

EAMCET – 2020 Model Paper

No. of Questions: 160

Max. Marks: 160

Time: 3 Hrs.

BOTANY

1. Enzyme linked immuno - sorbent assay used to detect HIV that helps to know which of these components of the virus.
1) Proteins 2) DNA 3) RNA 4) Carbohydrates
2. In most operons, the operator region is located adjacent to the
1) i-gene 2) Promoter 3) Repressor 4) Terminator
3. Photosynthetic succulent leaves, photosynthetic succulent stem and photosynthetic non succulent roots are respectively observed in
1) Bryophyllum, Ruscus, Asparagus
2) Bryophyllum, Taeniophyllum, Euphorbia
3) Bryophyllum, Euphorbia, Asparagus
4) Bryophyllum, Opuntia, Taeniophyllum
4. Match the following lists.

List - I

- A) Relic of past
B) Dioecious independent gametophyte
with homosporous sporophyte
C) Homosporous independent plant forming
independent monoecious gametophyte
D) Flask shaped female sex organ fertilizing
with non motile male gamete

List - II

- 1) Cycas
2) Marchantia
3) Equisetum
4) Polysiphonia

The correct match is

- A B C D
1) 4 1 2 3
3) 4 2 3 1

- A B C D
2) 1 2 4 3
4) 1 2 3 4

5. Study the following table and find the correct combination

S. No.	Plant group	Site of zygote formation	Type of division that immediately results gametes
A)	Majority of Algae	Outside of the body	Mitosis
B)	All Bryophytes	Inside of the body	Mitosis
C)	Majority of Pteridophytes	Inside of the body	Mitosis
D)	All Phenerogams	Inside of the body	Mitosis

- 1) A & B only correct 2) C & D only correct
3) B, C & D only correct 4) A, B, C & D are correct

6. During the development of a male gametophyte of a typical angiospermic plant from its unicellular microspore the ratio between number of assymetric spindles formed, symmetric spindles formed and number of karyokinesis required to form two male ga- metes respectively is
- 1) 1 : 1 : 1 2) 1 : 1 : 2 3) 1 : 2 : 2 4) 1 : 2 : 3
7. Find the mismatch from the following
- 1) Fig → Pollination is entamophily and dispersal of fruit is by birds
2) Cocos → nflorescence is protected by a bract and fruits are dispersed by water
3) Zostera → Male and female sex organs of its bisexual flowers remain submerged in water and pollen grains are released inside the water
4) Vallisneria → The female flowers reach the surface of water by the long stalk and the male flowers are released on to the surface of water.
8. Zea mays, Ficus, Avicennia, Striga, turnip and Pisum. In the given list of taxons, the ratio between taxons with roots modified for mechanical function and roots modified for physiological functions respectively is
- 1) 1 : 1 2) 1 : 2 3) 1 : 5 4) 3 : 2
9. Among four classes of fungi that you have studied which one of the following characters is seen only in phycomycetes members
- 1) Dikaryophase in the life cycle
2) Parasitism in some species and saprophytism in some other
3) Exogenously formed asexual and sexual spores
4) Possess coenocytic hyphae and with either isogamy or anisogamy or oogamy as syngamy method
10. Leaves are often modified to perform functions other than photosynthesis. Among the following in which plants leaves are modified to perform both photosynthesis and other functions
- A) Nepenthes B) Pisum
C) Opuntia D) Bryophyllum
1) All except A 2) All except B
3) All except C 4) In all of the above plants
11. **Assertion (A):** Flowers in the inflorescence of Allium cepa show centripetal arrangement but Crotalaria shows acropetal arrangement.
- Reason (R):** In the inflorescence of Allium cepa, all the flowers arise from the same point of the condensed peduncle but in Crotalaria they arise from the different points of the elongated peduncle.
- 1) Both A and R are correct and R is the correct explanation of A.
2) Both A and R are correct but R is not the correct explanation of A.
3) A is True but R is False.
4) R is True but A is False.
12. Find the incorrect statement from the following
- 1) In hypogynous and perigynous flowers, ovary adnates with the thalamus at its base
2) In an angiospermic flower, two types of aestivations may be seen but not two types of placentations.
3) In basal placentation, a single anatropous ovule is seen
4) Anterior petals of vexillary aestivation are larger than the posterior one

- 13.** Which of these parts are edible in fruits of anacardiaceae members that you have studied?
- Mesocarp of pericarp
 - Endocarp of pericarp
 - Pedicel
 - Seed cotyledons
- A, B, C & D
 - A, C & D
 - A only
 - A & C only

- 14.** Study the following table with respect to typical representative of the given taxon.

S.no Taxon	Total number of sporophylls in the flower	Number of types of aestivations in the calyx of their flowers
A) Brassicaceae	8	2
B) Fabaceae	11	2
C) Solanaceae	7	1
D) Liliaceae	9	1

Find the correct combination

- A, B, C & D
 - B & C
 - A, B & C
 - B, C & D
- 15.** In which of the following organelle, carbohydrates are produced without the use of solar energy
- Chloroplast
 - Glyoxysomes
 - Peroxisomes
 - Mitochondria
- 16.** Lipids with more complex structures are observed in:
- Meristematic tissue
 - Heart tissues
 - Neural tissues
 - Vascular tissues
- 17.** **Assertion (A) :** During Anaphase of mitosis the two chromatids present in a telocentric chromosome segregates from each other
- Reason (R):** Telocentric chromosomes possess one chromatid, only during anaphase of mitosis.
- Both A and R are correct and R is the correct explanation of A.
 - Both A and R are correct but R is not the correct explanation of A.
 - A is True but R is False.
 - R is True but A is False.
- 18.** A vessel and a sieve tube are similar
- In having perforated end walls
 - In showing tube like structure
 - Individual elements are end to end joined
 - Enucleated dead elements
 - In possessing lignified walls
 - In showing sieve plates at end walls
- A, B, C, D, E & F
 - A, B, C, E & F
 - A, B, C & F
 - A, B & C

- 19.** Find the correct combination from the following
- A) Formation of secondary xylem in stem - Centripetal
 - B) Formation of secondary xylem in root - Centripetal
 - C) Formation of secondary phloem in stem - Centrifugal
 - D) Formation of secondary phloem in root - Centrifugal
- | | |
|------------------|------------------|
| 1) only A & C | 2) only A, B & D |
| 3) only B, C & D | 4) A, B, C & D |
- 20.** **Assertion (A):** Forest provide a vast bank for CO₂.
- Reason (R):** Huge amount of CO₂ is deposited in the timber of forests.
- 1) Both A and R are correct and R is not correct explanation of A.
 - 2) Both A and R are correct but R is the correct explanation of A.
 - 3) A is True but R is False.
 - 4) R is True but A is False.
- 21.** Find the correct statement from the following
- 1) Deficiency symptoms are not seen for the macro essential elements like C, H & O
 - 2) Continuous deprivation of any element would always leads to death of the plant
 - 3) Plants compete with soil microbes for limited molecular nitrogen in the soil
 - 4) Leghaemoglobin is a Mo-Fe protein and that helps the nitrogenase enzyme in catalysing conversion of N₂ to NH₃.
- 22.** Which of the following is correct with respect to the catalytic cycle of an enzyme action.
- 1) Enzyme has to diffuse towards the substrate for binding.
 - 2) Binding of the enzyme to the substrate causes, the substrate to alter its shape as per the shape of active sites in enzyme.
 - 3) The binding of the substrate induces the enzyme to alter its shape and there by substrate fitting more tightly around the enzyme
 - 4) Binding of substrate with the enzyme causes physical change in the enzyme but enzyme molecule bring about a chemical change in the substrate.
- 23.** Match the following lists
- | List - I | List - II |
|----------------------|------------------------|
| A) Root pressure | I) Positive pressure |
| B) Osmotic pressure | II) Negative pressure |
| C) Turgor pressure | III) Positive pressure |
| D) Wall pressure | IV) Negative pressure |
| A B C D | A B C D |
| 1) I II III IV | 2) I III I III |
| 3) I III II IV | 4) I II IV III |

- 24.** Type of bacterial sexual reproduction in which neither plasmid DNA nor genomic DNA is replicated in donor cell before it is transferred to the recipient cell is
- I) Conjugation II) Transformation III) Transduction
 1) I, II & III 2) II & III 3) I only 4) II only
- 25.** Find the incorrect statement from the following
- 1) Diffusion and osmosis are entropy driven processes
 2) Flow of sucrose in pressure flow hypothesis experiment is passive
 3) Plants obtain their carbon, oxygen and hydrogen only from CO_2 in the atmosphere
 4) Long distance transport of substances within a plant cannot take place by diffusion alone
- 26.** Which of the following is required for all flowering plants
- 1) Photoperiodism 2) Vernalisation
 3) Seed dormancy 4) Plant growth regulators
- 27.** Find the correct statements in relation to viruses.
- A) Number of types of nucleic acid molecules is always one in each virus
 B) Number of nucleotide chains may be one or more than one
 C) Nucleic acid molecule may be linear or circular type
 1) only A & C 2) only B & C
 3) only A & B 4) A, B, C
- 28.** Find the correct statement from the following in relation to higher plants
- 1) Cyclic photophosphorylation only occurs when only light of wavelengths beyond 780nm are available for excitation
 2) Cyclic photophosphorylation also occurs when only light of wavelengths less than 680nm are available for excitation
 3) Cyclic photophosphorylation only occurs when only light of wave lengths less than 680nm are available for excitation
 4) Cyclic photophosphorylation only occurs when only light of wave lengths beyond 680nm are available for excitation.
- 29.** In T.H. Morgan's experiment on Drosophila, the number of types of gametes formed if the two genes in a dihybrid cross follows Mendelian independent assortment and number of types of gametes formed when the two genes in a dihybrid cross were situated on the same X-chromosome respectively are
(Note: Consider that yellow bodied, white eyed females were crossed with brown bodied, red eyed males and two genes are incompletely linked)
- 1) 4 & 4 2) 1 & 4 3) 4 & 1 4) 4 & 2
- 30.** Among the following reactions which reaction is considered as "most crucial step (A)" of calvin cycle and which reaction (B) is catalysed by highly efficient carboxylase enzyme.
- I) $\text{PEP} + \text{HCO}_3^- \rightarrow \text{OAA}$
 II) $\text{RUBP} + \text{CO}_2 + \text{H}_2\text{O} \rightarrow [2]3 - \text{PGA}$
 III) $\text{RUBP} + \text{O}_2 \rightarrow \text{Phosphoglycerate} + \text{phosphoglycolate}$
 IV) $\text{Malic acid} \rightarrow \text{PEP} + \text{CO}_2$
- 1) A-III, B-II 2) A-II, B-IV 3) A-III, B-I 4) A-II, B-I

- 31.** **Assertion (A):** Packing of eukaryotic chromatin at a higher level requires 5 types of histones and a set of NHC proteins.

