BF_3.

21. The type of bonding fond in NH_3 is known as
(a) Covalent (b) ionic (c) metallic (d) denture

22. The following are that affect the Strength of metallic bond
(a) Size of metal atoms
(b) No of valence electrons metals atom (c) a an d b (d) none

23. In which of the following is hydrogen bond is most likely to be strongest
(a) NH_3 (b) H_2O (c) HF (d) HCL

24. Molecules with permanent dipole are said to be
(a) non polar (b) bipolar (c) polar (d) aprotic

Answer to chemical bonding.

1. **Option D**
2. **Option D**
BF_3 violates Octet rule because it has fewer number of bond pair of electrons

1. **Option A**
2. **Option B**
Lone_Pair > Lone Pair > Lone–Pair > Bond_Pair > Bond_Pair > Bond Pair
Decrease in Repulsion

5. **OPTION A.**

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NH_4^+ exhibit coordinate Dative Bond which is a type of covalent bond in which the shared pair of electrons is supplied by only one of the bonded atoms.

6. **OPTION D**

NaCl is ionic crystals and diamond is a covalent compound with layer crystal.

7. **OPTION C**

Ionic compound exhibit the following properties

1) They are three dimension solid structures at temperature.
2) They have high meting and being point.
3) They are Good conductors of electricity.
4) They are soluble in water.

8. **OPTION A**

:N=N:

Nitrogen gas has three covalent Bond pair

9. **OPTION C**
10. **OPTION B**
11. **OPTION B**
12. **OPTION D**
13. **OPTION B**
14. **OPTION B**
15. **OPTION B**
16. **OPTION C**
17. **OPTION C**
18. **OPTION B**
19. **OPTION D**
20. .**OPTION B**
21. **OPTION D**
22. **OPTION C**
23. **OPTION C**
24. **OPTION C**

PHYSICS PRACTICAL (PHS 191 & PHS 192).

There are some basic parameters that guarantee success in physics practical they are highlighted below:

1. Introduction
2. The use of the meter rule
3. Errors in physics practical
4. Tabulations
5. Linearization of expressions
6. Graphs

a. Slopes and intercept
b. Making scales
c. Drawing the vertical and the horizontal line
d. Precautions

INTRODUCTION

There are two major practical types namely

a. Real practical
b. Alternative to practical

REAL PRACTICAL

In this aspect you handle the apparatus. Everything would have to be done by you. E.g. ssce examination

ALTERNATIVE TO PRACTICAL

This kind is done on abstract basis, you don't handle the apparatus, everything would have been done for you such kind of examination is the popular Gce examinations.

Both types of practical have some things in common and some little differences which will be highlighted shortly as we proceed.

PHS 191 and 192 is term as the real practical but in the real sense the time required for each experiment might be a little low so your knowledge of the alternative to practical is also required to work smart so once you have your table and some parameters you can go ahead to finish up the practical in due time without having to waste further time. Once you understand the background principle of basics of every practical topic.

THE USE OF METER RULE

One of the instrument used during the physics practical is the meter rule it is calibrated in inches and in centimeters (cm). we use cm during measurement mostly.

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0.1cm or 1mm is the smallest graduation on a meter rule or ruler however we could also make measurement to half of this smallest graduation.

ERRORS IN PHYSICS PRACTICAL

Error is a measure of the degree of uncertainty in a given measurement. Errors are not synonymous with mistakes in physics they are not the same as mistakes.

Two main errors that are done in physics measurement include:

1. Personal error(erratic error)
2. Instrumental errors

PERSONAL ERROR

This can also be called human error.it arises as a result of wrong interpolation i.e. wrong judgments of result by the observer.

- ✓ It could be an error due to inherent weakness of the individual e.g. an observer having eye problem(colour blindness)
- ✓ Examination fright or inability to set up the apparatus as specified in the question
- ✓ In reading a scale e.g. meter rule,measuring cylinder, ammeter etc. the eye should be place in such position that is normal 900 to the point of reading to eliminate error due to **PARALLAX.**

INSTRUMENTAL ERROR

This arises from a deflective instrument which is not sufficiently sensitive to measure the given readings.

Other kinds of errors

1. Systematic error
2. Random errors

Systematic error affects measurement in a regular and predictable manner. That is the error is constant throughout the experiment. That is why your reading may be slightly different from your friends sometimes within-0.2 or +0.2.

CAUSES

- ✓ Zero error of an instrument
- ✓ Incorrect calibration of an instrument
- ✓ An individual persistently carrying out a mistimed action
- ✓ Heat losses in a calorimeter experiment
- ✓ Effect of air resistance in a dynamics experiment
- ✓ Approximation in a theory

REMEDY

These errors can be eliminated by repeating the procedure many times. it can also be

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avoided by changing or varying the conditions of the experiment that is by uSing different method, different instrument or by a different individual.

ii. **RANDOM ERROR**

This error like the name suggest occurs in an irregular or random manner. The error is fluctuating i.e. it is not constant.

NOTE

- ✓ A measurement with a small systematic error is said to have a high accuracy.
- ✓ If random error is small and there is no erratic error, then the measurement is precise
- ✓ With a little more care and practice, it should be possible to reduce the number of erratic errors to a minimum.

General Notes on physical Practical

Personal needs: Sharp pencil, pen, protractor, ruler, compass and eraser or a complete mathematical set.

Requirement for good practical work

1. Read the question carefully without any rush.
2. Be time conscious
3. Present the values specified in the question in a tabular form with appropriate units. e.g If the question says, measure and record time, t in s and the corresponding length, L in cm. The table can be drawn as shown below:

4. Use standard degree of accuracy in measurement and approximation e.g angles and temperatures are measured to one decimal place in degrees.
5. Be familiar with physics apparatus and symbols
6. Be familiar with common graphs
7. By familiar common relationship between variables e.g Ohm's law, V a I, simple pendulum, T2 a L etc

Common Graphs of variables

1. Nature - graphs in physics are either straight lines or smooth curves. jagged graphs are not expected.

Straight lines - Can be with positive or negative slope .Positive slope line is a line that makes an acute angle with the horizontal in the clockwise direction. Negative slope line is a line that makes an obtuse angle with the horizontal in the clockwise direction

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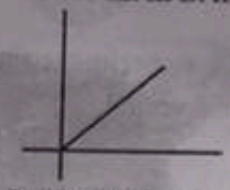
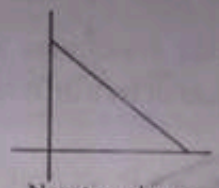
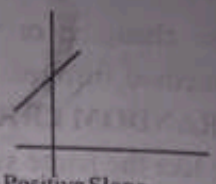


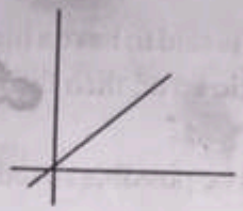
Positive Slope
No intercept on Y axis



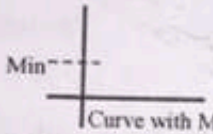
Negative slope
+ ve intercept on both axis



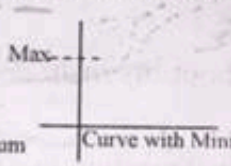
Positive Slope
Positive intercept in Y axis



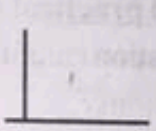
The graphs are related to the equation $Y = MX + C$ where
Y = ordinate, X = abscissa, M = gradient / slope, C = intercept on Y axis
<u>Curve</u> - can be with maximum, minimum or both.



Curve with Maximum



Curve with Minimum



Smooth curves are related by the equation $Y = MX^2 + CX + b$

<u>Plotting good graph</u>

1. Good graph work must be clear and neat
2. The title of the graph must be boldly written at the top part of the graph paper.

Great attention is needed here as most candidates easily forget the title and render the graph meaningless. Thus title writing is recommended to be the first step o be taken in a plotting a good graph

3. Suitable scales must be selected. scales with an odd numbers such as 3, 7, 9, 3 must be avoided
4. The scales must be written on the graph sheet- preferably on the white part of the graph paper
5. The points must be clearly marked with crosses (x), encircled dots ( ) or plus sign (+) such that they can still be seen ven after the line or curve passingthrough them has been drawn.
6. All works on graph sheet must be done with pencil (sharp). on the occasion should pen be used on any part of the graph sheet.

This is why all calculations, including the determination of slope are recommended to be done on the work or answer sheet

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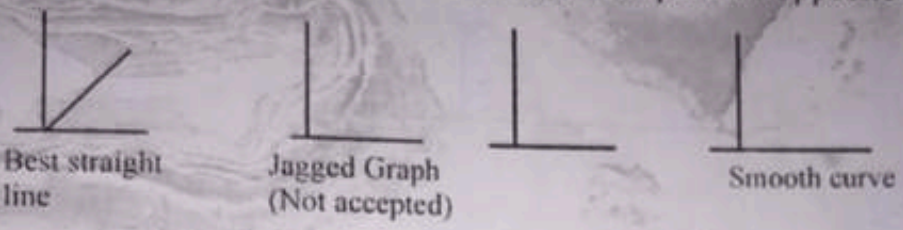
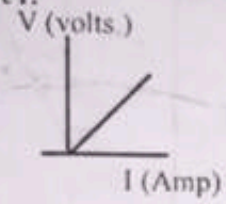
A large triangle is needed for calculating the slope

8. A best line of fit or smooth curve is required after all points have been plotted. This is a line or curve that passes through good number of points outside are either equally distributed or in a simple ratio opposite each other.

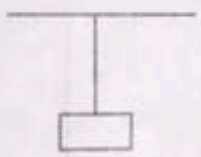


9. The axes (ordinate & abscissa) must be well labeled with units e.g plotting V against I.



MECHANICS

1. Elasticity



(a) <u>with no Oscillation</u>

$F = ke, k = \frac{f}{e}$

Comparing $F = k(e)$ to $Y = Mx + C$,

Slope, $M = k$ and intercept, $C = 0$

(b) <u>With Oscillation</u>

From SHM,

$T = 2\sqrt{\frac{M}{K}} = 2\frac{e}{g}$

$T^2 \; a \; m$ or $T^2 \; a \; e$

Also, $\frac{m}{K} = \frac{e}{g}$

$m = \frac{k}{g}(e)$

1. $T = 2\sqrt{\frac{M}{K}}$

$T^2 = 4\frac{M}{k}$ Or $\frac{4}{k}$

<u>Pendulum Experiment</u>

1. <u>Simple Pendulum</u>

a bob suspended from a string or thread

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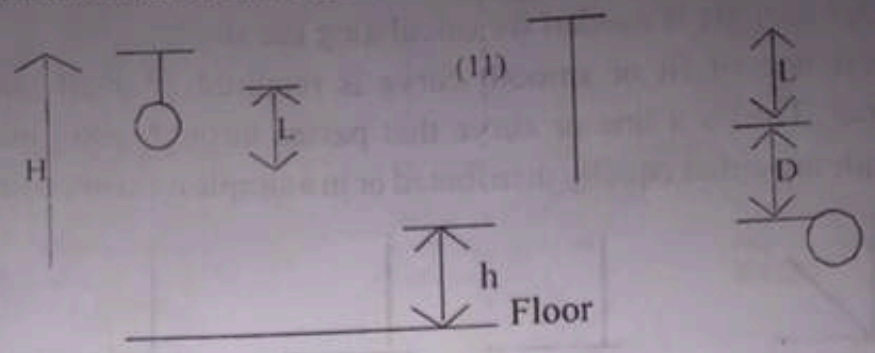
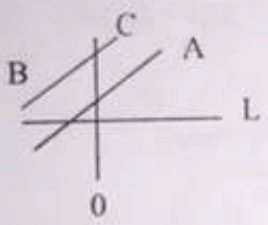
(11)



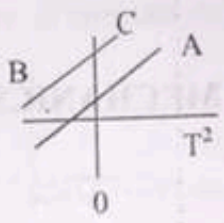
a. $T = 2\sqrt{\frac{L}{g}}$

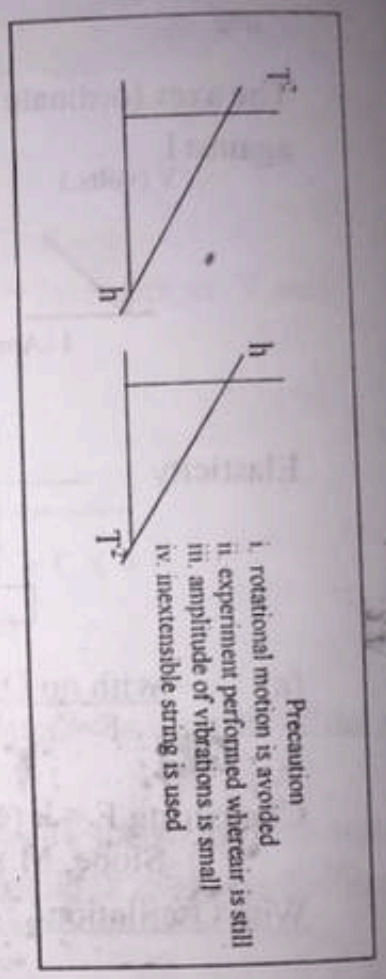
$T^2 = 4\frac{^2}{g}L$, T^2 aL or L a T^2

From $T^2 \frac{4^2}{g}L$, $T^2 = \frac{4^2}{g}(L)$



or





With reference to the floor

$H = L + h$, $L = H - h$

Also with reference to the support at the top

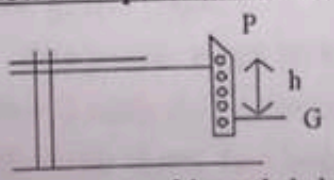
$T = 2\sqrt{\frac{L}{g}}$ or $T^2 = \frac{4L}{g}$

$T^2 = \frac{4}{g}(Hh) = 4\frac{H-4}{g}h$ or $\frac{-4}{g}$

Compound pendulum

Objects other than a bob which can be suspended and vibrated from a point e.g Vibration metre rule and object immersed.

(a) <u>Metre suspended vertically from a drill hole</u>



From $T = 2\sqrt{\frac{L}{g}}$ in simple pendulum

$L = K^2 + h^2$ for meter rule

where K = moment of inertial, h = centre of gravity from the point of suspension.

$2\sqrt{\frac{h^2 + K^2}{gh}}$, $T = 4\frac{(h^2 + K^2)}{gh}$

$T^2 = 4\frac{(h^2 + k^2)}{8}$, $T^2 h = \frac{4}{g}h^2 + \frac{4}{g}k^2$

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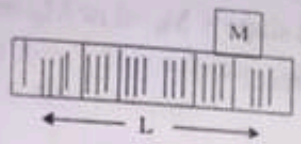
Comparing to $y = MX + C$

Slope $s = 4\pi$ or $g = 4\pi$, $g = 4\pi$,

intercept, $C = 4\pi K^2$ or $k^2 = \frac{C(g)}{4}$

(b) Loaded metre rule : resembling a simple pendulum is it has an addition weight on it.