Reason (R): The beads-on-sting structure in eukaryotic chromatin is packaged to form chromatin fibres that are further coiled and condensed at telophase stage of cell division to form chromosomes.

- 1) Both A and R are correct and R is the correct explanation of A.
- 2) Both A and R are correct but R is not the correct explanation of A.
- 3) A is True but R is False.
- 4) R is True but A is False.

- 32.** Match the following lists given in relation to aerobic electron transport

List - I

- A) Total number of electrons transferred from two FADH + H⁺ to the molecular O₂
- B) Total number of complexes involved while transporting electrons to O₂ from mitochondrial NADH + H⁺
- C) Total number of mobile electron and proton carriers involved during the oxidation of mitochondrial NADH + H⁺
- D) Total number of mobile electron carriers involved during the oxidation of mitochondrial FADH + H⁺

A B C D

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

List - II

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

- 33.** Find the incorrect statement from the following

- 1) Apomictic embryos and somatic embryoids are similar in that both originates asexually
- 2) New gene combinations required for providing disease resistance can be created through the induced mutations and genetic engineering
- 3) Sonalika and Kalyansona are high yielding and drought resistant wheat varieties
- 4) Conventional breeding barriers can be bypassed through the somatic hybridisation technique

- 34.** Study the following reactions

- A) 1, 3-bis phosphoglyceric acid → Glyceraldehyde-3-phosphate
- B) Glucose → Glucose-6-phosphate
- C) Glyceraldehyde-3-phosphate → 1, 3-bis phosphoglyceric acid
- D) Pyruvic acid → Lactic acid
- E) Pyruvic acid → Ethanol

How many of above reactions do not require the presence of oxygen.

- 1) 5
- 2) 4
- 3) 2
- 4) 3

35. **Assertion (A):** In case of complete dominance, heterozygous tall Pea plant can be clearly distinguished phenotypically and genotypically from homozygous dwarf. However heterozygous tall Pea plant can not be distinguished both genotypically & phenotypically from homozygous tall

Reason (R): In case of complete dominance, one of the allele of same gene is completely dominant over the other

- 1) Both A and R are correct and R is the correct explanation of A.
- 2) Both A and R are correct but R is not the correct explanation of A.
- 3) A is True but R is False.
- 4) R is True but A is False.

36. Gene cloning can be done

- A) Through the use of PCR technique
 - B) Through the use of artificial chromosomes
 - C) By linking a gene to a natural plasmid
- 1) only A
 - 2) only A & C
 - 3) only B & C
 - 4) A or B or C

37. Cyclosporin - A an immuno suppressive agent used in organ transplant patients and is produced by a fungus belonging to the class

- 1) Phycomycetes
- 2) Ascomycetes
- 3) Basidiomycetes
- 4) Deuteromycetes

38. The most obvious and technically complicated feature of all living organisms is

- 1) Reproduction
- 2) Ability to sense their environment
- 3) Performing a living reaction
- 4) All of these

39. Vectors used at present are engineered in such a way that they help

- A) Easy linking of foreign DNA
 - B) In isolating specific gene product from a bioreactor
 - C) Selection of recombinants from non-recombinants
 - D) In carrying electrophoresis for isolating desired gene
- 1) A, B, C & D
 - 2) A, B & C
 - 3) A & C only
 - 4) A & B only

40. Match the following lists.

List - I

- A) Nehemiah grew & Marcello Malpighi
- B) Haeckel
- C) Wodehouse
- D) Takhtajan

List - II

- 1) Internal morphology
- 2) Plant ecology
- 3) Palynology
- 4) Plant taxonomy

The correct match is

- | | | | |
|----|---|---|---|
| A | B | C | D |
| 1) | 2 | 3 | 4 |
| 3) | 4 | 2 | 1 |

- | | | | |
|----|---|---|---|
| A | B | C | D |
| 2) | 2 | 1 | 3 |
| 4) | 3 | 2 | 4 |

ZOOLOGY

41. In the stomach of lamellibranchiates the following secretes carbohydrates

- | | |
|----------------|----------------------|
| 1) Endostyle | 2) Crystalline style |
| 3) Blastostyle | 4) Pygostyle |

42. Match the following sacred groves.

Name	State
A) Western Ghat region	I) Meghalaya
B) Khasi and Jaintia hills	II) Rajasthan
C) Chanda	III) Maharashtra
D) Aravalli Hills	IV) Madhya pradesh
A B C D	A B C D
1) III I II IV	2) II III I IV
3) III II I IV	4) III I IV II

43. All these are applicable to 'ciliary muscles' except

- | | |
|--|-------------------------------------|
| 1) Ectodermal in origin | 2) Muscle fibre is a spindle shaped |
| 3) Actin and myosin molecules are absent | 4) Uninucleate cells |

44. The most abundant neurons in the human body

- | | |
|--|------------------------------------|
| 1) Bears one axon and two or more dendrites | 2) Bears one axon and one dendrite |
| 3) Bears one or more axons and only one dendrite | 4) Bears one axon and no dendrite |

45. Study the following and choose the correct pair.

Class	Feature	Example
A) Chelicerata	I) Chelicerae are for feeding	Limulus
B) Chilopoda	II) First pair of trunk appendages bears poison claws	Julus
C) Trilobita	Extinct marine forms	Dalmanites
D) Hexapoda	They excrete mostly uric acid	Lepisma

- | | | | |
|----------|----------|----------|-----------|
| 1) A & D | 2) B & C | 3) C & D | 4) only D |
|----------|----------|----------|-----------|

46. **Assertion (A):** According to 'Molecular systematics' Archaea and Eukarya are more closely related to each other than to Bacteria.

Reason (R): There are eight obligate categories in the taxonomic hierarchy according to three domain classification.

- | | |
|--|--|
| 1) A and R are true and R is the correct explanation of A. | 2) A and R are true and R is not the correct explanation of A. |
| 3) A is true, R is false. | 4) A is false, R is true. |

- 47.** Study the following statements about sauropsidans.
- A) Columella auris is present in the middle ear.
 - B) Latimeria and sphenodon are living fossils
 - C) Cloaca is three - chambered
 - D) Testes are descended into scrotal sacs
- From the above, identify the correct statements.
- 1) A & B
 - 2) B & C
 - 3) C & D
 - 4) A & C
- 48.** It is a marine typical chordate with notochord, tubular nerve cord and pharyngeal slits throughout the life, it shows.
- 1) Numerous gonads with gonoducts.
 - 2) An endostyle is present along the dorsal wall of the pharynx.
 - 3) Closed circulatory system, without heart, Blood cells and respiratory pigment
 - 4) Fertilization is internal and with direct development.
- 49.** **Assertion (A):** Marsupials exhibit mammary foetus'.
- Reason (R):** The gestation is very long in marsupials
- 1) A is true, but R is false
 - 2) Both A and R are correct. R is not the correct explanation of A.
 - 3) Both A and R are correct. R is the correct explanation of A.
 - 4) A is false, but R is true
- 50.** Sex chromatin body bearing blood corpuscles in certain female mammals are characterised by
- 1) Bilobed nucleus
 - 2) Large spherical nucleus
 - 3) Small and abundant specific granules in the cytoplasm
 - 4) Large sized granules in the cytoplasm
- 51.** Study the following.
- A) A flagellum pushes the fluid medium at right angles to the point of its attachment, by its bending movement
 - B) Cilium moves the water perpendicular to the surface of its attachment like that of a paddle
 - C) Metachronous movement passes like a wave
 - D) Symmetrogenic division is right angles to the homothetogenic fission that occur in sporozoans
- Which of the above are true statements
- 1) A & C
 - 2) A, B & C
 - 3) A & D
 - 4) B, C & D
- 52.** The following stages of *Ascaris lumbricoides* undergo extra intestinal migration.
- 1) 1st stage & 3rd stage rhabditiform larvae
 - 2) 2nd stage & 4th stage filiform larvae
 - 3) 2nd stage & 5th stage rhabditiform larvae.
 - 4) 2nd stage & 4th stage rhabditiform larvae.

- 53.** Which one of the following is correct?
- 1) Hypertrophy always leads to cancers
 - 2) Depression, insomnia etc..... can be treated through coke
 - 3) 'Widal test' is used to kill Salmonella
 - 4) Cycle of Ross is described by G.B Grassi and others in plasmodium life history

- 54.** Match the following.

Column – I

- A. Tetranucleate cyst
- B. Sporozoite
- C. Ensheathed microfilaria
- D. Sleeping pills
- E. Tashkent ulcers

A B C D E

- 1) III IV I II V
- 3) III I II IV V

Column – II

- I) Lesihmania tropica
- II) Wuchereria
- III) Entamoeba
- IV) Plasmodium

v) Barbiturates

A B C D E

- 2) III IV II V I
- 4) III V I IV II

- 55.** Which of the following is incorrect pertaining to periplaneta.

- 1) Most of the food is digested in crop
- 2) Except the last chamber all chambers of heart are with ostia
- 3) The tracheoles are supported by intima and taenidia.
- 4) Scolopidia are the subcuticular units of mechanoreceptors of chordo-tonal organs.

- 56.** The correct match in the following

- 1) Utriculi majores - ootheca
- 3) Right phallomere - titillator
- 2) Seminal vesicles - Spermatophore
- 4) Colleterial glands - Oogenesis

- 57.** Match the following.

LIST - I

- A) Sea mouse
- B) Sea anemone
- C) Sea lily
- D) Sea horse
- E) Sea gulls

A B C D E

- 1) III IV V I II
- 3) III V I IV II

LIST - II

- I) Ptilocrinus
- II) Hippocampus
- III) Aphrodite
- IV) Larus
- V) Adamsia

A B C D E

- 2) III V I II IV
- 4) II V I IV III

- 58.** Which of the following rule states that the 10 percent law for the transfer of energy from one trophic level to another.

- 1) Lindeman's rule
- 3) Allen's rule
- 2) Van't Hoff's rule
- 4) Bergman's rule

59. Match the following.

Name	State
A) Exponential growth	i) Algal blooms
B) Electrostatic precipitator	ii) Unlimited resources
C) Biological oxygen demand	iii) Hospital wastes
D) Incinerators	iv) global warming
E) Kyoto protocol	v) Particulate matter
	vi) CFCs

A B C D E

- 1) III II V I VI
2) II V I III IV
3) II IV V VI II
4) II V I IV III

60. Arrange the following in sequence with respective to digestion

A) Pepsinogen

B) Trypsinogen

C) Carboxy peptidase

D) Trypsin

E) Pepsin

F) Dipeptidase

- 1) A - B - E - D- C - F
2) A - E - B- D - C- F
3) E - D - A - B - C - F
4) B - E - D - A - F- C

61. Match the following.

LIST - I

- A) Turbins
B) Rima gottidis
C) Trachea
D) Functional Residual Capacity
E) Bohr effect

A B C D E

- 1) IV V I II VI
2) IV V I III II
3) IV I V III VI
4) IV I V III II

LIST - II

- I) Larynx
II) Oxygen dissostation curve shifts right
III) ERV + RV
IV) Respiratory part
V) Pseudostratified epithelium
VI) TV + IRV + ERV

A B C D E

- 1) IV V I III II
2) IV V I III II
3) IV I V III VI
4) IV I V III II

62. An active person with the increase in adrenalin release, all the following occur except

- 1) Increase in cardiac out put
2) Number of beats per minute increases
3) Strength of ventricular contraction decreases
4) Cardiac cycle time decreases

63. Match the following.

LIST - I

- A) Competitive exclusion
- B) Competitive release
- C) Coexistence
- D) Commensalism
- E) Mutualism

A B C D E

- 1) IV I V III II
- 3) IV II III V I

LIST - II

- I) Connel's, Balanus and chathamalus
- II) Orchids and bumble bees
- III) Sea anemone and clown fish
- IV) Gause, Abingdon Tortoise and Goats
- V) Mac Arthur, Warblers

A B C D E

- 2) IV I II V III
- 4) IV I II III V

64. Choose the correct sequence in the following regarding urinary excretion

- A) 70-80% electrolytes and water reabsorbed
- B) Ultrafiltration
- C) Region impermeable to water but permeable to electrolytes
- D) Permeable to water and almost impermeable to electrolytes
- E) Conditional reabsorption

- 1) B-E-A-D-C
- 2) B-A-D-C-E
- 3) B-A-C-D-E
- 4) B-C-A-D-E

65. **Assertion (A):** During powerstroke 'Z' membranes of the sarcomere are brought closer.

Reason (R): The myofilaments do not actually shorten during muscle contraction.

- 1) A and R are true and R is the correct explanation of A.
- 2) A and R are true and R is not the correct explanation of A.
- 3) A is true, R is false.
- 4) A is false, R is true.

66. Read the following statements.

- A) Association areas in cerebral cortex are neither sensory nor motor in function and these are non-functional areas.
- B) Superior colliculi and inferior colliculi are involved respectively in auditory and visual functions
- C) The two foramina of Monro join 1st and 2nd ventricles with 3rd ventricle of brain.
- D) Speech ability is lost whenever XIIth pair of spinal nerves cut
- E) During hyperpolarisation both sodium activation and inactivation gates are closed

Which of the above are Incorrect.

- 1) A, B & C
- 2) B, C & D
- 3) C, D & E
- 4) A, B & D

67. Identify the pair of hormones which are in similar function.

- 1) Insulin and Glucagon
- 2) Somatotropin and somatostatin
- 3) Adrenalin and nor adrenalin
- 4) MSH and Melatonin

68. Which of the following is a correct match

- 1) T cells - Antibodies
- 2) Complement system - opsonisation
- 3) Artificial passive immunity-colourum
- 4) CMI - Antibodies

69. Match the following.

LIST - I

- A) HIV
- B) Graves disease
- C) Hypersensitivity
- D) Vaccination

A B C D

- 1) II IV III I
- 3) II I IV III

LIST - II

- I) Auto - immune disorder
- II) Tissue tropism
- III) Artificial active immunity
- IV) Asthmatic attack

A B C D

- 2) I II IV III
- 4) II I III IV

70. Find out the incorrect combination.

- 1) Computer axial tomography - evaluating osteoporosis
- 2) Prolonged Q - T interval - Tachycardia
- 3) Beta EEG waves - Low amplitude with high frequency
- 4) Competitive ELISA - Pregnancy test

71. Match the following.

LIST - I

- A) Hypoblast
- B) Mesoderm
- C) Endoderm
- D) Sclerotome
- E) Mesomere

A B C D E

- 1) IV I V III II
- 3) V I IV III II

LIST - II

- I) Involution
- II) Urino-genital organs
- III) vertebral column
- IV) Delamination
- V) Ingression

A B C D E

- 2) IV I III V II
- 4) V IV I II III

72. The incorrect combination in the following.

- 1) Contraception – Natural methods – Lactational amenorrhea method
- 2) Contraception – IUDS – saheli
- 3) Assisted Reproductive technology – ZIFT – Invitro fertilization
- 4) Assisted Reproductive technology – GIFT – Ovum transfer

- 73.** Read the following statements.
- A) Drones exhibit Arrhenotoky in *Apis mellifera*
 - B) X linked recessive characters are most common in females than in males
 - C) X linked dominant characters are colourblindness, Haemophilia etc...
 - D) Sex limited and sex influenced genes are located on autosomes
 - E) The children born to homozygous A-blood group and homozygous Rh positive father, homozygous B-blood group and Rh - negative wife are always Rh - positive and with different blood group from parents.

The correct statements in the above

- 1) A, B & C
- 2) B, C & D
- 3) C, D & E
- 4) A, D & E

- 74.** Match the following.

List - I

- A. Genic balance theory
- B. DNA sequencing DNA
- C. DNA finger printing DNA
- D. Linkage

List - II

- I. Frederick sanger
- II. Morgan
- III. Mendel
- IV. Bridges
- V. Alec jeffrys

A B C D

A B C D

- 1) IV I III II
- 2) V IV III II
- 3) IV I II III
- 4) IV I V II

- 75.** Find out the correct combination in the following.

- 1) Sickle cell anaemia – Chromosome 11 – Polycythemai
- 2) Cystic fibrosis – Chromosome 7 – Sweat without salt
- 3) Edward's syndrome – 47, +18 – Cardiac abnormalties
- 4) Cri- du - chat syndrome – 46, t (9 : 22) – larynx and nervous system problems

- 76.** Study the following.

- A. Homologous organs explain convergent evolution and adaptive radiation
- B. Serological test of H.F. Nuttal suggested anthropoid ape is more closely related to man than monkey
- C. A mammalian embryo first excretes ammonia, then uricacid and finally urea which is an evidence of biogenetic law
- D. Mammals evolved earlier than Aves from reptiles and origin of human beings is in pleistocene epoch

Which of the above are correct statemnets

- 1) A, B & C
- 2) A & D
- 3) B, C & D
- 4) A, C & D

- 77.** The following man was well known for his cave paintings

- 1) Homo erectus of Africa
- 2) Homo ergaster of Europe
- 3) Cro-magnon man of Europe
- 4) Homo neanderthalensis of Asia

78. Match the following.

List - I

- A. Cross breeding
- B. Avian flu virus
- C. Ovaprim
- D. Human insulin
- E. Toxoid vaccine

List - II

- I. Dopamine inhibitor
- II. Hisardale
- III. Tetanus
- IV. 51 amino acids with two poly peptide chains
- V. H₅N₁

A B C D E

- 1) II V IV III I
- 2) II V I IV III
- 3) II V I III IV
- 4) III II I IV V

A B C D E

79. Assertion (A): Cancer cells exhibit metastasis.

Reason (R): Cancer cells show apoptosis.