For Simple pendulum. $T = \frac{2L}{g}$

$T^2 = \frac{4\pi L}{g}$

$\text{Log } T^2 = \log(4\pi L)$

$2 \log T = \log \frac{(4\pi + \log L)}{g}$

$\text{Log } T = \frac{1}{2} \text{Log } L + 1 \log \frac{(4\pi)}{g} + \log 100$

Adding log 100 to both sides

$\text{Log } 100 + \log T = \frac{1}{2} \log \frac{(4\pi)}{g} + \log 100$

$\text{Log } (100T) = \frac{1}{2} \log L + \log 100 \frac{(4\pi)}{g}^{1/2}$

$\text{Log } (100T) = 1 \log L + \log \frac{(200)}{\sqrt{g}}$

Plotting log 100 T against log L.

Slope, $s = \frac{1}{2}$, $C = \log \frac{200}{\sqrt{g}}$

Also $T2 = 4\pi^2 \frac{4(M + M)}{K}$

Or $T^2 = \frac{4}{k} M + \pi^2 \frac{M_2}{k}$

If L = length of pendulum

D = distance between the threads.

From Bifilar relationship, $T = 2 \quad 41L$

$Mg D^2$ or $T2 = 4$

1. When D, the separation between the two vertical threads is constant

$T^2 = 16 \frac{IL}{Mg D^2}$, $T2 = 16 \frac{I(L)}{mgD^2}$

2. When, the length of the vertical thread is kept constant.

(I) $T = 4\pi \frac{IL}{D} \sqrt{\frac{I}{Mg}} = \frac{1}{T} \frac{mg}{4\pi} \sqrt{\frac{(D)}{IL}}$

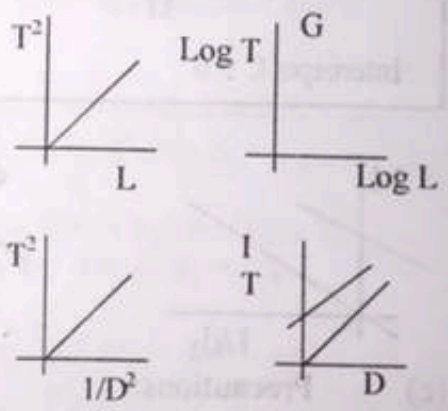
(ii) From $T^2 = \frac{16\pi^2 I}{mgD^2}(L)$,

$\log T^2 = \log \frac{(16\pi^2 I)}{mgD^2}(L)$

$2 \log T = \log \frac{(16\pi^2 I)}{mgD^2} + \log L$

$\text{Log } T = \frac{1}{2} \text{Log } L + \frac{1}{2} \frac{(16\pi^2 I)}{mgD^2}$

$Y = MX + C$



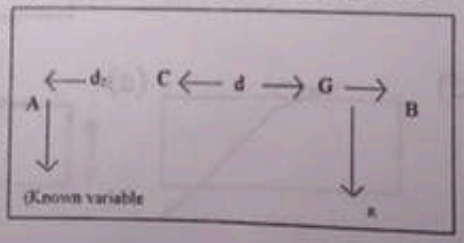
C) ***Precautions:***

i. Using frictionless pulleys

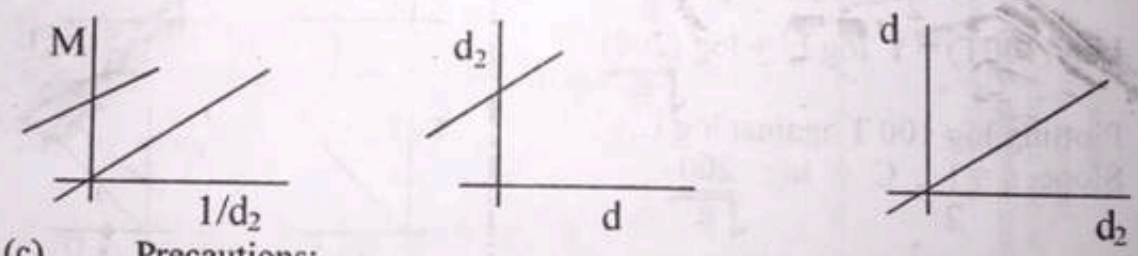
ii. The string rests or the board before drawing

iii. Masses added gently.

[4] ***Equilibrium of parallel forces***



(a) Mass of metre rule from constant mass ? CM = ? AM About the pivot opr knife edge $Wd_2 = W_R \times d$ $d_2 = \frac{W_R (d)}{W}$ Comparing d1 against d to Y = MX + C !slope = W_R or W_R = W (slope) Note: W_R = weight of the metre rule	(b) From $Wd_2 = WR_o$ $W = W_R d\ (1/2_2)$ or $M = M_R - d\ (1/d_2)$ Comparing M against $1/d_2$ to Y = MX C, $M \alpha 1/d$ And slope = $M_R - d$ or M_R = slope, intercept = 0
(c) From $Wd_2 = w_0 d$ or $Md_2 = M_0 d$ $\frac{D_1 m_0 (d)}{m_1}$ Comparing d_2 against d to Y = MX + C αd_1 d and slope = m_0 = M (slope) Intercepts C = 0.	(d) Alternatively from $Wd_2 = W_o d$ pr $Md_2 = m_0 d$ $M = m_0 d$ $M = m_0 d(1)$, $M \alpha 1/d_2$ Comparing M against $1/d_2$ to Y = MCX + C Slope = $M_0 d$ or $M_0 = \frac{slope}{d}$



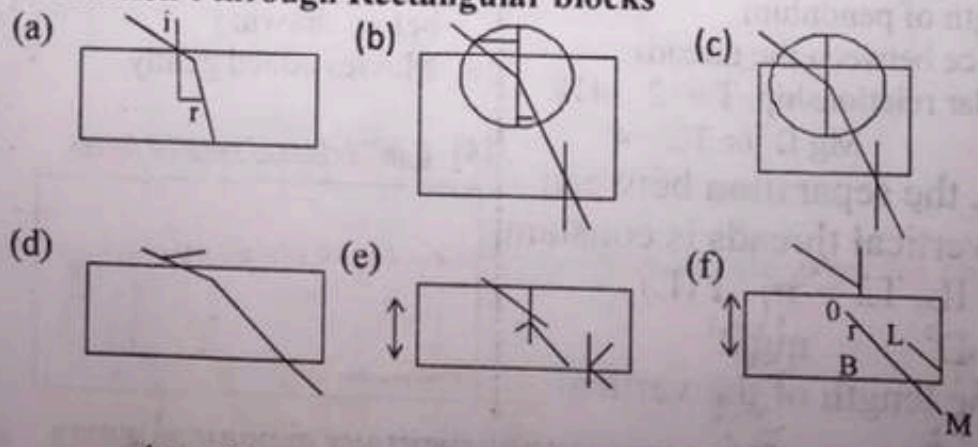
(c) Precautions:

i. USing frictionless pulleys

ii. The string rests or the board before drawing

iii. Masses

Refraction t through Rectangular blocks



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a) (i) $n = \frac{\text{Sin I}}{\text{Sin r}}$

Sin I = n Sin r

plotting Sin I against Sin r,

Slope, s = n = refractive index

(ii) Sin r $\frac{1}{n}$ Sin i

plotting Sin r against Sin i

slope, s = $\frac{1}{n}$

(iii) $n = \frac{\text{Sin I}}{\text{Sin r}}$

Sin*i* = n Sin r

Subtracting Sin r from both sides

Sin*i*Sin r – n Sin r – Sin r

Sin*i* – Sin r = Sin r (n -1)

Sin*i* s- Sin r = n – 1 (Sin r)

Plotting Sin r – Sin r against r,

Slope, s = n – 1 or n = s – 1

(iv) From Sin/ = r

adding Sin r to both sides

Sin*i* + Sin r = Sin r + Sin r

Sin*i* + Sin r = Sin r (n + 1)

Sin*i* + Sin r = n + 1 (Sin r)

(v) From Sin i = Sin r

multiply both sides by Sin I

(Sin i) Sin I = n (Sin r) Sin I

Sin^2 I = n Sin I Sin r

Plotting Sin^2 I against Sin I Sin r

Slope, s = n

(vi) from Sin I = n Sin r

multiply both sides by Sin r

Sin I Sin r = n (Sin r) (Sin i)

Sin I Sin r = n Sin^2r

Sin^2r = $\frac{1}{N}$ (Sin I Sin r)

plotting Sin^2 I against Sin I Sin r,

Slope, s = $\frac{1}{n}$

(b) Sin I = AB, Sin r = CD/ OD

Sin r = AB/OD = AB - O

Sin I CD/OD OA CD

n = Sin I = $\frac{\text{AB}}{\text{Sin r}}$ as OA = OD (radius of a circle) CD

n = $\frac{\text{AB}}{\text{CD}}$, AB = n (CD)

Plotting AB against CD, slope , s = n

(c) OMN = I (corresponding angles)

ODN = r (alternate angles)

Sin i = ON/OM in he glass

Sin r = ON/OD

n - $\frac{\text{Sin I}}{\text{Sin r}}$ = $\frac{\text{ON/OM}}{\text{ON/OD}}$ = $\frac{\text{ON x OD}}{\text{OM ON}}$ = $\frac{\text{OD}}{\text{OM}}$

OD = n (OM), plotting OD against OM,

slope, s = n

(d) <POQ = < VSU (for symmetry)

< POQ = 90 – Y (angles in quadrant is 90^{0})

< OST = X (alternate angles)

ng = $\frac{\text{Sin}^{\circ}(90 - \text{Y})}{\text{Sin X}}$ = $\frac{\text{Cos Y}}{\text{Sin X}}$

Sin X = $\frac{\text{Cos Y}}{\text{N}}$, Sin X = 1 $\frac{\text{(Cos Y)}}{}$

Plotting Sin X against Cos Y,

Slope, s = $1/n_g$ or $n_g = 1/s$

(e) NCM = I (I = e)

By Sine rie

$\frac{\text{DC}}{\text{Sin r}}$ = $\frac{\text{BC}}{\text{Sin (180 – (r + d)}}$

DC = $\frac{\text{Sin r}}{\text{Sin (180 – r + d)}}$ (BC)

DC = $\frac{\text{Sin r}}{\text{Sin (r + d)}}$

(BC) as in 180 - = Sin

DC = n_g (BC)

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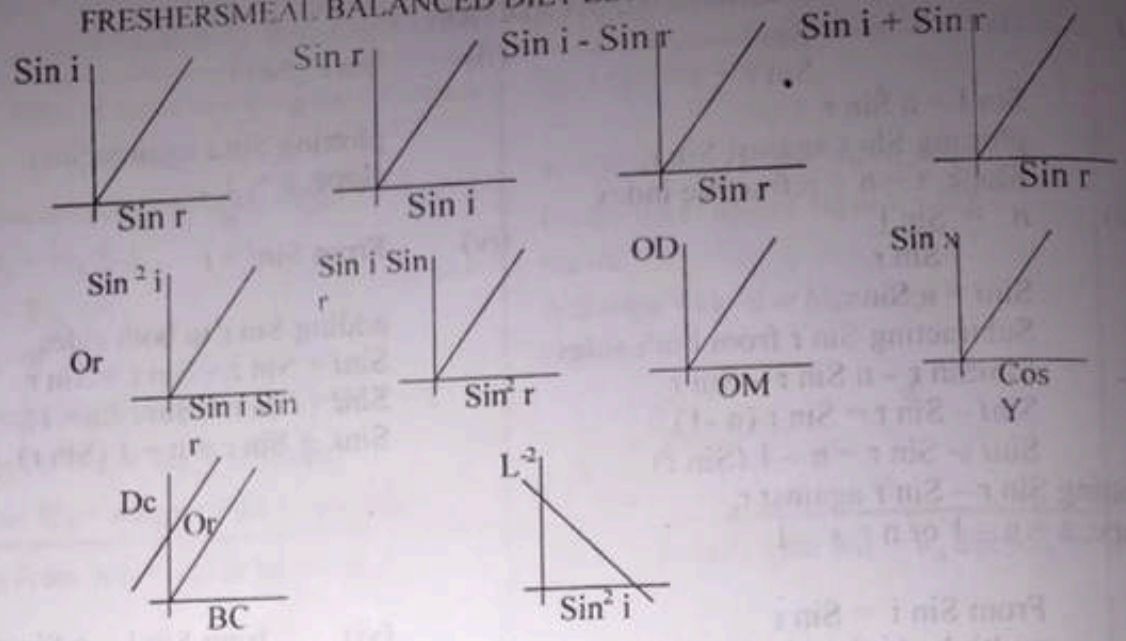

Other importance notes on Rectangular block

(I) i = (symmetrical property)

(ii) i = r + d or d = i - r (vert. opp angles)

(iii) i r (i - r) or d

i(v) Sin i Sin r Sin (i - r)

Refraction through Triangular block

1. d and i

$d = i - r_1 + e - r_2$

$d = (i + e) - (r_1 + r_2)$

As d and i + e can be combined in the form

Y = MX + C rather than d and i only, a linear relationship does not exist for d and i

2. e and i

from $d = i - r + e - r_2$

$e = i + r_1 + r_2 - d$

As e does not depend on i only in the equation, but also on variables like r_1, r_2 and d linear relationship does not exist between e and i

Thus, the common graph of these relationship is as shown below.

3. d - e and i

from $d = i - r_1 + e - r_2$

$d - e = 1\,(i) - (r_1 + r_2)$

comparing to Y = MX + C,

Slope, is positive, intercept is positive

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HEAT AND TEMPERATURE

(N.B) For Phs 101 and Phs 105

A thermometer, which was not accurately calibrated, indicated 0.5% at the lover fixed point and 106 at the upper fixed point. What is the time temperature when the thermometer registers 63.4c?