- 1) A and R are true and R is the correct explanation of A.
- 2) A and R are true and R is not the correct explanation of A.
- 3) A is true, R is false.
- 4) A is false, R is true.

80. Identify the correct sequence in the following with reference to human reproductive system.

- 1) Spermatogonia - primary spermatocytes- spermatids - secondary spermatocytes - spermatozoa
- 2) Oogonia - primary oocyte - secondary oocyte - ovum
- 3) Zygote - Morula - Gastrula - Blastula- youngone
- 4) Menstrual phase- ovulatory phase - follicular phase - luteal phase

PHYSICS

81. The power of a nuclear reactor is 960 MW and an energy of 200 MeV is released per every fission of U²³⁵. The mass of U²³⁵ that undergoes fission per one hour is

- 1) 4.23 gm
- 2) 42.3 gm
- 3) 0.423 kg
- 4) 4.23 kg

82. A man weighing 80 kg is standing on a long trolley weighing 320 kg. The trolley rests on frictionless horizontal rails. If the man starts walking on the trolley parallel to the rails with a speed of 1m/s relative to the trolley, then after 5 s, his displacement relative to the ground will be

- 1) 6 m
- 2) 5 m
- 3) 4 m
- 4) 1 m

83. A 3.0 kg block is initially at rest on a frictionless, horizontal surface. The block is moved 8.0 meters in 2.0 seconds by the application of a constant horizontal force. What is the average power developed while moving the block?

- 1) 24 W
- 2) 48 W
- 3) 32 W
- 4) 96 W

84. Two spheres made of different materials and having radii 'r' and '2r' are touching each other. If the centre of mass of the system of two spheres coincides with the point of contact, the densities of the materials of the spheres must be in the ratio of

- 1) 8 : 1
- 2) 4 : 1
- 3) 16 : 1
- 4) 1 : 16

85. A block of mass 2 kg is at rest on a rough horizontal surface. A horizontal impulse given to the block imparts a kinetic energy of 64 J. Subsequent to that the block moves over a distance 16 m before stopping. The coefficient of friction between the block and the horizontal surface is ($g = 10 \text{ ms}^{-2}$)

- 1) 0.02 2) 0.2 3) 0.04 4) 0.4

86. The bob of a simple pendulum is describing vertical circular motion with a radius ' r '. When the bob is at the lowest point of its path, its speed is found to be $\sqrt{6gr}$. The acceleration of the bob when it is at the highest point of path is (g = acceleration due to gravity)

- 1) g 2) $2g$ 3) $3g$ 4) zero

87. An astronaut landing on a strange planet finds that his weight is reduced to half of his normal weight on Earth. Which of the following could explain this?

- 1) the mass of the planet is half that of the Earth's but its radius is the same
- 2) the radius of the planet is half that of the Earth's but its mass is the same
- 3) both the mass and radius are half the Earth's values
- 4) the mass of the planet is half that of the Earth's and radius twice that of the Earth

88. The time period of a linear simple harmonic motion is T and amplitude is A . The equilibrium position is O. Match the time taken for the motions given in column II with those described in column I.

Column - I

- a) Time taken to move from O to $x = +A/2$ e) $T/6$
 - b) Time taken to move from $x = -A/2$ to $x = +A$ f) $T/4$
 - c) Time taken to move from $x = -A$ to O g) $T/3$
 - d) Time taken to move from $x = +A/2$ to $x = +A$ h) $T/12$
- 1) a – h, b – g, c – f, d – e 2) a – e, b – f, c – g, d – h
3) a – f, b – g, c – h, d – e 4) a – h, b – f, c – e, d – g

Column - II

89. The equation for the stationary vibrations of a string of length 0.75 m fixed at both ends and vibrating is given by $y = (0.2 \text{ mm}) \sin(4\pi x) \cos(1000 \pi t)$, where x is in meters and t is in seconds. Then the string must be emitting its

- 1) fundamental frequency 2) second harmonic
3) third harmonic 4) fourth harmonic

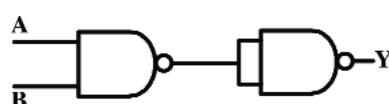
90. A ray of light undergoes a minimum deviation of 30° when incident on an equilateral prism made of material of refractive index $\sqrt{2}$. The angle of incidence on the first refracting surface of the prism is

- 1) 30° 2) 45° 3) 60° 4) 0°

91. In the determination of the internal resistance of a cell using a potentiometer, a balance length of 660 cm is obtained when the cell is connected in the secondary circuit. When the cell is shunted by a resistance of 10Ω the balance length decreased to 550 cm. The internal resistance of the cell is

- 1) 1Ω 2) 2Ω 3) 3Ω 4) 4Ω

92. The combination of the following gates shown in figure is equivalent to



- 1) AND gate 2) OR gate 3) NOT gate 4) NOR gate

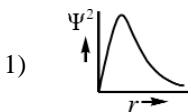
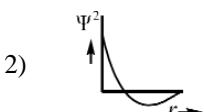
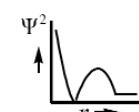
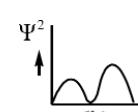
- 93.** An FM broadcasting station is operating at a frequency of 100 MHz. If an antenna of a receiver has a length of one fourth of the wavelength, its length expressed in cm is
- 1) 7.5 2) 75 3) 750 4) 0.75
- 94.** A north pole of strength Π Am, is moved once around a circle of radius 10cm whose center lies on a long straight conductor carrying a current of 10A. The work done is nearly (assume that the plane of the circle is perpendicular to the wire)
- 1) 4 μ J 2) 40 μ J 3) 400 μ J 4) zero
- 95.** A ballet dancer with her arms stretched out horizontally spins about a vertical axis on one leg with an angular velocity 2 rad/s. When she folds her arms, the angular velocity is found to increase to 4 rad/s. As a result of folding her arms, her radius of gyration about the axis of rotation must have
- 1) increased by 70% nearly 70% 2) decreased by 70% nearly 70%
- 3) decreased by 30% nearly 30% 4) increased by 30% nearly 30%
- 96.** A bus is moving with a velocity of 5 m/s towards a huge wall. The driver sounds a horn of frequency 165 Hz. If the speed of sound in air is 335 m/s, number of beats heard per second by a passenger inside the bus will be
- 1) 3 2) 4 3) 5 4) 6
- 97.** Velocity of water in a river is x . Velocity of a boat relative to still water is y . The boat crosses the river taking a shortest time of 3 minutes. The same boat crosses the same river by shortest path and takes 6 minutes. The ratio $x : y$ is
- 1) $1 : \sqrt{2}$ 2) $\sqrt{3} : 2$ 3) $3 : 4$ 4) $2 : \sqrt{3}$
- 98.** If Y is the Young's modulus of the material of a wire, 'p' is the stress to which it is subjected and 's' is the longitudinal strain, which of the following does NOT represent the elastic strain energy per unit volume?
- 1) $\frac{1}{2}(ps)$ 2) $\frac{1}{2}(Y s^2)$ 3) $\frac{1}{2}(p^2/Y)$ 4) $\frac{1}{2}(Y p^2)$
- 99.** When a light of certain wavelength is incident on a metal surface, maximum kinetic energy of the photoelectrons emitted is K . When the wavelength of the incident light is halved, maximum kinetic energy of the photoelectrons is $3K$. Work function of the metal is
- 1) K 2) $2K$ 3) $K/2$ 4) $3K/2$
- 100.** For an ideal gas, absolute temperature is plotted on the X-axis and 'PV' product is plotted on the Y-axis. Then the graph is
- 1) a rectangular hyperbola
 2) straight line passing through the origin
 3) straight line not passing through the origin
 4) parabola
- 101.** A parallel plate condenser of capacity $10\mu F$ is charged with a constant charging current of $0.16A$. The displacement current is
- 1) $0.16\mu A$ 2) $0.16 A$ 3) $0.96 A$ 4) $9.6 A$
- 102.** Primary coil of a transformer has twice the number of turns of its secondary coil. A load connected to the secondary draws a current of $6 A$ at $200 V$. If the efficiency of the transformer is 75% , primary current is
- 1) $2.25 A$ 2) $4 A$ 3) $2 A$ 4) $8 A$

- 103.** In a compound microscope, focal lengths of the objective glass and eyepiece are 1.0 cm and 2.5 cm respectively. If an object is kept at a distance of 1.2 cm from the objective and the final image is formed at the least distance of distinct vision (25 cm) by the eyepiece, the overall magnification produced by the instrument is
- 1) 55 2) 50 3) 16 4) 15
- 104.** An electron is accelerated from rest through a potential difference of V and its de Broglie wavelength is λ_1 . Another electron is accelerated from rest through a potential difference of $2V$ and its de Broglie wavelength is λ_2 . The ratio $\lambda_1 : \lambda_2$ is
- 1) $\sqrt{2} : 1$ 2) $2 : 1$ 3) $1 : 2$ 4) $1 : \sqrt{2}$
- 105.** A uniform wire of constantan is connected across a battery of negligible internal resistance. The current density in the wire is found to be j . Now the wire is stretched to double its length and connected to the same battery. Current density in the wire now is
- 1) $\frac{j}{4}$ 2) $\frac{j}{2}$ 3) $2j$ 4) $4j$
- 106.** Area of cross-section of three glass capillary tubes are in the ratio $1 : 4 : 9$. If they are dipped in water, ratio of the capillary rises in them is
- 1) $9 : 4 : 1$ 2) $36 : 9 : 4$ 3) $3 : 2 : 1$ 4) $6 : 3 : 2$
- 107.** A stone is thrown up obliquely with velocity 10ms^{-1} from the ground so that its horizontal range is maximum. From what height it should be thrown horizontally with the same velocity 10ms^{-1} so that it would fall to the ground at the same spot? ($g = 10\text{ms}^{-2}$)
- 1) 5m 2) 8m 3) 10m 4) 14m
- 108.** A body at rest explodes into 3 pieces A, B, C of masses in the ratio $1 : 2 : 4$. If the pieces A and B fly off with velocity 2ms^{-1} and 1ms^{-1} respectively so that the angle between their directions is 120° , the velocity of the piece C will be
- 1) 0.5ms^{-1} making 120° with the direction of A 2) 2ms^{-1} making 120° with the direction of B
 3) 0.5ms^{-1} making 60° with the direction of A 4) 1ms^{-1} making 60° with the direction of B
- 109.** A large open tank has two circular holes of radii $5R$ and $4R$ at depths $4h$ and $9h$ respectively from the top. When the tank is completely filled with water the quantities of water flowing out per second from the holes will be in the ratio
- 1) $5 : 9$ 2) $75 : 32$ 3) $16 : 81$ 4) $25 : 24$
- 110.** Coefficient of apparent expansion of a liquid when determined using two different vessels A and B are C_A and C_B respectively. If the coefficient of linear expansion of the vessel A is α . Then the coefficient of volume expansion of vessel B is
- 1) $C_A - C_B + 3\alpha$ 2) $C_A + C_B - 3\alpha$ 3) $C_A - C_B + \alpha$ 4) $C_B - 3\alpha$
- 111.** The polariser and analyser are inclined to each other at an angle 60° . If the intensity of the unpolarised light incident on the polariser is I , then the intensity of the light emerging out from the analyser is
- 1) $\frac{I}{8}$ 2) $\frac{I}{4}$ 3) $\frac{3I}{2}$ 4) $\frac{I}{2}$
- 112.** The time period of a bar magnet oscillating in a magnetic field is T . If the magnet is cut into two equal parts perpendicular to its length and one piece is made to oscillate in a field of two times magnetic induction then its time period is
- 1) $\frac{T}{\sqrt{2}}$ 2) $\frac{T}{2}$ 3) $\frac{T}{2\sqrt{2}}$ 4) $\frac{T}{4}$

- 113.** An infinite long straight wire is charged positively. If λ is the linear charge density, the electric intensity at a radial distance 'r' from its axis is
- 1) $\frac{\lambda}{2\epsilon_0 r}$
 - 2) $\frac{\lambda}{2\pi\epsilon_0 r}$
 - 3) $\frac{\lambda}{4\pi\epsilon_0 r}$
 - 4) $\frac{\lambda}{4\pi\epsilon_0 r^2}$
- 114.** When two unknown resistances x and y are connected in the left and right gaps of a metre bridge, the balancing length is 60cm, when a 10Ω resistor is connected parallel to x the balancing length becomes 30cm. the value of x is
- 1) 37.50Ω
 - 2) 31Ω
 - 3) 25Ω
 - 4) 17Ω
- 115.** A moving coil galvanometer of resistance 100 ohm shows full scale deflection when a current of $50 \mu A$ is passed through it. If it is converted into an ammeter of maximum range $10mA$, then the resistance to be shunted is approximately
- 1) 50Ω
 - 2) 10Ω
 - 3) 0.8Ω
 - 4) 0.5Ω
- 116.** A body starts from rest with a uniform acceleration. If its velocity after n seconds is v then its displacement in the last two seconds is
- 1) $\frac{2v(n+1)}{n}$
 - 2) $\frac{v(n+1)}{n}$
 - 3) $\frac{v(n-1)}{n}$
 - 4) $\frac{2v(n-1)}{n}$
- 117.** When the electron in the hydrogen atom jumps from 2^{nd} orbit to 1^{st} orbit, the wavelength of radiation emitted is λ . When the electrons jump from 3^{rd} orbit to 1^{st} orbit, the wavelength of emitted radiation would be
- 1) $\frac{27}{32} \lambda$
 - 2) $\frac{32}{27} \lambda$
 - 3) $\frac{2}{3} \lambda$
 - 4) $\frac{3}{2} \lambda$
- 118.** The temperature of a monoatomic gas in state A is $127^\circ C$. When the gas undergoes an adiabatic expansion from state A to B, the temperature of gas becomes $27^\circ C$ and the work done by the gas is 30 J. If the volume of gas becomes 10 times when it undergoes an isothermal expansion from state A to C, then the work done by the gas is
- 1) 92 J
 - 2) 126 J
 - 3) 158 J
 - 4) 184 J
- 119.** Suppose $A = B^n C^m$, where A has dimensions LT , B has dimensions $L^2 T^{-1}$, and C has dimensions LT^2 . Then the exponents n and m have the values respectively
- 1) $\frac{2}{3}; \frac{1}{3}$
 - 2) 2; 3
 - 3) $\frac{4}{5}; \frac{-1}{5}$
 - 4) $\frac{1}{5}; \frac{3}{5}$
- 120.** A body of capacity $4\mu F$ is charged to $80V$ and another body of capacity $6\mu F$ is charged to $30V$. When they are connected, the energy lost by $4\mu F$ is
- 1) 7.8 mJ
 - 2) 4.6 mJ
 - 3) 3.2 mJ
 - 4) 2.5 mJ

CHEMISTRY

- 121.** The correct order of increasing bond angles in the following species is
- 1) $\text{NO}_2^+ < \text{NO}_2^- < \text{NO}_2$
 - 2) $\text{BF}_3 < \text{SO}_2 < \text{CH}_4$
 - 3) $\text{SnCl}_4 < \text{SO}_3 < \text{XeF}_2$
 - 4) $\text{BeCl}_2 < \text{NF}_3 < \text{NH}_3$
- 122.** A 0.66 kg ball is moving with a speed of 100 m/s . The associated wavelength will be ($\hbar = 6.6 \times 10^{-34} \text{ Js}$)
- 1) $6.6 \times 10^{-32} \text{ m}$
 - 2) $6.6 \times 10^{-34} \text{ m}$
 - 3) $1.0 \times 10^{-35} \text{ m}$
 - 4) $1.0 \times 10^{-32} \text{ m}$

- 123.** The ions O^{2-} , F^- , Na^+ , Mg^{2+} and Al^{3+} are isoelectronic. Their ionic radii show
 1) A significant increase from O^{2-} to Al^{3+}
 2) A significant decrease from O^{2-} to Al^{3+}
 3) An increase from O^{2-} to F^- and then increase from Na^+ to Al^{3+}
 4) A decrease from O^{2-} to F^- and then increase from Na^+ to Al^{3+}
- 124.** The graph for 2S orbital between radial probability density (Ψ^2) versus radial distance (r) is correctly shown by
- 1)  2)  3)  4) 
- 125.** Which compound has planar structure?
 1) XeF_4 2) $XeOF_2$ 3) $XeO F_{2\ 2}$ 4) XeO_4
- 126.** In Haber process 30 litres of dihydrogen and 30 litres of dinitrogen were taken for reaction which yielded only 50% of the expected product. What will be the composition of gaseous mixture under the aforesaid condition in the end ?
 1) 20 litres Ammonia, 20 litres Nitrogen, 20 litres Hydrogen
 2) 10 litres Ammonia, 25 litres Nitrogen, 15 litres Hydrogen
 3) 20 litres Ammonia, 10 litres Nitrogen, 30 litres Hydrogen
 4) 20 litres Ammonia, 25 litres Nitrogen, 15 litres Hydrogen
- 127.** Units of vanderwaal's constant 'b' are
 1) $atm\ lit^2\ mole^{-2}$ 2) $lit\ mole^{-1}$ 3) $mole\ lit^{-1}$ 4) $mole^{-1}$
- 128.** Sulphide ores of metals are usually concentrated by froth flotation process. Which one of the following cannot be concentrated by froth flotation ?
 1) Galena 2) Copper pyrite 3) Sphalerite 4) Calamine
- 129.** Tyndall effect, Brownian movement and electrophoresis are
 1) Optical, mechanical and electrical properties of colloidal sol respectively
 2) Mechanical, optical and electrical properties of colloidal sol respectively
 3) Electrical, optical and mechanical properties of colloidal sol respectively
 4) Optical, electrical and mechanical properties of colloidal sol respectively
- 130.** If Vant Hoff factor of $HgCl_2$ and Na_2SO_4 is 2.6 each, then which of the following is correct?
 1) Degree of dissociation of each is 0.80
 2) Total number of ions formed on complete disociation is 3 in each case
 3) Degree of dissociation of $HgCl_2$ is greater than Na_2SO_4
 4) Both 1 & 2
- 131.** A solution containing components A and B follows Raoult's law.
 1) A-B attraction force is greater than A-A and B-B
 2) A-B attraction force is less than A-A and B-B
 3) A-B attraction force remains same as A-A and B-B
 4) Volume of solution is different from sum of volume of solute and solvent

132. 49.9 ml of 0.1M HCl is mixed with 50ml of 0.1M NaOH solution. pH of resultant solution is