[a] 166.7°C [b] 59.6°C [c] 16.7°C [d]160.7°C [e] 69°C

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2. An ideal gas at 170c has a pressure 0f 760mmHg and is compressed (I) Isothermally (II) Adiabatically until its volume is halved in each reversibly ($Cp = 2100, Cv = 1500Jkd^{-1}k^{-1}$)
[a] 360mmHg [b] 1820mmHg [c] 760mmHg
[d] 2010mmHg [e] 190mmHg

3. In case (I) the final temperature
[a] 17°C [b] 110°C [c] -17°C [d] -11°C [e] 34°C

4. In case (II) the final pressure
[a] 380mmHg [b] 1520mmHg [c] 760mmHg
[d] 2010mmHg [e] 190mmHg

5. In case (II) the final temperature
[a] 17°C [b] 11°C [c] -17°C

[a] 120 [b] -40 [c] 573.25 [d] 40 [e] 30

6. The absolute zero is scale equivalent to
[a] -273.15c [b] -273.25 [c] -273.15K [d] -273.15K

7. The temperature at which standard water vapour, pure water and ice are all in equilibrium is
[a] 272.16k [b] 273.16K [c] 273K [d] 273°c [e] 273°F

8. If a house thermostat is set to 70F, what is the temperature in Celsius scale?
[a] 23°C [b] 20°C [c] 25°C [d] 27°C [e] 273°C

9. At temperature are the Fahrenheit and Celsius scalars equal
[a] 40 [b] -40 [c] -30 [d] 30 [e] 25

10. Absolute zero temperature can be define as the temperature
[a] At which the average kinetic energy of particles making up a body is zero
[b] At which pure water changes to ice at standard atmosphere pressure
[c] Of zero degree on the Celsius scale
[d] At which pure water and steam co-exist

11. A temperature of 20°c is the same as
[a] 36F [b] 68F [c] 11.1F [d] 43.1F [e] 25F

12. The length of mercury thread when it is at O°c, 100°cand at an unknown temperature O is 25mm, 225mm and 175mm respectively. The value of O is
[a] 85.0°C [b] 88.0°C [c] 75.0°C [d] 70.0°C

13. The lower fixed point of a finally thermometer reads $2^{0}c$ while the upper fixed point is $100^{0}c$. What is the true temperature when the thermometer reads $51^{0}c$?

[a] $52^{0}C$ [b] $50^{0}C$ [c] $49^{0}C$ [d] $46^{0}C$

14. The pressure on the gas of a constant volume gas thermometer at the ice point is 352mm of mercury and at steam point 815mm of mercury. Find the temperature when the pressure of the gas is 490mm of mercury

[a] 30K [b] 243K [c] 300K [d] 303k

15. The resistance of a platinum wire at the ice and steam points are 0.75 and 1.05 respectively. Determine the temperature at which the resistance of the wire is 0.90

[a] $43.0^{0}C$ [b] $50.0^{0}C$ [c] $69.0^{0}C$ [d] $87.0^{0}C$

ANSWERS TO HEAT AND TEMPERATURE

1.	Option B	2.	Option C	3.	Option A
4.	Option A	5.	Option E	6.	Option A
7.	Option E	8.	Option C	9.	Option E
10.	Option C	11.	Option A	12.	Option E
13.	Option D	14.	Option C	15.	Option C

PHS 105

Course Synopsis

Linear motion, motion in a circle and simple harmonic motion, Gravitation, static and hydrostatics , Elasticity. Friction. Viscosity and surface tension. Heat, temperature and thermometers Expansion of solids. Liquids and Gases. The Gas laws, change of state. Kinetic theory of matter Heat transfer.

Linear Motion

1. Which of the following statements is true of a body which is moving in a straight line with uniform acceleration? The velocity of the body.
   [a] Is also uniform
   [b] Must always be zero when the body stops accelerating
   [c] will increase with time in the direction of the acceleration
   [d] is equal to the quotient of distance travelled and time
   [e] is the product of the distance travelled and time.
2. A body starts from rest and moves with constant acceleration. Which of the following quantities varies/vary linearly with the square of the time?
   [i] Velocity [ii] Displacement [iii] Momentum
   [a] I only [b] ii only [c] iii only
   [d] I and ii only [e] ii and iii only
3. A train has an initial velocity of 44 m/s and an acceleration of $-4m/s^2$. Its velocity after 10 seconds is.
   [a] 2 m/s [b] 4 m/s [c] 8 m/s
   [d] 12 m/s [e] 16 m/s
4. A body accelerates uniformly from the rest at $2ms^{-2}$ calculate its velocity after travelling 9m.
   [a] $36ms^{-1}$ [b] $18ms^{-1}$ [c] $6ms^{-1}$
   [d] $4.50ms^{-1}$ [e] $4.24ms^{-1}$
5. A body starts from rest and moves in a straight path with uniform acceleration of $8ms^{-2}$ for 5 seconds it then decelerates the magnitude of its acceleration
   [a] $80ms^{-2}$ [b] $16,s^{-2}$ [c] 8 m/s
   [d] $4 m/s^{-2}$ [e] $3 ms^{-2}$
6. A body falls from rest to the ground in 0.5s. calculate the height from which it falls.
   [a] 0.125 [b] 0.5m [c] 1.0m [d] 1.25 [e] 5.0m
7. A motor vehicle is brought to rest from a speed of 15 m/s in 2-s. calculate the retardation
   [a] $0.75 m/s^2$ [b] $1.33 m/s^2$ [c] $5 m/s^2$ [d] $7.50 m/s^2$
8. A body moving with a velocity of $4ms^{-1}$ is bought to rest by a constant force travelling 20m. Calculate the retaliation
   [a] $0.1ms^{-2}$ [b] $0.2 ms^{-2}$ [c] $0.4ms^{-2}$ [d] $2.5ms^{-2}$ [e] $5 ms^{-2}$
9. A body which is uniformly retarded comes to rest in 10s after travelling a distance of 20m. Calculate its initial velocity

[a] $0.5ms^{-1}$ [b] $2ms^{-1}$ [c] $4ms^{-1}$
[d] $20ms^{-1}$ [e] $200ms^{-1}$

10. A car travelling at $20ms^{-1}$ is brought to rest with a constant declaration of $10ms^{-2}$ calculate the distance travelled.
[a] 10m [b] 20m [c] 200m [d] 400m

11. A car moving with a speed of 90km/her was brought uniformly to rest by the application of the brakes in 10s. How far did the car travel after the brakes were applied?
[a] 125m [b] 150m [c] 250m [d] 15km

12. Two particles X and Y starting from rest cover the same distance. The acceleration of x is twice that of Y. The Ratio of the time taken by X is that taken by y is
[a] ½ [b] 2 [c] $1\sqrt{2}$ [d] $\sqrt{2}$ [e] 4

13. The driver in a motor car of which the total mass is 800kg and which is travelling at 29m/s. Suddenly observes a stationary dog in his path 50m ahead. If the car brakes can exert a force of 2000N, what will most likely happen.
[a] The car will be able to stop immediately the driver notices the dog.
[b] The car will stop 30m after hitting the dog.
[c] The car will stop 20m in front of the dog.
[d] The driver will quickly reverse the car.
[e] The car will stop 5m beyond the dog.

14. If a car starts from rest and moves with a uniform acceleration of $10m/s^2$ for ten seconds, the distance it covers in the last one second of its motion is
[a] 95m [b] 100m [c] 500m [d] 905m [e] 100m

15. A body starts from rest and moves with uniform acceleration of $6m/s^2$. What distance does it cover in the third several?
[a] 15m [b] 18m [c] 27m [d] 30m

Answers to linear Motion

1. Option c
For accelerating motion v = u + at, s = ½at2, v2 = u2 + 2as
Thus v α t or v2 α s. hence, velocity increases with time

2. Option B
For a body that starts from rest, v = at, s = ½ at2, v2 = 2as
Thus v α t, s α t2

3. Option B
U = 44m/s, a = $-4m/s^2$, t = 10s
Fro acceleration motion, v = n + at i.e v = 4m/s

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4. Option C
From rest $U = O$, $a = 2ms^{-2}$, $S = 9m$
$V = at$, $s = ½ at 2$, $v^2 = 2x2x9 = 36$
$V = 6ms^{-1}$

5. Option D
Starting from rest, $u = O$, $a = 8ms^{-2}$, $t = 5s$
Using $V = at = 8 \times 5 = 40$ m/s
Decelerating to rest means from the final or maximum velocity reached during the accelerating stage.
Hence, $U = 40$ m/s, $t = 10s$
Also $u = at$, $s = ½ at^2$, $u^2 = 2es$

6. Option D
Falling from the rest is an example of accelerating motion under gravity.
$T = 0.5s$, $g = 10ms^{-2}$
$H = ½ gt^2 = ½ \times 10 \times 0.5^2 = 5 (0.25)$
$= 1.25m$

7. Option A
$U = 15m/s$, $t = 20s$
For a restoring motion to rest
$U = at$, $a = {}^{U}/_{t} = {}^{15}/_{20} = 0.75m/s^2$

8. Option C
$U = 4ms^{-1}$, $s = 20m$
Using $u^2 = 2as$, $a = \frac{u^2}{2s} = \frac{4^2}{2x20} = \frac{16}{40}$
$A = 0.4ms^{-2}$

9. Option C
$T = 10s$, $s = 20m$
From $u^2 = 2as$
$U = \frac{2s}{T} = \frac{2x\ 20}{10} = 4ms^{-1}$

10. Option B
$U = 20m/s$, $a = 10m/s^2$
$S = \frac{U^2}{2a} = \frac{400}{20} = 20m$

11. Option A
$U = 90km/hr = 90 \times \frac{10}{36} = \frac{150}{6} = 25m/s$
$V = 0$
Using $s = ½ at^2 = ½ \times {}^{v}/_{t} \times t^2 = ½ ut$
$S = ½ \times 25 \times 10 = 125m$

12. Option C
Acceleration from rest,
$V = at$, $s = ½ at^2$, $V^2 = 2as$

$a_x = 2ay$, $s_x = s_y$, $\frac{1}{2}(2ay)t_x = \frac{1}{2}a_y t^2$

$2t^2_x = t^2y$, $(t_x)^2 = \frac{1}{2}(ty^2)$

$\frac{Tx}{Ty} = \frac{1}{2}$

13. Option B

U = 20 m/s, m = 800kg F = 2000H

As the car retains to rest on applying the brakes, the motion is uniform retardation to rest.

Hence $U^2 = 2as$, $s = \frac{u^2}{2a}$

Also $F = m.a = \frac{f}{m}$

Distance travelled before coming to rest,

$S = \frac{u^2}{2f/m} = \frac{u^2m}{2f} = \frac{20^2 \times 800}{2 \times 2000} = 80m$

As this distance is greater the sighting distance, the car will stop 30m after hitting the dog.

14. The last one second means between the 9th and 10th second

$S = \frac{1}{2}at^2 = \frac{1}{2}at^2_1 \frac{1}{2}a(t_1^2 - t_2^2)$

$S = \frac{1}{2} \times 10(10^2 - 9^2) = 95m$

15. Option A

For uniform acceleration from part U= 0

In the third second means between the 3rd and 2nd Hence

$S = \frac{1}{2}at_1^2 - \frac{1}{2}at2 = \frac{1}{2} \times 6(3^2 - 2^2) = 15m$

Circular Motion

1. An object moving in a circle has an acceleration towards its centre. This is provided by

[a] A change of momentum [b] A centripetal force
[c] A centrifugal force [d] Newton's force of gravitation
[e] An acceleration due to gravity

Option B

Movement of and object in a circle with an acceleration towards its centre is provided by change in velocity and centripetal force

- a $\alpha \Delta v \alpha$. F

2. Which of the following statements is/are correct about a car moving round a circular track at a uniform speed?

I. Its velocity is uniform
II. It undergoes an acceleration
III. The friction between its tyres and the ground provides the necessary centripetal force.

[a] I only [b] II only [c] III only
[d] II & III only [e] I, II & III

Option D

Speed is constant or uniform while velocity is variable for circular motion
Circular motion has an acceleration despite the constant speed.
The centripetal force is balanced by the frictional force between the types of the car and the ground

3. I. Its velocity is constant
II. No work is done on the body
III. It has constant acceleration direct away from the centre.
IV. The centripetal force is directed towards the centre.
Which combination of the above is true of a body moving with constant speed in a circular track?
[a] II and IV [b] I and IV [c] II and III [d] I and III

Option A

Speed is constant, not the velocity
Magnitude of acceleration is constant not entire acceleration.
Acceleration and centripetal force are directed towards the centre.
No work is done as the body moves about a fixed point i.e no distance.

4. The momentum of a car moving at constant speed in a circular track
[a] Can be both positive and negative
[b] Can be zero depending on its position in the track
[c] Is constantly changing in magnitude
[d] Is constantly changing in direction

Option D

Momentum is a product of mass and velocity
Mass does not change between places or with time.
Velocity of circular motion is constant in magnitude and varies in direction.

5. Which of the following is true of a particle moving in a horizontal circle with constant angular velocity?
[a] The energy is constant bu the linear momentum varies
[b] The linear momentum is constant but the energy varies
[c] Both energy and linear momentum are constant
[d] The speed and the linear velocity are both constant

Option A

Angular velocity is also called angular speed
Circular motion is characterized by constant speed, acceleration, force and energy.
It also has varying direction, velocity, linear momentum and angular displacement.

6. The force responsible for holding the moon is orbit around the earth against the gravitational pull of the earth is

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[a] Centrifugal [b] Rotational
[c] Reaction [d] Centripetal
[e] Tractional

Option D

The force responsible for holding the moon in orbit is the same as the force the keeps the moon in a circular motion round the earth. This is called centripetal.

7. An object of mass 2kg moves in a circular path of radius 0.5m with a speed of $1ms^{-1}$. What is its angular velocity?

[a] $8\ rads^{-1}$ [b] $4\ rads_{-1}$ [c] $2\ rad^{-1}$ [d] $1\ rad^{-1}$

Option C

M = 2kg, r = 0.5m, v = $1ms^{-1}$

V = or . $O = \frac{v}{R} = \frac{1}{0.5} = 2\ rads^{-1} = C$

8. The length of the seconds hand of a laboratory clock is 0. Im. Calculate the speed at the tip of the seconds hand.

[a] $1.05 \times 10^{-2}\ ms^{-1}$ [b] $1.85 \times 10^{-4}\ ms^{-1}$
[c] $9.50 \times 10^{-1}\ ms^{-1}$ [d] $5.25 \times 10^{-3}\ ms^{-1}$

Option A

Length of seconds hand = r = 0 1m

But the seconds hand rotate through 360^0 or 2π rad in 60s

Thus $w = \frac{\theta}{T} = \frac{2\pi}{60}$

Velocity of the tip of the hand.

$V = wr = \frac{2\pi}{60} \times 0.1 = \frac{2\pi}{600} = \frac{\pi}{300}$

$V = \frac{3.142}{300} = 0.01047$

$V = 1.05 \times 10^{-2}\ ms^{-1} = A$

9. A particle moves in a circular orbit of radius 0.02m. If the speed of the particles is $0.88ms^{-1}$ calculate its frequency in cycles per second.

[a] 2.0 [b] 8.8 [c] 7.0 [d] 17.0 [e] 17.6

Option C

R = 0.02m . v = $0.88ms^{-1}$

V = or = $2\pi f)r$

$F = \frac{V}{2\pi} = \frac{0.88}{2 \times 0.22} = \frac{22}{\pi} = \frac{22 \times 7}{22}$

F = 7 cycles/s = C

10. The force required to make an object of mass. M. travelling with velocity. V. turn in a circle of radius r is.

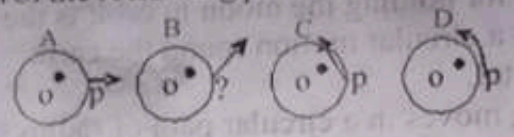
[a] $\frac{mv^2}{R}$ [b] $\frac{mr^2}{v}$ [c] $\frac{mr}{v}$ [d] $\frac{mv}{r^2}$ [e] $\frac{mv}{R}$

Option A

F = ma : acceleration for a circular motion $= \frac{v^2}{R}$

Therefore, $f = ma = mv^2 = A$

11. A ball attached to one end of a string moves anticlockwise around a circle whose centre is O. If the string sudden breaks when the ball is at the point P. along which of the following path will it move?



Option B

The string will move along the tangent to the curve when it breaks

12. A stone tied to a string is made to revolve in a horizontal circle of radius 4m with an angular speed 0f 2 rad/s. With what tangential velocity will the stone move off the circle if the string cuts?

[a] $16.0ms^{-1}$ [b] $8.0ms^{-1}$ [c] $6.0ms^{-1}$ [d] $2.0ms^{-1}$ [e] $0.5ms^{-1}$

Option B

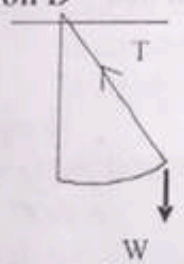
R = 4m, O = 2 rad/s

V = or = 2 x 4 = $8ms^{-1}$ = B

13. An object of mass 6kg is whirled round a horizontal circle of radius 3m by a revolving string inclined to the vertical. Calculate the tension in the string if the uniform speed of the object is 9m/s (assume $g = 19m/s^2$)

[a] 27N [b] 54N [c] 162 [d] 173N

Option D



$T\cos\theta = w = mg$

$T\sin\theta = mv^2/r$

$\frac{T\sin\theta}{R\cos\theta} = \tan\theta = \frac{mv^2/r}{mg} = \frac{v^2}{gr}$

Also, $(T\cos\theta)^2 + (T\sin\theta)^2 = (mg)^2 + (ma)^2$

$T^2\cos^2\theta + T^2\sin^2\theta = m^2g^2 + m^2a^2$

$T^2(\cos^2\theta + \sin^2\theta = m^2(g^2 + a^2)$

$T^2 = m^2(g^2 + a^2$ as $\cos^2\theta + \sin^2\theta = 1$

$T = m\ (g^2 + a^2)$

$g = 10m/s^2$, $a = v^2/r = 9^2/3 = 81/3 = 27m/s^2$

$T = 6\sqrt{(10^2 + 27^2)} = 6\sqrt{(100 + 729)} = 6\sqrt{829}$

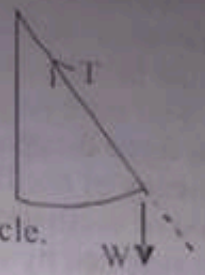
T = 173N

General, $T = m\ g^2 + a^2)$ for horizontal circle

14. An object if mas 15kg is whirled round in a vertical circle of radius 3m with a constant speed of 4.5m/s. Find the maximum tension in the string ($g = 10m/s^2$)

[a] 101.3M [b] 179.5N [c] 202.5N [d] 251.3N

Solution



Generally, T m (g+a) for vertical circle.

15. A stone is tied on one end of a light string and whirled in a vertical circle. The tension in the string is at maximum when the
[a] Stone is at the top of the circular path
[b] Stone is at the bottom of the circular path
[c] String lies in a horizontal direction
[d] Stone is at any other along the path

Option B

Tension is maximum when

Simple Harmonic (SHM)

1. The motion of a body is simple harmonic if the
[a] Acceleration is always directed towards a fixed point
[b] Path of motion is a straight line
[c] Acceleration is directed towards a fixed point and proportional to its distance from the point.
[d] Acceleration is proportional to the square of the distance from a fixed point
[e] Acceleration is constant and directed towards a fixed point.

Option C

In SHM, acceleration id directed towards a fixed point like circular motion.

Also, the acceleration is proportional to the displacement of distance from the fixed point unlike circular motion.

2. A particle executing a simple harmonic motion has a frequency of 5Hz and an amplitude of 8.9×10^{3}m. Calculate the maximum velocity of its motion.
[a] $2.51\ ms^{-1}$ [b] $2.20\ ms^{-1}$ [c] $2.00ms^{-1}$ [d] $1.50\ ms^{-1}$

Option A

F = 50Hz, a = 8×10^{-3}m = 0.008m

$V = \pm w\ (a^2 - x^2)$

C is maximum when x = 0

$V\,max = wa = (2f)a = (2 \times 3.142 \times 50) \times \frac{8}{1000}$

$Vmax = 314.2 \times \frac{8}{1000} = \frac{2513.6}{1000} = 2.51\ ms^{-1}$

3. A vibrating diving board has a frequency of 20Hz. What is the angular velocity of the board?
[a] $2\pi rad\ s^{-1}$ [b] $20\pi rad\ s^{-1}$ [c] $30\pi rad\ s^{-1}$ [d] $40\pi rad\ s^{-1}$

Option D

Angular velocity O = $2\pi f$

$O = 2\pi\ (20) = 40\pi rad\ s^{-1} = D$

4. The amplitude of the motion of a body performing simple harmonic motion decreases with time because.
   [a] Frictional force dissipate the energy of motion
   [b] The frequency of oscillation varies with time
   [c] The period of oscillation varies with time
   [d] Energy is supplied by some external agencies.

Option A

All vibratory processes are subject to energy losses due to friction. Energy los in pendulum is due to the viscosity of air

$a \alpha \frac{1}{t}$ and energy, $E \alpha a^2$

5. Which of the following processes will increase thee rate of oscillation of a pendulum?
   [a] Increasing the length of the pendulum
   [b] Decreasing the length of pendulum
   [c] Increasing the mass of the pendulum
   [d] Decreasing the mass of the pendulum
   [e] decreasing the amplitude of oscillation of the pendulum.

Option B

Rate of oscillation means no. of oscillation in a unit time i.e the frequency.

$- T = \pi\frac{L}{g}, \quad f = \frac{1}{T} = \sqrt{\frac{1\ g}{2\pi}}, \quad \frac{f\alpha}{L}\ \frac{1}{L}$

Increasing f means decreasing L as they are inversely related.

6. Which of the following will reduce the frequency of oscillation of a simple pendulum?
   [a] Increasing the mass of the bob
   [b] Decreasing the mass of the bob
   [c] Increasing the length of the string
   [d] Decreasing the length of the string
   [e] Decreasing the amplitude of oscillation

Option C

$F = \sqrt{\frac{/g}{2\pi L}}$ or $f \frac{\alpha 1}{L}$

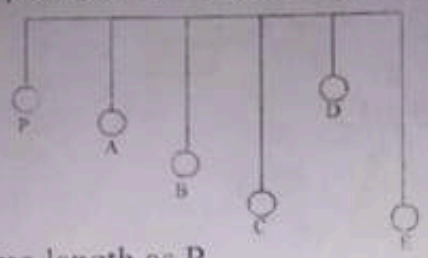
Reducing frequency means increasing the length

7. Which of the of the following affects the period of a simple pendulum?
   I. Mass of the pendulum bob II. Length of the pendulum III. Acceleration due to gravity
   [a] I, II & III [b] II & III only
   [c] I and III only [d] I and II only

Option B

$T = 2\pi\sqrt{(//g)}$ hence the factors that can affect the period of a simple pendulum are length and acceleration due to gravity.

8. The diagram below represents a system of simple pendula of different lengths . If P is set into oscillation while others are forced by it to oscillate, which of the pendula will resonate with P?



Option D

D has the same length as P

The same length indicates the same natural frequency

$$F = \sqrt{\frac{1g}{2\pi l}}$$

All pendula oscillate with small swings except D

D oscillate with large swing due to resonant vibration.

9. A student found out from a simple pendulum experiment that 20 oscillations were completed in 38 seconds. What is the period of oscillation of the pendulum?

[a] 8.0s [b] 3.8s [c]2.0s [d] 1.9s [e] 0.5s

Option D

Period = time taken for 1 complete oscillate

$$T = \frac{\text{total time taken}}{\text{Number of oscillation}} = \frac{38}{20} = \frac{19}{10} = 1.9s$$

10. A boy times 30 oscillations of a certain pendulum thrown and obtained 1min 10s, 1min 12s and 1min 7s respectively. The mean period of oscillation of the pendulum is

[a] 0.14 [b] 0.43s [c] 2.32s [d] 6.97s

Option C

$$\text{Period} = \frac{1}{N}$$

$$\text{Period are: } \frac{1\text{min } 10s}{30}, \frac{1\text{min } 12s}{30} \text{ and } \frac{1\text{min}7s}{30}$$

$$\text{Periods are } \frac{(60+10)s}{30}, \frac{(60+12)s}{30}, \frac{(60+7)s}{30}$$

$$\text{Periods are, } \frac{70}{30}, \frac{72}{30} \text{ and } \frac{67}{30}$$

$$\text{Mean period} = (70/30 + 72/30 + 67/30)/3$$

$$= \frac{1}{3}(70/30 + 72/30 + 67/30)$$

$$\text{Mean period } \frac{1}{3}\frac{(70+72+67)}{30}$$

$$= \frac{209}{90} = 2.32s = C$$

11. A simple pendulum 0.6m long. Has a period of 1.5s. What is the period of a similar pendulum 0.4m long in the same location?

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Option A

[a] $1.5\sqrt{(2/3)}s$ [b] $1.5\sqrt{(3/2)}s$ [c] 2.25s

[d] 1.00s [e] 2.00s

$T = 2\pi\sqrt{\frac{l}{g}}$, $T^2 = 4\pi^2\frac{l}{g}$, $\frac{T^2}{l} = k$

$\frac{1.5^2}{0.6} = \frac{T^2}{0.4}$, $T^2 = \frac{0.4 \times 1.5^2}{0.6}$

$T^2 = \frac{4}{6}(1.5)^2 = \frac{2}{3}(1.5^2)$

$T = \frac{2}{3}(1.5^2) = 1.5\frac{2}{3}s$

12. A simple pendulum with a period of 2.0s as its length doubled. Its new period is

[a] 1.00s [b] 1.41s [c] 2.83s [d] 4.00s

Option D

$\frac{T^2}{l} = k$, $\frac{2^2}{l} = \frac{T^2}{2l}$, $T^2 = \frac{2l}{l}(2)^2 = 8$

$T = \sqrt{8} = 2.83s = D$

13. Two simple pendula x and y make 40c and 500 oscillations respectively in equal time. If the period of oscillation is x is 1.5s, what is the period of oscillation of y?

[a] 0.53s [b] 0.83s [c] 1.20s [d] 1.50s [e] 1.88s

Option C

$N_x = 40$ osc, $a_y = 500$ osc, $T_x = 1.5s$, $T_y = ?$

Using $T = \frac{t}{n}$ and with $t = k$,

$T_x = k$ or $T_1 n_1 = T_2 n_2$, $\therefore 1.5 \times 400 = t_y \times 500$

$T_y = \frac{1.5 \times 400}{500} = 1.20 = C$

14. Which of the following assumptions is made in a simple pendulum experiment? The

[a] Suspending string is inextensible

[b] bob has a finite size [c] bob has a definite mass

[d] Initial angle of oscillation must be large.

The assumption made in simple pendulum are

i. The string is inextensible

ii. The initial angle of oscillation is small

15. The length of a displaced pendulum bob which passes its lowest point twice every second is

[a] 0.25m [b] 0.45m [c] 0.58m [d] 1.0m

Taking ($g = 10\ m/s^2$)

Option A

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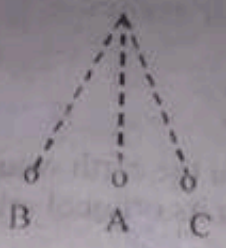
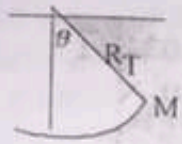


A complete oscillation of a pendulum is used when a body passes from B to C and C to B i.e passing through the lowest point twice.
Hence, time taken to pass through is period.

$T = 1s = 2\pi \sqrt{\frac{l}{G}}$

$l^2 = 4\pi^2 \frac{l}{g}$ $l = \frac{g}{4\pi^2} = \frac{10}{4\pi^2} = 0.25m$

16.



A simple pendulum of mass m moves along an arc of a circle radius R in a vertical plane as shown in the figure

What is the workdone by gravity in a downward swing through the angle θ to 0^0

[a] mgR sin θ [b] mgR (1 - cos θ)
[c] mgR [d] mgR (1 - sinθ)

Option B

GRAVITATIONAL FIELD

1. Which of the following are contact forces
I. Force of tension II. Force of friction
III. Magnetic force IV. Force of reaction
[a] I, II & III only [b] I, II & IV only
[c] I, III & IV only [d] II, III & IV only
[e] I & IV only

Option B

Contact forces include tension, reaction friction, up thrust etc.
Non contact forces are force fields. These are gravitational, magnetic and electric forces.

2. Which of the following statements is true of law of universal gravitation?
[a] Any two bodies attract each other with a force which is proportional to the difference in their masses.
[b] Any two bodies attract each other with a force which is inversely proportional to the square of the distance between them.
[c] Any two bodies attract each other with a force which is proportional to the product of their masses and inversely proportional to the square of the distance between them.
[d] Any two bodies attract each other with a force whish is directly proportional to the square of the distance between them.
[e] Any two bodies attract each other with a force which is

proportional to the sum of their masses.