- 1) 10 2) 7 3) 3 4) 12

133. The experimental data for the reaction $2A + B_2 \rightarrow 2AB$ is

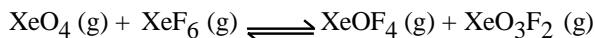
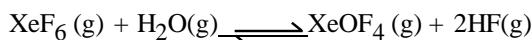
Experiment [A] [B₂] Rate (mole.lit⁻¹.s⁻¹)

- (i) 0.50 0.50 1.6×10^{-4}
(ii) 0.50 1.00 3.2×10^{-4}
(iii) 1.00 1.00 3.2×10^{-4}

The rate equation for the above data is

- 1) rate = k[A]² [B₂]² 2) rate = k[A]² [B₂]
3) rate = k[B₂] 4) rate = k[B₂]²

134. If K₁ and K₂ are the respective equilibrium constants for the two reactions, K₁ K₂



The equilibrium constant of the reaction,

- 1) $\frac{K_1}{K_2}$ 2) K₁ . K₂ 3) $\frac{K_1}{(K_2)^2}$ 4) $\frac{K_2}{K_1}$

135. The efficiency of fuel cell is given by

- 1) $\frac{\Delta G}{\Delta S}$ 2) $\frac{\Delta G}{\Delta H}$ 3) $\frac{\Delta S}{\Delta G}$ 4) $\frac{\Delta H}{\Delta G}$

136. A 5 ampere current is passed through a solution of zinc sulphate for 40 minutes. The amount of zinc deposited at the cathode is (Atomic weight of Zn = 65.5)

- 1) 0.4065 g 2) 65.04 g 3) 40.65 g 4) 4.065 g

137. If enthalpies of formation for C₂H₄ (g), CO₂ (g) and H₂O (l) at 25°C and 1 atm pressure are 52, - 394 and - 286 KJ/mol respectively, then enthalpy of combustion of C₂H₄ (g) will be

- 1) +14.2 KJ/mol 2) +1412 KJ/mol
3) -141.2 KJ/mol 4) -1412 KJ/mol

138. Wrong statement about Schottky defect is

- 1) It is observed in ionic compounds
2) It arises when equal number of cations and anions are missing from their lattice points
3) In this electrons are trapped in anion vacancy
4) It lowers the density of crystals

139. Number of P-P bonds in cyclic trimeta phosphoric acid [(HPO₃)₃]?

- 1) zero 2) 4 3) 2 4) 5

140. Which is not the correct statement?

- 1) S₂ vapours are paramagnetic S₈
2) Oxygen is more electronegative than sulphur
3) SF₄ exists, but OF₄ does not exist
4) SO₃²⁻ and SO₃⁻ both have trigonal planar geometry

141. Which one of the following arrangements does not give the correct picture of the trends indicated against it ?

- 1) $F > Cl > Br > I$: Electronegativity
- 2) $F_2 > Cl_2 > Br_2 > I_2$: Oxidizing power
- 3) $Cl > F > Br > I$: Electron gain enthalpy
- 4) $F_2 > Cl_2 > Br_2 > I_2$: Bond dissociation energy

142. Which is correct statement about $\text{Cr}_{2}\text{O}_{7}^{2-}$ structure ?

- 1) It has neither Cr – Cr bonds nor O – O bonds
- 2) It has one Cr – Cr bond and six O – O bonds
- 3) It has no Cr – Cr bond and has six O – O bonds
- 4) It has one Cr – Cr bond and seven Cr – O bonds

143. The geometry of $[\text{Ni}(\text{CO})_4]$ and $[\text{Ni}(\text{CN})_4]^{2-}$ respectively are

- | | |
|----------------------------------|----------------------------------|
| 1) Both are tetrahedral | 2) Both are square planar |
| 3) Square planar and tetrahedral | 4) Tetrahedral and square planar |

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

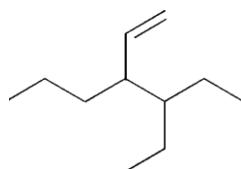
- | | |
|---|---|
| 1) $[\text{Co}(\text{en})_3]^{3+}$ | 2) $[\text{Co}(\text{en})_2 \text{Cl}]^+$ |
| 3) $[\text{Co}(\text{NH}_3)_3 \text{Cl}_3]^0$ | 4) $[\text{Co}(\text{en})\text{Cl}(\text{NH}_3)]^+$ |

145. The BOD values of four samples A, B, C and D are 9 PPM, 10 PPM, 100 PPM and 400 PPM respectively. The least polluted sample is

- | | | | |
|------|------|------|------|
| 1) C | 2) B | 3) A | 4) D |
|------|------|------|------|

146. The correct IUPAC name of the given compound is

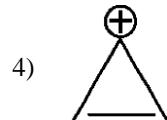
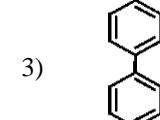
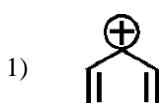
- | |
|-----------------------------------|
| 1) 3 – (1-Ethyl propyl) hex-1-ene |
| 2) 4-Ethyl-3-Propyl hex-1-ene |
| 3) 3-Ethyl-4-Ethenyl heptane |
| 4) 3-Ethyl-4-Propyl hex-5-ene |



147. Mixture of Chloroform and aniline can be purified by

- | | | | |
|----------------|--------------------|-----------------|--------------------|
| 1) Sublimation | 2) Crystallization | 3) Distillation | 4) Chromatographic |
|----------------|--------------------|-----------------|--------------------|

148. Which one is not aromatic compound ?



149. In which of the following reactions Markownikov's rule is not observed?

- 1) $\text{CH}_3\text{CH} = \text{CH}_2 + \text{HCl} \longrightarrow$
- 2) $\text{CH}_3\text{CH} = \text{CH}_2 + \text{HBr} \xrightarrow{\text{organic peroxide}/\text{h}\nu}$
- 3) $\text{CH}_3\text{CH} = \text{CH}_2 + \text{HBr} \xrightarrow{\text{H}_2\text{O}_2/\text{h}\nu}$
- 4) Both 2 & 3

150. Which one of the following sets of monosaccharides forms sucrose ?

- 1) β – D – Glucopyranose and α – D – Fructofuranose
- 2) β – D – Glucopyranose and β – D – Fructofuranose
- 3) α – D – Glucopyranose and α – D – Glucopyranose
- 4) α – D – Glucopyranose and β – D – Fructofuranose

151. Which is not the correct statement about RNA and DNA ?

- 1) DNA and RNA both does not contain adenine
- 2) DNA is double stranded while RNA is usually single stranded
- 3) DNA contains deoxyribose as its sugar and RNA contains ribose
- 4) RNA contains uracil in place of thymine (found in DNA) as a base

152. Assertion (A): Iodoform is used as antiseptic for skin

Reason (R): Iodoform produces iodine when it comes in contact with skin.

- 1) A and R are true and R is the correct explanation of A.
- 2) A and R are true and R is not the correct explanation of A.
- 3) A is true, R is false.
- 4) A is false, R is true.

153. Natural rubber is a polymer of

- 1) Styrene
- 2) Ethyne
- 3) Butadiene
- 4) Isoprene

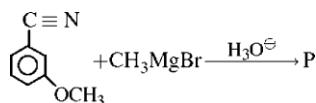
154. The decreasing order of the basic character of NH_3 , CH_3NH_2 , $\text{C}_2\text{H}_5\text{NH}_2$ and $\text{C}_6\text{H}_5\text{NH}_2$ is

- 1) $\text{NH}_3 > \text{CH}_3\text{NH}_2 > \text{C}_2\text{H}_5\text{NH}_2 > \text{C}_6\text{H}_5\text{NH}_2$
- 2) $\text{C}_2\text{H}_5\text{NH}_2 > \text{CH}_3\text{NH}_2 > \text{NH}_3 > \text{C}_6\text{H}_5\text{NH}_2$
- 3) $\text{C}_6\text{H}_5\text{NH}_2 > \text{C}_2\text{H}_5\text{NH}_2 > \text{CH}_3\text{NH}_2 > \text{NH}_3$
- 4) $\text{CH}_3\text{NH}_2 > \text{C}_2\text{H}_5\text{NH}_2 > \text{C}_6\text{H}_5\text{NH}_2 > \text{NH}_3$

155. Which of the following will cause laxative effect?

- 1) Sulphate
- 2) Nitrate
- 3) Phosphate
- 4) Lead

156.



product 'P' in the above reaction is

- 1)

Structure 1: 4-methoxyphenylmethanol (Oc1ccccc1C(O)C)
- 2)

Structure 2: 4-methoxyphenylmethyl ketone (Oc1ccccc1C(=O)C)
- 3)

Structure 3: 4-methoxybenzaldehyde (Oc1ccccc1C=O)
- 4)

Structure 4: 4-methoxybenzoic acid (Oc1ccccc1C(=O)O)

157. Which of the following is not correctly matched?

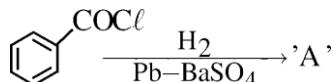
- 1) $> \text{C} = \text{O} \xrightarrow{\text{Clemmensen reduction}} > \text{CH}_2$
- 2) $-\text{CO}\ddot{\text{C}} \xrightarrow{\text{Rosenmund reduction}} -\text{CHO}$
- 3) $> \text{C} = \text{O} \xrightarrow{\text{Wolf-Kishner reduction}} > \text{CHOH}$
- 4) $- \text{C} \equiv \text{N} \xrightarrow{\text{Stephen reaction}} - \text{CHO}$

- 158.** Which of the following statements are incorrect?
- Boron shows diagonal relationship with Aluminium
 - Borax dissolves in water to give an acidic solution
 - Diborane reacts with NH₃ to give [BH₄(NH₃)₄]⁺ [BH₂]⁻
 - i and ii only 2) ii and iii only 3) i and iii only 4) i, ii, and iii

- 159.** Which of the following will give linear silicones ?