Option C

$F \alpha \frac{M_1 M_2}{d_2}$ or $F \alpha \frac{Mm}{r_2}$

3. If the attract of the sun suddenly ceased the earth would continue to move in a straight line making a tangent with its original orbit. This statement is derived from Newton's

[a] First law of motion [b] Second law of motion
[c] third law of motion [d] Law of universal gravitation

Option A

4. Given that the gravitational constant is $7 \times 10^{-11} Nm^2 kg^{-2}$ what is the force of attraction between 10^6kg mass of copper hanging one metre away from a 10^3kg mass of iron

[a] 7×10^{-20} N [b] 7×10^{-8} N
[c] 7×10^{-2}N [d] 7×10^{1} N [e] 7×10^{8}N

Option C

$F \alpha \frac{M_1 M_2}{D_2}$, $F = \frac{GM_1 M_2}{d_2}$

$G = 7 \times 10^{-11} Nm^2 kg^{-2}$

$F = \frac{7 \times 10^{-11} \times 10^6 \times 10^3}{1^2} = 7 \times 10^{-2} N = C$

5. A planet has mass m_1 and is at a distance r_1 from the sun. A second planet has mass $m_2 = 10m_1$ and is at a distance of $r_2 = 2r_2$ from the sun. Determine the ratio of the gravitational forces experienced by the planets.

Option B

Between m_1 and sun. $F_1 = \frac{GMm_1}{r_1^2}$

between m_2 and sun, $F_2 = \frac{GM(10m_1)}{(2r_1)^2}$

$= \frac{10GMm_1}{4r_1^2}$

Ratio of forces experienced $= \frac{F_1}{F_2}$

$\frac{F_1}{F_2} = \frac{GMm_1}{r_1^2} \times \frac{4r_1^2}{10GMm_1} = 2 : 5 = B$

6. A skylab is moving in a circular orbit of radius R_o round the centre of the earth of radius R. An Astronaut inside feels weightless because

I. the reaction of the floor on him is less than his weight
II. the reaction of the floor is zero
III. the centripetal force on him is mg^1 where m is his mass and g^1 is given by $\frac{g^1}{G} = \frac{R^2}{R_0^2}$

Where g is the acceleration due to gravity at the earth's surface.

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[a] I, II, III [b] I, III [c] II, III
[d] I only [e] III only

Option C

For weightlessness,

I. the reaction must be zero

II. the centripetal force required by the moving body is provided by the gravitational attraction i.e $F_c = F_g$ e.g earth moving round the sun (between earth and sun), moon moving round the earth (between earth and moon) and a spacecraft (with an astronaut) in orbit round the earth.

$F_c = F_g$ (earth)

$M \bar{G}^2 r = mg = \frac{GMm}{d^2}$

7. An astronaut experiences weightlessness in space when he
[a] does not hold anything while in space
[b] Is midway between the sun and the earth
[c] is free from the earth's gravitational field
[d] is walking on the moon

Option C

Weightlessness occurs due to decreased force of attraction or acceleration in space or at a great height above the earth

8. Two bodies have masses in the ratio experience forces which impact accelerations in the ratio 2:9 respectively. Find the ratio of the forces the masses experience.
[a] 1:4 [b] 2:1 [c] 2:3 [d] 2:5

Option C

$M_1 : m_2 = 3:1$ or $\frac{m_1}{M_2} = \frac{3}{1}$

$g_1 \; g_2 = 2:9 \; \frac{g_1}{g_2} = \frac{2}{9}$

Ratio of forces $= \frac{f_1}{F_2} = \frac{m_1 g_1}{m_2 g_2} = \frac{3}{1} \; \frac{2}{9} = \frac{2}{3}$

Ratio of Forces 2 : 3

9. An astronaut ha s mass of 100kg on the earth's surface where the acceleration due to gravity is $10m/d^2$. What would be his mass on the surface of another planet where acceleration due to gravity is one half of earth's value
[a] 100kg [b] 75kg [c] 50kg [d] 20kg [e] 10kg

Option A

$M_1 = 100kg$, g_1 $10m/s^2$, $m_2 = ?$

$G_2 = ½ (10) = 5 m/s^2$

$M_2 = m_1 = 100kg$ as mass does not change from one place to the other but the weight.

10. A satellite of mass 1000kg orbits the earth as a height of $4 \times 10^7 m$ above the earth's centre calculate the gravitational force on the satellite.

No Option

Alternative Method

$G_1 = 9.8\ m/s^2$

$W_1 = mg$, $W_1 = 1000 \times 9.8 = 9800\ N$

$d^1 = R = 6400\ km$, $W_2 = ?$

$d^2 = 4 \times 10^7 m$ (from the earth's centre)

$d_2 = 4 \times 10^4 km$

using $w_1 d_1^2 = W_2 d_2^2$, $W_2 = W_1 \frac{d_1^2}{d_2}$

$$W_2 = 9800 \frac{(6400)^2}{(4 \times 10^4)^2} = 9800 \frac{6400^2}{40000}$$

$$W_2 = 9800 \left(\frac{16}{100}\right)^2 = \frac{9800 \times 256}{10000} = 250.88$$

$$= 250.9N$$

11. A missile weighting 400N on the earth's surface is shot into the atmosphere to an altitude of $6.40 \times 10^6 m$, taking the earth as sphere of radius $6.40 \times 10^6 m$ and assuming the inverse square law of universal gravitation, what would be the weight of the missile at that altitude?

[a] 100N [b] 200N [c] 400N [d] 800N [e] 1600N

Option A

$F_1 = 400N$, $d_1 = R = 6.4 \times 10^6 m$, $F_2 = ?$

$d_2 = (6.4 \times 10^6) + (6.4 \times 10^6)$

$d_2 = 12.8 \times 10^6 = 1.28 \times 10^7\ m$

using the inverse square law

12. The force experienced by an object of mass 60.0kg in the earth's gravitational field is $1.002 \times 10^2 N$. What is the intensity of the gravitational field?

[a] $0.60 Nkg^{-1}$ [b] $1.67 Nkg^{-1}$

[c] $6.12 \times 10^2\ Nkg^{-1}$ [d] $9.81 ms^{-2}$

Option B

$F = 1.002 \times 10^2 N$, $M = 60kg$

Gravitational field intensity or strength $= \frac{F}{M}$

Gravitational field intensity $= \frac{1.002 \times 10^2}{60}$

gravitational field intensity $= 1.67\ Nkg^{-1} = B$

13. The earth's gravitational field intensity at its surface is about

[a] 6.8N/kg [b] 7.9N/kh [c] 8.9N/kg

[d] 9.8N [e] 9.8N/kg

($G = 6.7 \times 10^{-11}\ Nm^2/kg^2$, mass o the earth is $6 \times 10^{24} kg$, radius of the earth is $6.4 \times 10^6 m$, gon the earth $= 9.8\ ms^{-2}$

Option E

gravitational field intensity equals force per unit mass

i.e $E = \frac{F}{m} = \frac{GMm/d^2}{m} = \frac{GM}{d^2}$

$E = \frac{6.7 \times 10^{-11} \times 6 \times 10^{24}}{(6.4 \times 10^{6})^2} = 9.8Nkg$

Alternatively, $\frac{GMm}{d^2} = mg$, $\frac{GM}{d_2} = g = E$

Hence, $E = g = 9.8N/kg$ = option E in the question

14. If the distance of the earth to the moon is about 60 earth radii, then the gravitational filed at the moon in Nkg^{-1} due to the earth is about

[a] 6 [b] 0.16 [c] $3.2 c 10^{-2}$

[d] 2.8×10^{-3} [e] 5.4×10^{-3}

(take $g = 10ms^{-2}$ or $E = 10Nkg^{-1}$ on earth)

Option D

Forces Accelerations and Frictions

1. Which of the following statements about friction is not correct?

[a] Cars are less likely to skid on wet than on dry roads

[b] nails hold boards together by friction

[c] Limiting friction is directly proportional to the force acting between two surfaces.

[d] Sliding friction is less than limiting friction

[e] Lubrication reduces friction

Option A

2. The friction which operates when one solid surface slides over another is called

[a] Solid friction [b] static friction

[c] limiting friction [d] dynamic friction

[e] none of the above

Option D

Limiting or static friction is the frictional force between two surfaces in contact just before one of the bodies moves.

Sliding, kinetic or dynamic friction is the frictional force between two surfaces in contact when a body slides over another at constant speed.

3. Which of the following statements is not true of friction between two solid surfaces?

[a] the frictional force between two solid surfaces is greater when one of the objects is moving than when they are both stationary.

[b] The frictional force between two rough surfaces is greater than that between two smooth surfaces

[c] The frictional force between two surface is independent of the area in contact

[d] Frictional force depends on the type of materials which forms the surfaces which are in contact.

[e] Frictional force is proportional to the normal reaction on one of the surfaces.

The untrue option is A as

The frictional force between two solid surfaces when one of the objects is moving is called sliding. dynamic or kinetic friction.

Force between two solid surfaces when they are both stationary is called static ort limiting friction.

The dynamic or sliding friction is less than the static or limiting friction

Others are true for friction.

4. The limiting frictional force between two surfaces depend on

I. The normal reaction between the surfaces

II. The area of surfaces in contact

III. The relative velocity between the surfaces

IV. the nature of the surfaces

[a] I only [b] II only [c] III only

[d] I & IB only [e] I & III only

Option D

Friction depends on the nature of the surfaces in contact (i.e the roughness or smoothness of the surface) and the normal reaction. $F = \mu R$

Solid friction is independent of the area of the surfaces in contact and the relative velocity between the surfaces.

5. Which of the following statements are true of friction?

I. Frictional force opposes motion

II. Rolling friction between two surfaces is greater than sliding friction between the same two surfaces is greater than sliding friction between the same two surfaces

III. Co-efficient of friction is proportional to the limiting frictional force

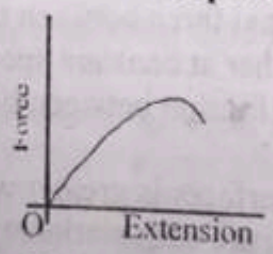
IV. It will be impossible to stop a moving car if there were not friction between the road and the tyres.

[a] I, II, III & IV [b] I, III & IV

[c] I & IV only [d] I, II & IV only

[e] II, III & IV only

Properties of Solids Elasticity & Crystallinity

1. 

The figure above is a graph of force against extension of a spiral spring. The force constant of the spring is given by the

[a] Slope of the linear portion of the graph

[b] Length of the linear portion of the graph

[c] Area under the linear portion of the graph

[d] Area under the entire graph

Option A

From Hooke's law, $F = Kc$

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F = K where W = force constant
E

Also comparing F = Ke to Y = MX
plotting F against e, M = K.
Slope = force constant = A

2. The point beyond which a stretched spring does not return to its original length is called the

[a] Breaking point [b] elastic limit
[c] spring constant [d] elastic point
[e] release point

Option B

3. A spring with a force constant 0f 20 Nm^{-1} hanging vertically, has a equilibrium length of 0.25m. A 100g mass is attached to the spring and carefully allowed to drop so that it comes to rest. The new equilibrium length of the spring is

[a] 30cm [b] 40cm [c] 50cm
[d] 75cm ($g = 10ms^{-2}$)

Option A

K = 20 Nm^{-1} natural length L = 0.25.

$F = = 100g = \frac{100}{1000} \times 10 = IN$

$F = Ke = K(L_2 - L_1)$; $I = 20(L_2 - 0.25)$

$\frac{I}{20} = L_2 - 0.25$; $0.005 = L_2 - 0.25$

$L_2 = 0.05 + 0.25 = 0.3m = 30cm$

4. A load of 5N gives an extension of 0.56cm in a wire which obeys Hooke's law. What is the extension caused by a load of 20N?

[a] 1.12cm [b] 2.14cm [c] 2.24cm [d] 2.62cm

$F_1 = 5N$, $e_1 = 0.56cm$; $F_2 = 20N$, e_2 ?

Using $\frac{F}{e} = k$ (for Hooke's Law)

$\frac{5}{0.56} = \frac{20}{e_2}$, $5e_2 = 20 \times 0.56$

$E_2 = 4 \times 0.56 = 2.24cm = (C)$

5. The total length of a spring when a mass of 20g is hung from its end is 14 cm, while its total length is 16cm when a mass of 30g is hung from the same end. Calculate the unstrectched length of the spring assuming Hooke's law is obeyed

[a] 9.33cm [b] 10.cm [c] 10.66cm
[d] 12.00cm [e] 15.00cm

Option B

6. A point at which the molecules of a loaded wire begin to slide across each other resulting in a rapid increase in extension is the

[a] Yield point [b] Proportionality point
[c] deformation point [d] elastic point

7. Elasticity is the property which enables a material to
   [a] Return exactly to its original shape and size on the removal of a force
   [b] Retain its deformed shape after the removal of an applied force
   [c] be drawn out in length
   [d] break without warning

   Option B
   The ability of a material to remain in its new position when distorted is called elasticity.
   The ability of a material to remain in its new position when distorted is called plasticity.
   The ability of a material to be drawn out in length is called ductility.
   The ability of a material to break easily i.e without warning is called brittleness.

8. The property of a material that allows it to be stretched into a wire is called
   [a] brittleness [b] malleability [c] fragility [d] ductility

   Option D
   Brittleness is the ability of a material to break easily without warning.
   Malleability is the ability of a material to be harmed or beaten and rolled into different shapes.
   Ductility is the ability of a material to break after passing through the elastic and yield points i.e ability to be stretched into a long length.

9. The force that produces an angular deformation without a change in the volume of a material is referred to as
   [a] tensile stress [b] shear stress
   [c] compressive stress [d] bulk stress

   Option B
   Shear stress causes angular deformation without change in volume
   Tensile/Compressive stress causes change in length in the direction of the stress
   Bulk stress causes reduction in volume of liquid.

10. Which of the following modulii of elasticity is/are applicable to liquids?
    I. Young's modulus II. Modulus of rigidity
    III. bulk modulus
    [a] II only [b] III only [c] I & II only [d] II & III

    Option B
    Young's modulus is the ratio of tensile/compressive street to tensile/compressive strain.
    Rigidity modulus is the ratio of the shear stress to shear strain.
    Rigidity modulus is the ratio of the shear stress to shear strain.
    Bulk modulus is the ratio of hydrostatic stress (pressure) to volumetric strain in liquids.

11. Which of the following modulus of elasticity Is equal to pressure?
    [a] Young's modulus
    [b] Adiabatic bulk modulus

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[c] Modulus of rigidity [d] Isothermal bulk modulus

Option D

Young's modulus is the ratio of tensile or compressive stress to tensile or compressive strain.

Bulk modulus is the ratio of hydrostatic stress called pressure to volumetric strain.

Various moduli given in physical tables and most often used are measured under constant temperature called isothermal conditions.

11. Atoms of solid having crystalline structures are arranged in regular patterns called

[a] energy levels [b] atomic structure

[c] lattices [d] orbits

Option C

The regular arrangement of atoms in a crystalline material is called lattice.