- Me₂SiCl₂
- Me₃SiCl
- MeSiCl₃
- Me₄Si

- 160.** Consider the following reaction.



The product A is

- C₆H₅CHO
- C₆H₅OH
- C₆H₅COCH₃
- C₆H₅Cl

KEY

BOTANY

1-1; 2-2; 3-4; 4-4; 5-4; 6-2; 7-3; 8-2; 9-4; 10-3; 11-3; 12-4; 13-2; 14-2; 15-2; 16-3; 17-3; 18-4; 19-4; 20-2; 21-1; 22-4; 23-2; 24-4; 25-3; 26-4; 27-4; 28-4; 29-1; 30-4; 31-3; 32-4; 33-3; 34-1; 35-4; 36-4; 37-4; 38-2; 39-3; 40-1.

ZOOLOGY

41-2; 42-4; 43-3; 44-1; 45-4; 46-2; 47-4; 48-3; 49-1; 50-3; 51-1; 52-4; 53-4; 54-2; 55-3; 56-2; 57-2; 58-1; 59-2; 60-2; 61-4; 62-3; 63-1; 64-2; 65-2; 66-4; 67-3; 68-2; 69-3; 70-2; 71-1; 72-2; 73-4; 74-4; 75-3; 76-3; 77-3; 78-2; 79-3; 80-2.

PHYSICS

81-4; 82-3; 83-2; 84-3; 85-2; 86-2; 87-1; 88-1; 89-3; 90-2; 91-2; 92-1; 93-2; 94-2; 95-3; 96-3; 97-2; 98-4; 99-1; 100-2; 101-2; 102-3; 103-1; 104-1; 105-2; 106-4; 107-1; 108-1; 109-4; 110-1; 111-1; 112-3; 113-2; 114-3; 115-4; 116-4; 117-1; 118-4; 119-4; 120-1.

CHEMISTRY

121-3; 122-3; 123-2; 124-3; 125-1; 126-2; 127-2; 128-4; 129-1; 130-4; 131-3; 132-1; 133-3; 134-4; 135-2; 136-4; 137-4; 138-3; 139-1; 140-4; 141-4; 142-1; 143-4; 144-3; 145-3; 146-2; 147-3; 148-1; 149-4; 150-4; 151-1; 152-1; 153-4; 154-2; 155-1; 156-2; 157-3; 158-4; 159-1; 160-1.

Physics

81. $\frac{nE}{t} = P$ find n

$$m = \frac{n}{N} \times 235 \quad (\text{N is avagadro's number})$$

82. Momentum of man = momentum of (man + trolley).

Velocity of the trolley = 0.2 m/s .

Velocity of man relative to ground is given as, $(1 - 0.2) = 0.8 \text{ m/s}$.

Displacement is $0.8 \times 5 = 4 \text{ m}$.

83. $s = ut + (1/2) at^2$

$$8 = \frac{1}{2} \times a \times 4 \Rightarrow a = 4 \text{ m/s}^2$$

$$F = ma = 3 \times 4 = 12N$$

$$\text{Power} = \frac{\text{work done}}{\text{time}} = \frac{12 \times 8}{2} = 48W$$

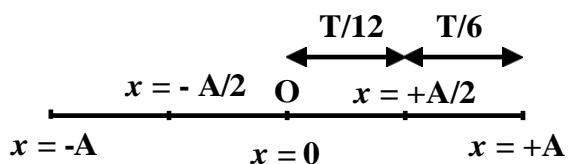
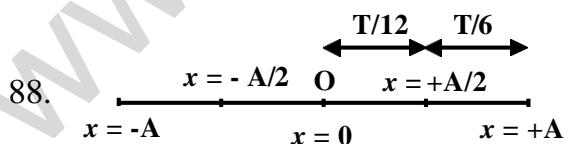
84. $m_1 r_1 = m_2 r_2 \Rightarrow r^3 \rho_1 r = 8 r^3 \rho_2 2r \Rightarrow \frac{\rho_1}{\rho_2} = \frac{16}{1} = 16$

85. $\mu mgs = K \Rightarrow 64 = \mu \times 2 \times 10 \times 16$

86. $v^2 = u^2 - 2gh = 6gr - 2g \times 2r = 2gr$

$$a = \frac{v^2}{rg} = 2g$$

87. $g = \frac{GM}{R^2} \Rightarrow mg = \frac{mGM}{R^2}$



89. $k = 4\pi$, but $k = 2\pi/\lambda$, hence $\lambda = 0.5 \text{ m}$ and loop length is $\lambda/2 = 0.25 \text{ m}$.

The string therefore must be vibrating in 3 loops, hence third harmonic.

90. At minimum deviation the angle of incidence $i = (A + D_m)/2$

$$\sin \left| \frac{A+D}{2} \right|$$

and $\mu = \frac{\sin \frac{A}{2}}{\sin \frac{D}{2}}$

$$91. r = R \left(\frac{L_1 - L_2}{L_2} \right)$$

92. NAND gate with inputs shorted acts as a NOT gate.

NAND gate followed by NOT gate is AND gate.

93. $c = f \lambda$.

94. Work done = $\mu_0 m i$ joule

$$95. I_1 \omega_1 = I_2 \omega_2 \Rightarrow M k_1^2 \omega_1 = M k_{22}^2 \omega_2$$

$$96. \Delta n = \frac{2V_s n}{V}$$

97. Time of crossing (minimum time) is $\frac{b}{y}$.

Time of crossing by shortest path is $\frac{b}{\sqrt{y^2 - x^2}}$.

98. Strain energy per unit volume = $\frac{1}{2} \times \text{stress} \times \text{strain}$.

$\text{Y} = \text{stress}/\text{strain}$

99. When the wavelength is halved, the photon energy gets doubled.

$$E - \phi = K_{\max}$$

100. $PV = nTR$, T on X-axis and PV on Y-axis gives $y = (nR)x$.

This is similar to $y = mx$.

101. Concept of displacement current

$$102. \frac{V_P}{N} = \frac{V_S}{N} \quad \text{and} \quad \eta = \frac{V_S I_S}{V_P I_P}$$

103. For objective, $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ and find 'v'.

$$\text{The magnification} = \left| \frac{v}{u} \right|$$

For the eye-piece magnification is $1 + \frac{D}{f}$.

$$\text{Therefore } m = m_o m_e$$

104. $p = \sqrt{2mK} = \sqrt{2meV}$, and $\lambda = \frac{h}{p}$

105. When the wire is stretched to double its length, two things happen.

I) the resistance becomes 4 times.

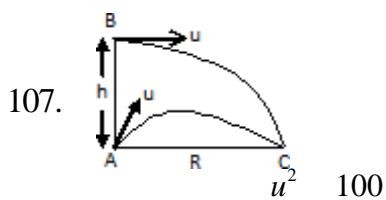
II) the area of cross section is halved.

If the current in the first case is 'i', then in the second case it is ' $i/4$ '.

106. Ratio of area cross sections are $1 : 4 : 9$.

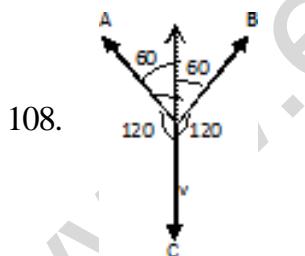
Ratio of radii is $1 : 2 : 3$.

$$\text{Hence the capillary rises are in the } \frac{1}{1} : \frac{1}{2} : \frac{1}{3} = 6 : 3 : 2$$



$$\text{i) Range } R = \frac{u^2}{g} = \frac{100}{10} = 10m$$

$$\text{ii) height } h = \frac{1}{2} g t^2 = \frac{1}{2} g \left[\frac{(R)^2}{(u)} \right] = 5m$$



$$P_A = 2 \text{ units}, P_B = 2 \text{ units}$$

$$\theta = 120^\circ$$

$$\therefore 4mV = 2m$$

$$U = \frac{1}{2} = 0.5 \text{ m/s}$$

109. $v = \sqrt{2gh}$ (Torricelli's theorem)

$$V = Av = A\sqrt{2gh} = \pi R^2 \sqrt{2gh}$$

$$V \propto R^2 \sqrt{h}$$

110. $\gamma_R = \gamma_A + 3\alpha$

111. $I = \frac{I_o \cos^2 60}{2}$

112. $\frac{T_2}{T_1} = \sqrt{\frac{I_2 M_1 B_1}{I_1 M_2 B_2}}$

Here $\frac{I_2}{I_1} = \frac{M_1}{M_2} \cdot \left(\frac{l_1}{l_2}\right)^2 = \frac{1}{2} \left(\frac{1}{2}\right)^2 = \frac{1}{8}$

113. linear charge density versus electric intensity

114. $\frac{x}{y} = \frac{60}{40} \dots\dots\dots (1)$

$$\frac{10x / (10+x)}{y} = \frac{30}{70} \dots\dots\dots (2)$$

115. $S = \frac{G}{n-1}$ where $n = \frac{i}{i_g}$

116. $V = an S_n = \frac{1}{2} an^2$

$$S_{n-2} = \frac{1}{2} a(n-2)^2$$

Therefore, $S_n - S_{n-2} = \frac{1}{2} a(n^2 - n^2 - 4 + 4n)$

$$= 2a(n-1) = \frac{2v(n-1)}{n}$$

117. $\lambda = \frac{1}{\lambda} + \frac{1}{\lambda}$
 $\lambda = \frac{1}{\lambda} \Rightarrow \lambda = \lambda$
 $\frac{1}{\lambda} = \frac{1}{\lambda} - \frac{1}{\lambda}$

$$\Rightarrow \lambda = \frac{\lambda}{\lambda} \Rightarrow \lambda = \frac{\lambda}{\lambda} = \frac{\lambda}{\lambda}$$

118. For Isothermal expansion $W_1 = 2.303 nRT \log \left(\frac{V_2}{V_1} \right)$

For adiabatic process $W_2 = \frac{nR\Delta T}{(\gamma-1)}$

119. Substitute the dimensions of A, B and C.

Equate the powers of L and T.