12. What is the difference between a crystalline and an amorphous solid?

Crystalline Solid

[a] has cubic structure while amorphous solid has hexagonal structure

[b] Has regularly repeating patterns while an amorphous solid has not

[c] Is white while amorphous solid is yellow

[d] is always hard while amorphous solid is always soft.

[e] melts on heating while amorphous solid sublimes on heating.

Option B

Regular repeating patterns in the structure

Three dimensional network in the structure.

26. Crystal have the following properties

I. they have definite shapes

II. they are insoluble

III. they have definite melting points which of the above statements is/are correct?

[a] I only [b] I & II only

[c] I, II & III [d] II & III only [e] I & III only

Option E

Have a definite shapes

Have definite and high melting points

Are usually soluble

13. Amorphous substance have the following properties

I. they are all hydrated

II. They do not have definite shape

III. They are all soluble

[a] I only [b] I & II only

[c] III only [d] II only [e] I, II & III

BIO 191 AND 192

1. Diagrams I and II below illustrate the alimentary systems of bird and cockroach. Use them to answer questions (a) to (e)

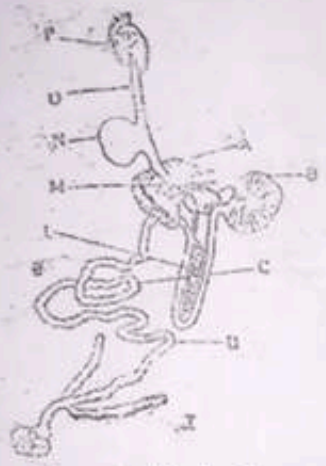
a. Name the structures labeled A to N

b. List one function and one adaptive features of each of the structures labeled B,J, K and M

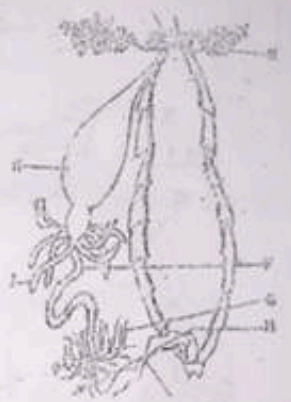
c. Using the diagrams, list two similarities and three differences between the alimentary systems of bird and cockroach.

d. What type of food would the animal represented by diagram I feed on? Give reasons for you answer

I



II



2. Diagrams I and II below represent stages in the development of a toad. Study them carefully answer Question

a. Name the structure labeled A to E

b. What are the functions of the parts labeled A and C

c. Name the next stage after the stage labeled I.

d. Name the parts labeled F and G in diagram II

e. List two method of the part labeled of

f. Explain briefly the relationship between diagram I and II

g. State one adaptive feature of the structure labeled

I II

QUESTION 3

I. The diagram Below represents?

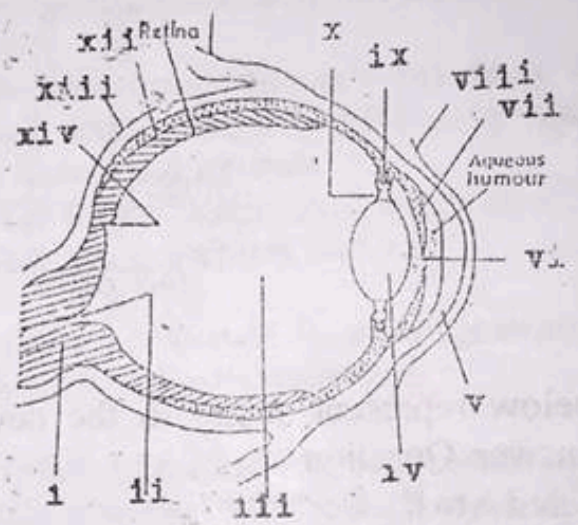
II. Give the names of label I to XIV

III. The sensitive part of the diagram is labeled?

IV. Give one vitamin that aid the function of the diagram above.

V. Give the correct object use for the correction of both hypermetripia and myopia.

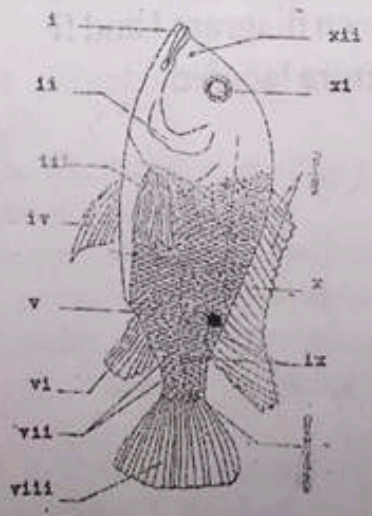
VI. Illustrate the correct order of light rays travelling in the structure above.



QUESTION 4

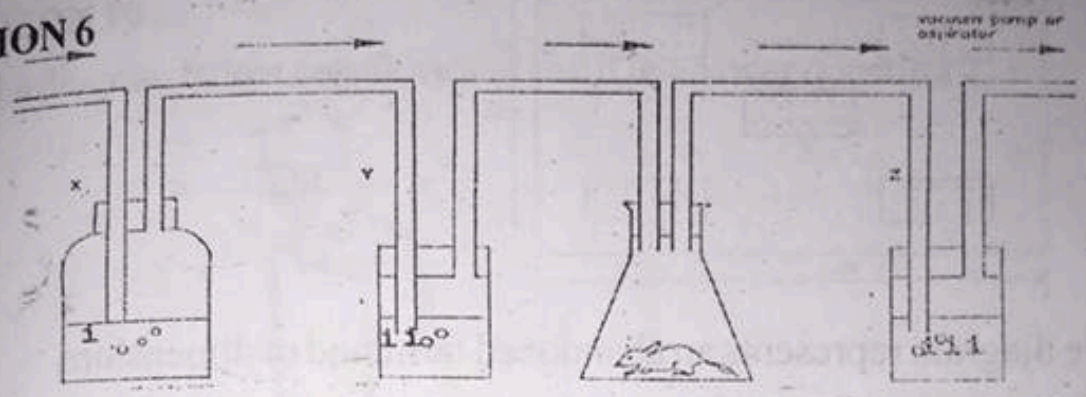
Give the kingdom, phylum, class and order of the following organism: 1) Housefly,2) Earthworm,3) Roseplant, 4) Human being 5) Lion.

QUESTION 5



I. The diagram above represent?
ii. Give the names of label I to XII
iii. The structure used for the detection of vibration and pressure in water is?
iv. The mode of reproduction of the above organism is?
v. State the group in which the organism belongs in the species.

QUESTION 6

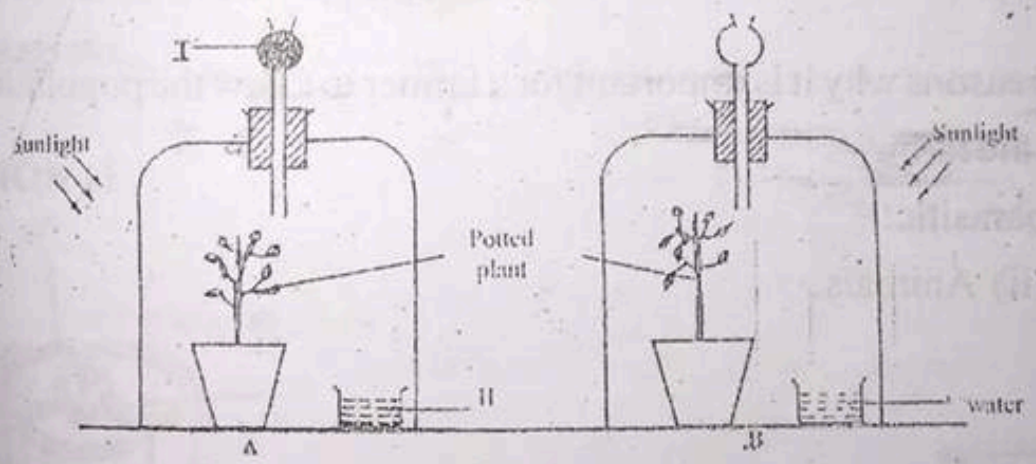


I. Give the appropriate substance represented by the no i, ii, iii in the above diagram

II. State the importance of the diagram above and explain it.

QUESTION 7

Study the experimental set-up illustrated below. Use it to answer question I (a) (i) - (vi)



a. i. What is the aim of the experiment set-ups in the diagrams above?

ii. State the substance contained in the parts labeled I and II in the set-up labeled A and their functions.

iii. What purpose is the set-up labeled B serving.

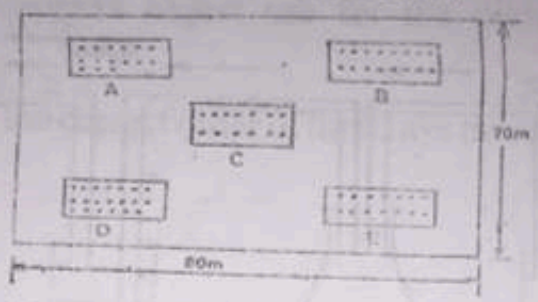
iv. State the differences between the leaves in the set-ups labeled A and B at the end of the experiment

b. Define (i) Pyramid of energy
(ii) Primary production.

c. State two ways by which energy flows in an ecosystem.

QUESTION 8

Study the diagram and the information below.



Q8 The above diagram represents an abandoned farmland of dimensions 70m x 80m, covered by Tridax Procumbens and other weeds.

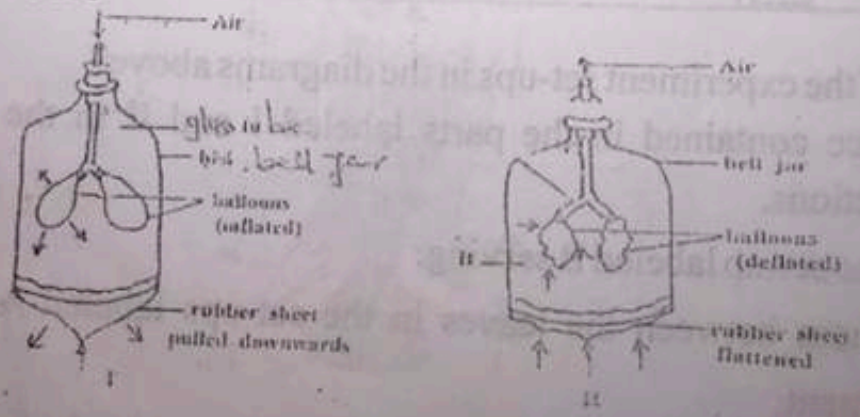
The rectangles A, B, C, D and E represent the areas on which a 1m x 1m quadrant land during a field sampling to determine the population size for tridax. Only five throws of the quadrants were made during the sampling. Each dot within the rectangle A, B, C, D and E represents a Tridax plant.

a. Calculate the estimated size of tridax population in the abandoned farmland.

b. State three reasons why it is important for a farmer to know the population of the weeds on the farm.

c. Name two parasitic:
(i) Plants (ii) Animals.

QUESTION 9



The set-up in diagrams I and II illustrate breathing mechanism in mannals.

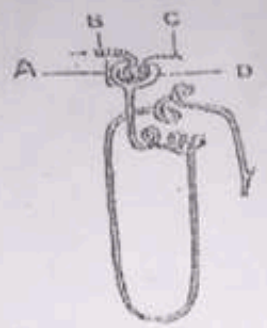
a. Name the structures in mammals that are equivalent in function to be parts labeled (i) glass tube (ii) bell jar (iii) balloons (iv) rubber (v) A (vi) B

b. Name the processes illustrated by (i) I (ii) II

c. In which of the bell jars is the pressure lower.

QUESTION 10

Study the diagram below carefully and use it to answer question 2.



a. Name the parts labeled A, B, C, and D.

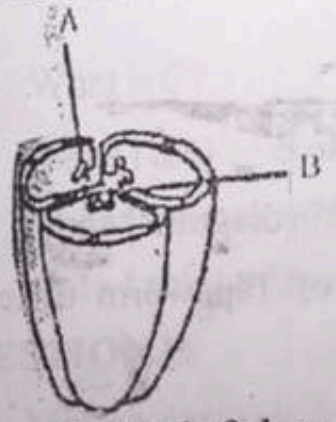
b. What is the significance of the relation sizes of B and C?

c. Name the structure in:

I. Amoeba

ii. Earthworm, which are equivalent in function to the structure illustrated in the diagram.

QUESTION 11



a. State the kind of placentation found in the fruit.

b. Name one of the fruit that has this kind of placentation

c. Name the structure labeled A and B

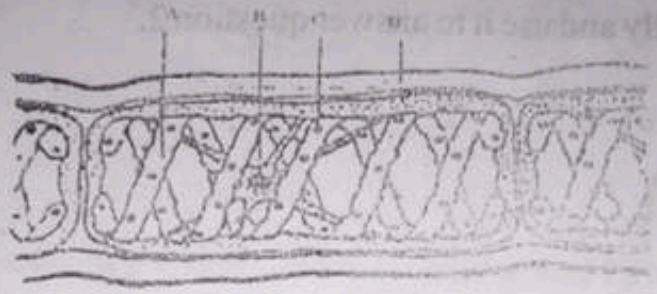
QUESTION 12: Study the diagram below

Ai. Identify the organism illustrated in the diagram.

ii. Give two reasons for your answer

Bi. Name the part labeled A to D

ii. State the function of one of the labeled parts



QUESTION 13: Complete the table below

Gland	Secretion/ Digestive Juice	Enzyme Present	Substrate acting upon	End produce
Salivary gland				
Stomach wall or *Gastric gland*				

b In what form and source do (a) Animal (b) Plants obtain the nutrients that repair warm out tissues.

c Where is the bile formed and function.

QUESTION 14: Identify the structures labeled A to E

b. State the mode of feeding of the organism illustrated in diagram I and II

c. State two ways in which the mode of feeding of Tapeworm differs from the mode of feeding of rhizopus

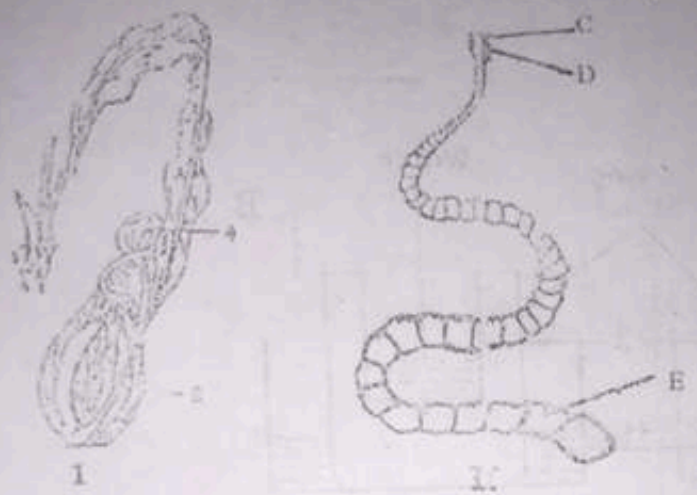
d. State the food substance which the organism represented in diagram I feed on

e. State two structure features of the organism represented in diagram II which adapt it to its mode of life.

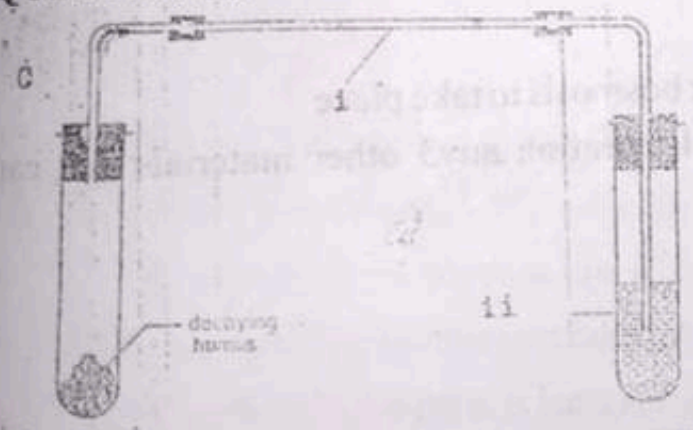
f. Describe briefly the mechanism of the organisms illustrated in diagram I

g. Where is the habitat of the adult tapeworm

h. State two effect of tapeworm infection in man



QUESTION 15



I. What is C?

II. Label I & II

III. Wjhat ios notice in II aftetr ¾ hours

IV. State 4 roles of decomposers in an eco-system

QUESTION 16

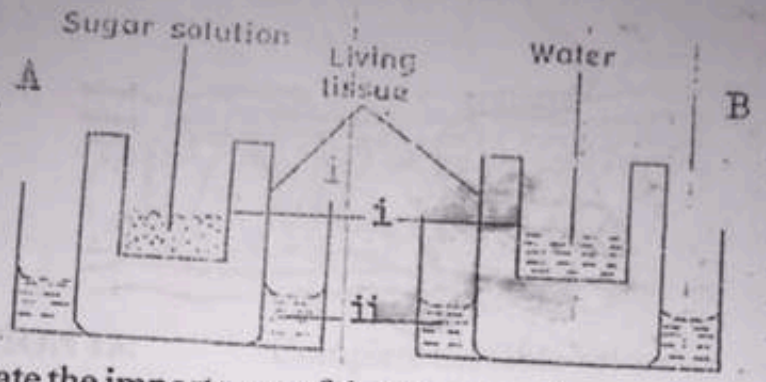
I. Make a well labell diagram of typical plant cell

II. State the function of any 5 organelles in plant cell.

QUESTION 17

I. Make a well diagram of the kidney
II. Apart from the kidney mention 3 parts involve in homeostasis
III. State any two functions of the kidney

QUESTION 18



I. State the importance of the diagram above
II. What is A & B respectively
III. Label I & II
IV. State the conditions necessary for bosmosis to take place
V. Apart from the name given in I, mention any3 other materials that can be use

QUESTION 19

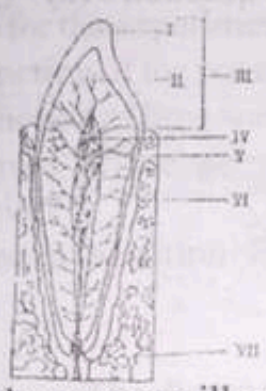
Fill the empty (box) below:

Type of Vertebrae	Fish	Amphibians	Reptile	Bird	Mammals
Time of Breeding		Seasonal			
No of egg laid			Few		
Mode of Fertilization					Internal
Feeding of embryo		From yolk & Albumen			
Growth	Oviparous				
Parental Care			none		

QUESTION 20a: Complete the table below:

CROPS	PART OF PLANT WHERE FOOD IS STORED	TYPE/CLASS OF FOOD STORED
Cowpea		
Maize		
Sugar cane		
Ginger		
Ground nut		

Study the diagram below and use it to answer question 1(b)-(c)



b. Identify the structure illustrated in the diagram above

c. Name the parts labeled I-VII in the diagram.

d. Give one function of the structure illustrated in the diagram

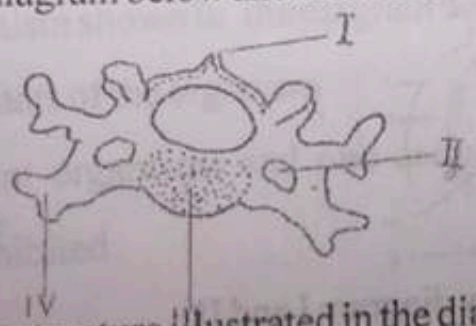
ei. State two functions of the part labeled IV

ii. Which of the labeled parts is least sensitive?

fi. Name the four types of finger prints in man

ii. State one function of finger prints

1. Study the diagram below and use it to answer question 2(a)



I. Identify the structure illustrated in the diagram above.

ii. In which part of the mammalian body is it located.

iii. Name the parts labeled I – IV

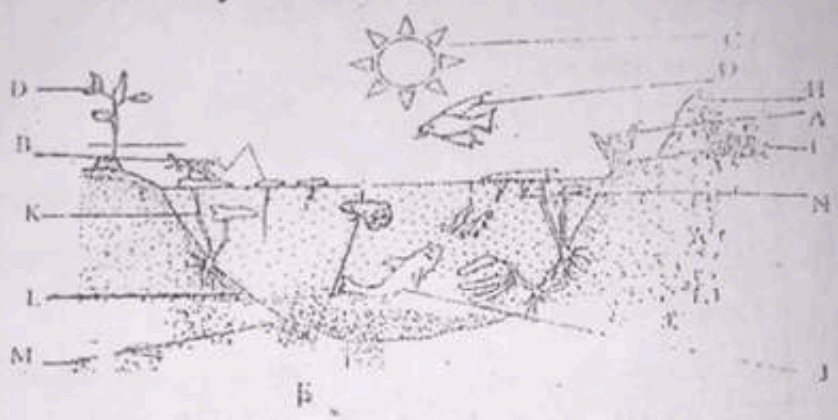
iv. Name the two bones which articulate with the structure illustrated in the diagram above

v. State two functions of the structure illustrated in the diagram above

vi. State two materials that strengthen the walls of plant cells

vii. Name three types of phloem cells

QUESTION 22: The diagram below is a typical scene in a habitat. Study it carefully and use it to answer question 5 (a) – (g).



a. Identify the illustrated habitat in the diagram

b. Identify the abiotic and biotic factors labeled A to J

c. Name the consumers in the illustrated habitat.

d. Explain how nutrients will be recycled in the illustrated habitat.

e. In the space provide, draw a possible food web for the illustrated habitat

f. List two decomposers that can be found in the habitat

QUESTION 23: Diagrams I and II are showing sections through two types of fruits

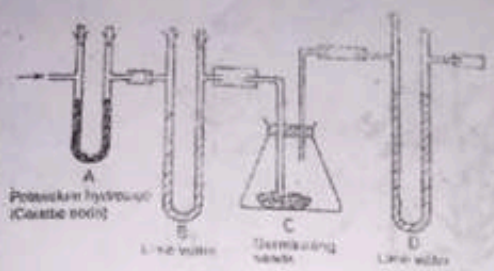
Name the parts labeled A-B

b. Give three similarities and difference between diagram I and II

c. Give two differences between diagram and a typical seed

d.

QUESTION 24: Study the diagram below and use it to answer Questions I (a) (I)- (v)



Ai. Suggest a title for the experiment illustrated in the diagram above

ii. What is the function of the potassium hydroxide in tube A?

iii. What is the function of lime water in tubes B and D?

iv. What is the role of the germinating seeds in the experiment illustrated in the diagram above?

v. Write a balanced equation for the reaction in the germinating seeds in C above

QUESTION 25: The diagram below shows two organisms that exhibit certain association. Study the diagram carefully and use it to answer Question 25 (i) – (v)

ai. What type of association is shown by the organisms illustrated in the diagram above

ii. Name the organism shown in the diagram above.

iii. Name **two** habitats of the organism

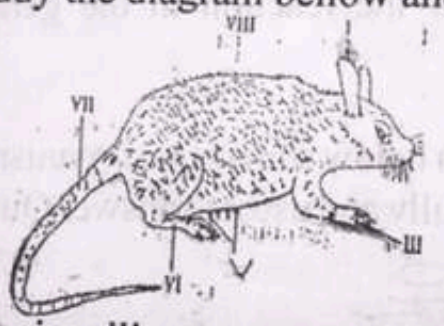
iv. Name **two** plant organisms and **one** animal organism in which this type of association is exhibited.

v. Name **two** other forms of associations among organisms, apart from the one mentioned above.

QUESTION 26: Study the diagrams below: Use them to answer Questions 26 (a) (i) – (iii).

i. Give a general name for the structures illustrated in diagram above
ii. Which of the labeled structures in the diagram is the filoplume?
iii. Name three functions of the structures illustrated in the diagram above

QUESTION 27: Study the diagram bellow and use it to answer Question 27 (a) (i) – (iv)

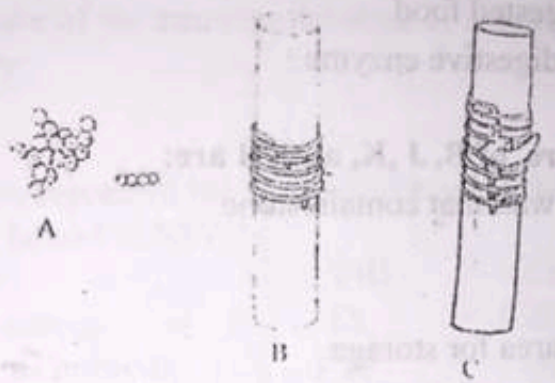


1.(ai) Identify the organism illustrated in the diagram above
(ii) Name the parts labeled I – VIII
(iii) List three similar and two different observable features between man and the organism illustrated in the diagram above
(iv) State the function of the parts label II

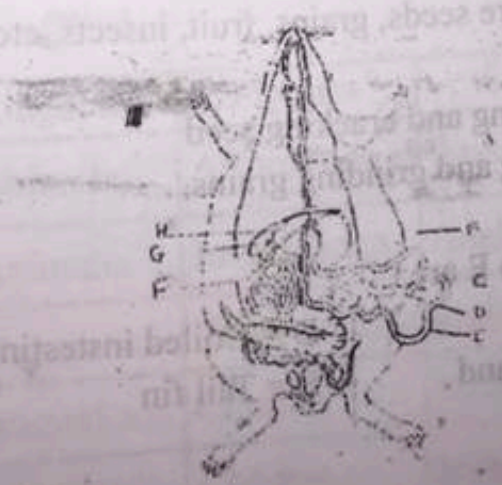
QUESTION 28: The structures illustrated below are types of reproduction. Study the structures illustrated in the diagrams and use them to answer question 28.

a. What type of reproduction is illustrated in the diagrams.
b. Name the type of reproduction illustrated by diagrams A and B
c. Give one example each of organism that display the type of reproduction A, B and C
d. Give three advantages and disadvantages of the types of reproduction mentioned Question (28a)

QUESTION 29: The diagram illustrated below is showing the alimentary canal of a mammal. Study the diagram carefully and use it to answer question 1



a. Name the parts labeled parts is A-H
b. Which of the labeled parts is responsible for the production of bile?
c. Name the labeled part that behave as a ductless gland that secrete hormone
d. Name the hormone that is produced the structure mentioned in question (c)
e. What effect will the malfunction of part labeled II will have in organism



1a. A = Liver
B = Gizzard
C = Small intestine
D = Large Intestine
E = Salivary gland
F = Stomach
G = Malphigian tubule
H = Illeumor hindgut
I = Colon
J = Gastric caeca
K = Crop
L = Pancreas
M = Proventriculus
N = Beak

b. **One function of B, J ,K, and M are:**
✓ B is for crushing or grinding food
✓ J is for production or secretion of digestive enzyme
✓ K is for storage of ingested food
✓ M is for secretion of digestive enzyme

One Adaptive Feature of B, J ,K, and M are:
✓ B has thick muscular wall that contain stone
✓ K is sac Like
✓ M is glandular
✓ J create large surface area for storage.

c. **Two similarities between them are:**
i. They both have crop
ii. They both have gizzard.

Three Differences between them are:

No	Diagram I (Bird)	Diagram II (Cockroach)
1.	Salivary gland absent	Salivary gland present
2.	Liver present	Liver absent
3.	Malphigian tubule absent	Malphigian tubule present

d. The type of food fed on are seeds, grains, fruit, insects, etc
Reason
- It has short beak for picking and cracking seed
- It has gizzard for crushing and grinding grains.

2a. The structure labelled A to E are:
A = Mouth or horny jaw
B = V - Shaped cement gland
C = External gills
D = Coiled instestine
E = Tail fin

dgut

b. Functions of A and C
A is for chewing vegetations
C is for respiration or gaseous exchange

c. The next stage is internal gills stage
d. Part labelled F and G are: F = Egg G = Jelly like string.

e. Two functions of G are:
i. It protect the eggs from bacterial attack
ii. It separate the eggs from each other for easy entrance of oxygen.
f. The relationship between diagram I and II is that the structure labelled II (egg) hatches into diagram I (tadpote).
g. One adaptive feature of the structure labelled F: it has protective covering against mechanical injury

3i. The diagram above represent the vertical section of the human eye.
ii. The names of the label I to XIV

I	=	Optic	VIII	=	Conjunctiva
II	=	Blind nerves	IX	=	Cilliary muscle
III	=	Veterons humour	X	=	Suspensory ligarned
IV	=	Lens	XI	=	Eye controlling muscle
V	=	Cornea	XII	=	Middle choroid
VI	=	Pupil	XIII	=	Scletrotic Lawyer
VII	=	Iris	XIV	=	Yellow spot

iii. The sensitive part of the diagram is labelled XIV (Yellow spot).
iv. One vitamin that aid the function of the diagram above is vitamin B2
v. The correction of hypermetropin is convexlen while myopia is concave len.
vi. The correct order of the travelling of light rays are:
Conjunctiva → Cornea → aqueous humour → Lens → Vitreous-humour → retina

4.