120. $W_1 = \frac{1}{2} CV^2 = \frac{1}{2} \times 4 \times 10^{-6} \times 50^2 = 12.8 \times 10^{-3} J$

After joining the capacitors in parallel the common voltage

$$V = \frac{C_1 V_1 + C_2 V_2}{C_1 + C_2} = \frac{4 \times 80 + 6 \times 30}{4 + 6} = 50$$

$$\therefore W_2 = \frac{1}{2} CV^2 = \frac{1}{2} \times 4 \times 10^{-6} \times 50^2 = 5 \times 10^{-3} J$$

$$\begin{aligned} \text{Energy lost} &= W_1 - W_2 = (12.8 - 5) \times 10^{-3} \\ &= 7.8 \times 10^{-3} J = 7.8 \text{ mJ} \end{aligned}$$

Chemistry

121. Bond angles are given as

109.5° in SnCl_4

1200 in SO_3

1800 in XeF_2

122. Wavelength (λ)

$$\frac{h}{mv}$$

m = mass of particle

v = velocity at which the particle's moving

123. Ionic radius is least for Al^{3+}

Ionic radius is highest for O^{2-}

Positive ions has less radii.

Negative ions have more radii.

124. Graphs can be obtained as function of radius

125. Xe in XeF_4 has 4 bond pairs and 2 lone pairs

All the atoms in the molecule are co-planar

126. $3\text{H}_2\text{N}_2 \xrightarrow{50\text{L}} 2\text{NH}_3$

30L 30L 0L at start

15L 25L 10L final

127. 'b' is volume constant
128. Froth flotation is not meant for calamine concentration
129. Tindall effect is optical property
 Brownian movement is mechanical property.
 Electrophoresis is electrical property
130. $\text{HgCl}_2 \rightleftharpoons \text{Hg}^2 + 2\text{Cl}^-$ 3 ions
 $\text{NaSO}_4 \rightleftharpoons 2\text{Na}^+ + \text{SO}_4^{2-}$ 3 ions
 If degree of dissociation is 80%, vant Hoff factor will be 2.6 in each case.
131. If attraction forces A-B remains same as those in A-A and B-B,
 The solution is ideal and Raoult's law is applicable
132. Milli moles of acid HCl = $49.9 \times 0.1 = 4.99$
 Milli moles of base NaOH = $50 \times 0.1 = 50$
 Moles of excess base = $5.0 - 4.99 = 0.01$
 Total volume of the mixture = $4.99 + 50.0 = 99.9 \text{ ml}$
 $[\text{OH}^-] = \frac{0.01}{99.9} \times 10^4 \text{ M}$
 $\text{pOH} = -\log[\text{OH}^-] = 4$
 $\text{pH} = 14 - \text{pOH} = 14 - 4 = 10$
133. Keeping [A] constant, if $[\text{B}_2]$ is doubled, the rate is doubled.
 Therefore, rate $[\text{B}_2]$
 Keeping $[\text{B}_2]$ constant, if [A] is doubled, the rate is same.
 Therefore, rate is independent of [A]
134. $\text{XeF}_6 + \text{H}_2\text{O} \rightleftharpoons \text{XeOF}_4 + 2\text{HF}$ (1)
 Equilibrium constant K_1
 $\text{XeO}_4 + \text{XeF}_6 \rightleftharpoons \text{XeOF}_4 + \text{XeO}_3\text{F}_2$ (2)
 Equilibrium constant K_2
 Equation (2) - Equation (1) gives
 $\text{XeO}_4 + \text{H}_2\text{O} \rightleftharpoons \text{XeO}_3\text{F}_2 + 2\text{HF}$ (3)
 Equilibrium constant K_2 / K_1
135. The ratio of change in free energy and change in enthalpy is a measure of fuel cell efficiency

136 Current strength = 5 amp

Time of electrolysis = 40 min = $40 \times 60 = 240\text{s}$

Number of coulombs = $5 \times 240 = 1200$

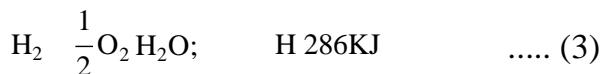
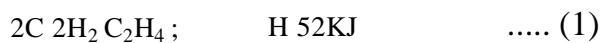
Equivalent weight of zinc = $\frac{65.5}{2} = 32.75$

96500 coulombs 32.75 g of zinc metal

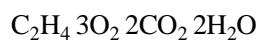
1200 coulombs

$\text{zinc deposited} = \frac{32.75 \times 1200}{96500} = 4.06 \text{ grams}$

137 Enthalpies of formation are given



Combustion of C_2H_4 is given as



Enthalpy of combustion of C_2H_4 is

$$= -1 \times (1) + 2(2) + 2(3)$$

$$= 52 - 788 - 572 = -1412 \text{ KJ}$$

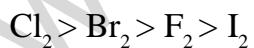
138 Few anions are missing in schottky defect

139 No two 'P' atoms are linked in the cyclic structure of meta phosphoric acid

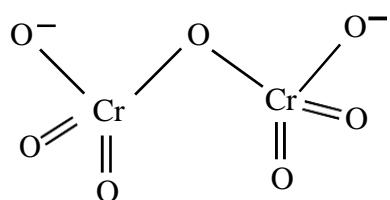
140 SO_3 is trigonal planar

SO_3^2 is trigonal planar

141 Bond energy order of halogens is given as,

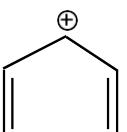


142 Structure of dichromate ion is given as



143. $[\text{Ni}(\text{CO})_4]$ is tetrahedral
 $[\text{Ni}(\text{CN})_4]^{2-}$ is square planar
144. $\text{CO}(\text{NH}_3)_3 \text{Cl}_3$ has no bidentate ligand
145. Lower the BOD value, less is the pollution
146. Longest chain containing double bond has 6 carbon atoms
 Two substituents are present
 Propyl at carbon – 3
 Ethyl at carbon – 4

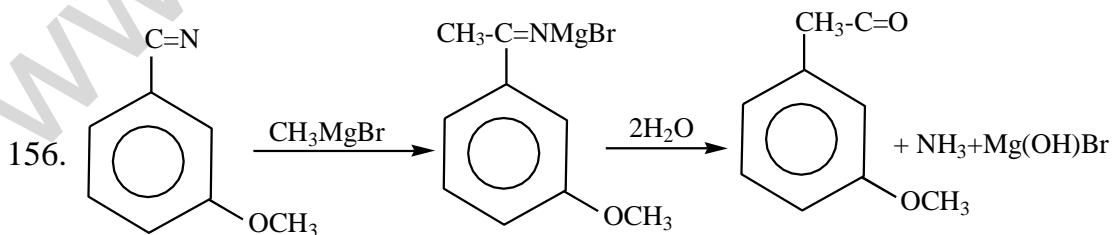
147. Chloroform and aniline differ much in their boiling points

148.  has 2 pi bonds and 4 pi electrons

Huckel's rule of $(4n+2)$ electrons fails here

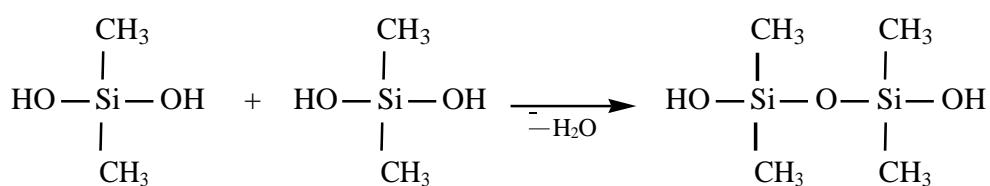
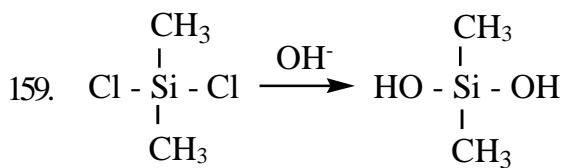
149. Presence of peroxide
150. - D - glucose and - D - fructose
151. Base thymine is present in DNA, but absent in RNA
 Base uracil is present in RNA, but absent in DNA
152. Iodoform releases I_2 on skin and acts as antiseptic
153. Natural rubber is polyisoprene
154. Alkylamine is more basic than ammonia
 Alkylamine is less basic than ammonia

155. Sulphate is laxative



157. Carbonyls are reduced to alkanes in the Wolf-Kishner reduction

158. B_2H_6 reacts with NH_3 to give diborane diammunate



160. $\text{R} - \text{CO} - \text{Cl}$ gives $\text{R} - \text{CO} - \text{H}$.

It undergoes partial hydrogenation with Lindlar's reagent

*Prepared and verified by
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