	Kingdom	Phylum	Class	Order
House Fly	Animalia	Arthropoda	Insecta	
Earth Worm	Animalia	Invertebrata	Anelida	Oligochaeta
Rose Plant	Plantae	Tracheophyta	Angio Spermae	
Human Being	Animalia	Chodita	Mamalia	Primate
Lion	Animalia	Chodata	Mamalia	Canivora

5. The diagram above represent Tillapia fish

ii. The name of labelled I to XII are:

I	=	Mouth	VIII	=	Tailor candal fin
II	=	Operculum	IX	=	Lacteral line
III	=	Pectoral fin	X	=	Dorsal fin
IV	=	Pelvic fin	XI	=	Eye
V	=	Anus and urinogenital opening			
VI	=	Anal fin XII	=	Nostril	
VII	=	Scale			

iii. The structure need for the detection of vibration and pressure in water is Lacteral line

iv. The mode of reproduction of the above organism is Oviparous

V. The organism belong to the group of bony fish

6. The appropriate substance represented by I, II and III in the diagram above are:

I = Caustic Soda

II = Lime Water

III = Lime Water

ii. The importance of the diagram is to share that carbondioxide is produce during aerobic respiration

Explanation

The appearance is set up as shown on the diagram above Air is drawn in through the aspirator bottle. canstic soda in X remove any Co2 in the air entering the appatus. This is check by the lime water in Y. A controg experiment is sal with a rat. It is observe that the lime water in Z murns milk.

7ai. The aim of the experiment is to show that carbon(iv)oxide is necessary for photosynthesis

ii. The substance contained in the part labelled I and II in the set up labelled A is soda lime (sodium hydroxide) and caustic potash (potassium hydroxide) respectively.

Function of I an II

i. Prevent CO2 in air from entering the jar by absorbing it.

ii. It absorb any trace of CO2 in the jar.

aiii. The purpose of the set up B is to serve as a control experiment

iv. The difference between the leaves in the setups labelled A and B at the end of the experiment is that B will turn blue black if tested for starch with iodine solution while the leaves in A remain brown when tested for starch indicating that photosynthesis took place in set-up white it did not take place in set-up A.

bi. Pyramid of energy illustrates the transfer of energy in a decreasing progression from producers to consumer.

ii. Primary production is the conversion of solar energy into chemical energy in the present of CO_2, H_2O and chlorophyll and stored as carbohydrate.

c. Two ways in which energy flows in an ecosystem are:

i. From producers to consumer

ii. Energy decrease from the bottom of the pyramid to the top.

8a. Calculate the estimated size of Tridax population in the abandoned farm land.

Step1: Count the number of Tridax in each quadrant throw in squares

Square A = 15 Tridax plant C = 13 Tridax plant

B = 16 Tridax plant D = 20 Tridax plant

E = 14 Tridax plant

Step 2: Total number of tridax plant within fire throw of the metre squadrant 15+16+13+20+14 = 78 Tridax plants

Step 3: Find the average number of tridax plant 78/5 = 15.6

Average of quadrant = 1 x 1 = 1m

Step 4: Find the area of the abandon farm 1 and 80 x 70 = 5600m

Step 5: Find the population density

= Average number of Tridax / Area of quadrant

= 15.6

= 15.6m

b. Three reason why a farmer should know the population of weed on the farm.

1. It give the knowledge of knowing where it is necessary to control the weed

2. It will help him to find out the amount of herbicide needed to control the weed

3. It help him to know the major spread of the weed on the farm land.

c. Two parasite: plant: Cassytha and Midtetoe

Animal: tape worm and tick.

9ai. Wind pipe or Trachea iv = Diaphragin

ii. Thoracicor Ribe cage v = A - Bronchus

iii. Lungs vi. = B-chest cavity

bi. Inspiration (breathing in or inhalation)

ii. Expiration (breathing out or exhalation)

c. The first bell jar (I)

10a. A = Bowman's capsule C = Efferent

B = Afferent vessel D = Glomerulus

b. The difference in relative size B greater than C result in high pressure in the glomerulus. This high pressure result in ultra filtration into the Bowman capsule space.

ci. Contractile vacoule
ii. Nephride
11a. Axile placentation
b. Canalily
c. A is seed and B is placenta

12ai. A filamentous alga like spirogyra
ii. Reasons
Presence of spiral chloroplast it is made up of more than one cell which are joined end to end.
bi. A - Spiral chloroplast
B - Nucleolus
C - Pyrenoid
D - mucilage
ii. A (spiral chloroplast) is for manufacturing of food by the process of photosynthesis
B (Neucleus) control all the activity of the organism
C (Pyrenoid) is for storage of fold like starch or carbohydrate
D (Mucilage) protect it from desiccation ordryina

13.

Gland	Secretion juice	Enzyme present	Subtracting upon	End prod
Salivary Glanf	Salivary	Ptylin	Cooked starch	Glucose
Gastric	Gastric	Pepsin	Protein	Amino

b. (a) in form of protein; source: beans, meat
(b) in form of nitrate; source: decaining humus, root naddles.
c. Bile is form in the live and functions in the Duodenum.

14a. The structure labelled:
A = Lid or Cover D = Sucker
B = Pitcher E = Proglottis
C = Hook.
b. Mode of feeding of diagram I and II
I is carnivorous mode 2
II is parasitic mode

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c. Two ways by which the mode of feeding of a tapeworm differ from the mode of feeding of rhizopus

No	Tapeworm	Rhyzopus
1.	No digestion is required	Extra cellular digestion is required
2.	Feed on already digested food of a living host	Feed on dead organic materials

d. The food substance in which the organism represented in diagram I feeds on is insect.

e.i. Presence of hook and sucker

ii. Flat body and detachable proglottis

f. The mechanism of feeding of the organism illustrated in diagram I and II are:

I: The pitcher has a lid which undergoes a nastic movement and closes in response to touch. The pitcher secrets enzymes which digested the insect. The digested insect is absorbs.

II: It attaches itself to the host intestine with the aid of its hooks & suckers. The digested food of the host is absorbed through the entire body surface.

g. The habitat of the tapeworm adult is small Intestine of man

h. Two effect of tapeworm Infection on man are:

i. Persistent hunger

ii. Lost of weight

15i. C is an experiment to show that Co2 is release during decomposition

ii. Label I and II are delivery tube and Lime water respectively.

iii. After 3/4 hours II (Lime water) turns milky

iv. Four roles of decomposers:

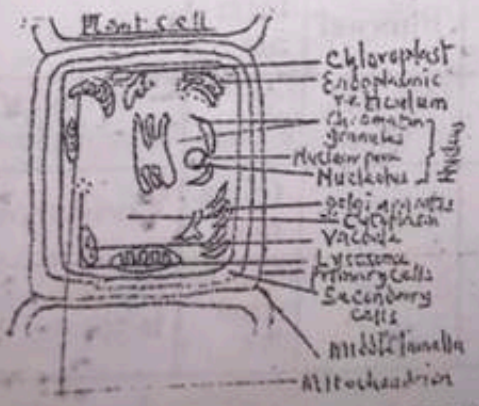
a. They contribute to environmental pollution

b. They enrich the soil with nutrient for plant growth

c. They are useful in making cheese

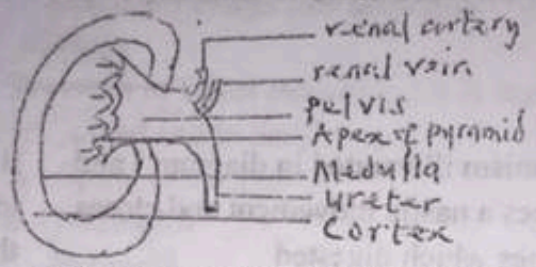
d. They allow the ecosystem to function by enabling kthe recyclin of nutrients.

16



ii. Function of any five orgamelles are:
- Mitochondrion: it is the site of respiration
- Vacoule: It act as osmoregulator
- Endoplasmic: It transport material within recticulum the cytoplasm
- Nucleus: It control all life activities of the cell
- Chloroplast: It aid photosynthesis

17. Structure of the Kidney



ii. Other part that are involve in homoestasis apart from the kidney are: Liver, Skin, hormones and brain.

iii. Two functions of the kidney are:
- Osmoregulation
- Excretion

18i. The importance of the diagram is the demonstrate osmosis

ii. A - real experiment while B is control experiment

iii. Label I is Yam while II is water

iv. Conditions necessary for osmosis to take place are:
- Stronger solution - Weaker solution
- Semi-permeable membrane

v. Three other materials that can be use apart from the one name above are: Potato, Pawpaw and Coco yam.

19.

Type of Vertebrae	Fish	Amphibians	Reptile	Bird	Mammals
Time of Breeding	Seasonal	Seasonal	Seasonal	Sea-sonal	Seasonal exce-ption humans
No of egg laid	Very Many	Many	Few	Few	Few
Mode of Fertilization	External	External	Internal	Inter-nal	Internal
Feeding of embryo	From yolk & Albumen	From yolk & Albumen	From yolk & Albumen	From yolk & Albumen	From mother through placenta
Growth	Oviparous	Oviparous	Oviparous	Ovipa-rous	Viviparous
Parental Care	Mostly None	None	None	Occur for a short time	Occur for a long time

20a

CROPS	PART OF PLANT WHERE FOOD IS STORED	TYPE/CLASS OF FOOD STORED
Cowpea	Cotyledon	Protein & Starch
Maize	Endosperm	Starch & Protein
Sugar cane	Stem	Sugar & carbohydrate
Ginger	Rhizome	Oil, Starch & Vitamin
Ground nut	Cotyledon	Oil, Fat , Protein & Starch

b. The structure illustrated in the diagram is the longitudinal section of a cannie tooth.

c. I = Enamel V = Gum

II = Blood vessel VI = Jaw bone

III = Crown VII = Passage for blood vessel

IV = Pulp cavity

d. The function of the illustrated structure is tearing or capturing of the prey.

e. Two function of the part labelled iv a re:

- It nourishes the tooth
- It house the blood vessel and nerva endings

ii. The labelled part that is least sensitve is I (Enamel)

fi. arch, loop, whorl, double whorl or compound

ii. One function of finger print is crime detection and identification

21ai. The structure illustrated is a cervical vertebra

ii. It is found in the cervical or neck region of the mammalian body

iii. The part labelled I - IV are:

I - Reduced neural spine III - Centrum

II - Vetebraterial canal IV - Transverse process

v. The two bone which articulate with the structure illustrated in the diagram are Axis cervical and cervical Thoracic

la. It give support to the head or skull

ii. It permit movement of the head and neck from side to side.

b. Two mater into strengthen the wall of plant cells are cellulose and liguin cut in steva tubes, and companion cells.

22a. The illustration habitat bis a pond in savannah forest

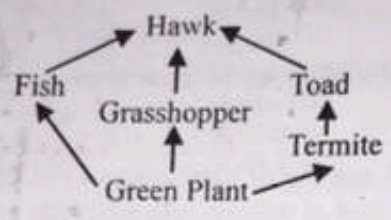
b. The part labelled A - J are

A - Grass
B - Grasshopper
C - Sun
D - Shrub
E - Toad
J - Fish
H - Anthill or Termitarium
I - Termite

c. The consumers include Grasshopper, Toad, Fish and Termite

d. The green plant absorb solar energy from the sun for photosynthesis and build up carbohydrate and plant protein. The herbivores like insect feed on grain plants. These insect are min turn eat en by toad. The toad is eaten by big fish for the synthesis of animal protein.

e.



f. Two decomposers that can be found are: bacteria and fungi

23a. DiagramI is a longitudinal section of fruit
Diagram II is a transverse section of frruit

b. Part labelled A - F are:
A - Epicarp
B - Mesocarp
C - Endocarp
D - Seed
E - Remain of single
F - Pericarp or fruit wall

c. Similarities between diagram I and II
i. They are both succulent and fleshy
ii. They both have seed(s)
iii. They both have pericarp 3 layers Difference between diagram I and II

	Diagram I	Diagram II
i.	It is a drupe	It is a berry
ii.	It has large seed	It has more than one small
iii.	Endocarp is hard, strong and woody	Endocarp is fleshy pulpy and juicy.

d. Different between Diagram I and typical seed

	Diagram I	Diagram II
I.	The fruit wall is made up of 3 layers	The fruit wall is made up of 2 layer
ii.	The outermost covering is epicarp	The outermost covering is test on seed coat.

24ai. Experiment to show that Co2 is released by a germinating seeds.
ii. The potassium hydroxide in tube A is to absorb the Co2 in-coming air

iii. The lime water in B is when remain clear is to show the absence of CO_2 in the in-coming air.

iv. The role of the germinating seeds in the experiment is that it serve as a control.

v. $C_6H_{12}O_6 + 6O_2 \quad 6CO_2\ 6H_2O + ATP$

25ai. Symbiosis or symbiotic association

ii. It is a Lichen

iii. Terrestial habitat

- Aquatic habitat

iv. Plant organism

- A root noodle of the root of beans
- Root noodle of the root of groundnut

Animal organism

- Termites and Bacterials

v. Parasitism assorption

- Predation assorption

26ai. The general name for the structures are feathers.

ii. The labelled structure in the diagram (iv)

iii.- They are used for flight

- They insulate the biro, thereby, temperature
- They protect the bird from getting wet

27ai. It is a mouse

ii. Names of part labelled I - VIII

I - Ear pinnia
II - Whisker
III - Digit
IV - Fore limb
V - Breast
VI - Hind limb
VII - Tail
VIII - Hair

iii. Similarities (3)

i. They both have hair

ii. They both have breast or mamary

iii. They both have ear pinna

Different (2)

i. Absence of tail in man

ii. Presence of whisker

iii. It is for sensitivity

iv. It is for the young ones.

28a. The type of reproduction illustrated by diagram A and B and C is a sexual or vegetative reproduction

b. A = Budding. B = Grafting

c. Organism that undergo this kind of reproduction include

A is yeast

B is Mango

C is Bryophyllum

d. Advantages of Vegetative Reproduction

- The new plants produced, matured faster
- The new plants resemble their parent
- More offsprings are produce within a short time
- It does not depend on external acent of pollution

Disadvantages

- The undersired qualities and diseases are transmitted from parent to their offsprings
- It reduces the strength and vigour of the succeeding generation
- Offspring may not be able to adapt to environment al changes
- There can be over crowding which can encourage completion for rejoices like water, light, nutrient to survival of few offspring.

29a. The part labelled A - H are:

A - Desophagus
B - Stomach
C - Pancreas
D - Pancreatic duct
E - Deodenum
F - Bile duct
G - Gall bladder
H - Liver

b. it is the liver (H)

c. It is pancrease

d. The lhormone is insuling

e. The malfunction of the labelled part H will result in less or no production of bile, therefore rate of fat digestion will be reduced (no emulsification of)