



Mock Test 4

180x4=720 MARKS

BOTANY

1. Which of the following is NOT a correct rule of biological nomenclature?

- 1) Biological names are written in italics or underlined if handwritten.
- 2) The first word in a biological name starts with a capital letter and represents the genus.
- 3) The second word in a biological name starts with a capital letter and represents the species.
- 4) Biological names are generally derived from Latin or Latinised.

2. What is the basis for grouping plant families like Convolvulaceae and Solanaceae into the order Polymoniales?

- 1) Similarities in vegetative characters
- 2) Similarities in floral characters
- 3) Similarities in habitat and distribution
- 4) Similarities in seed morphology

3. Identify the odd one out based on the classification of Deuteromycetes.

- 1) *Alternaria*
- 2) *Colletotrichum*
- 3) *Trichoderma*
- 4) *Agaricus*

4. Assertion(A): Viruses are not included in Whittaker's five-kingdom classification.

Reason(R): Viruses are non-cellular organisms that exhibit an inert crystalline structure outside the living cell.

- 1) A and R are true, and R is the correct explanation of A
- 2) A and R are true, but R is the correct explanation of A
- 3) Assertion (A) is true, but Reason (R) is false
- 4) Assertion (A) is false, but Reason (R) is true

5. Match the types of taxonomy with their respective basis:

I) Phylogenetic taxonomy	A) Chemical constituents of plants
II) Numerical taxonomy	B) Evolutionary relationships
III) Cytotaxonomy	C) Chromosome number, structure, and behavior
IV) Chemotaxonomy	D) Observable characteristics processed with codes

- 1) I-B, II-D, III-C, IV-A
- 2) I-D, II-B, III-A, IV-C
- 3) I-C, II-A, III-D, IV-B
- 4) I-A, II-C, III-B, IV-D

6. Read the following statements about Rhodophyceae Statements:

- a) Members of Rhodophyceae are commonly called red algae due to the presence of r-phycoerythrin.
 - b) Red algae are exclusively found in well-lighted regions near the water surface.
 - c) Floridean starch is the stored food material in red algae, structurally similar to amylopectin and glycogen.
 - d) Sexual reproduction in red algae is oogamous with complex post-fertilisation developments.
 - e) Red algae reproduce asexually through non-motile spores.
- 1) only a and c are correct.
 - 2) b and d are correct.
 - 3) b is incorrect, all others are correct.
 - 4) d and e are incorrect.

7. Which of the following statements about the floral characters of the Solanaceae family is incorrect?

- 1) The flowers are bisexual and actinomorphic.
- 2) The calyx has five sepals, united, with valvate aestivation.
- 3) The gynoecium is bicarpellary, ovary inferior, and bilocular.
- 4) The androecium consists of five stamens, epipetalous.

8. Which of the following is true for a dicotyledonous seed like castor?
- 1) Castor seed is non-endospermic, storing food in the cotyledons.
 - 2) Castor seed has a single cotyledon and stores food in the seed coat.
 - 3) Castor seed is endospermic, with the endosperm storing food reserves.
 - 4) Castor seed lacks a hilum and micropyle.
9. Which of the following is a characteristic feature of a monocotyledonous stem?
- 1) Vascular bundles are open and arranged in a ring.
 - 2) Phloem parenchyma is present within the vascular bundles.
 - 3) Vascular bundles are scattered and surrounded by a sclerenchymatous bundle sheath.
 - 4) Hypodermis is made up of collenchymatous cells.
10. What is the function of the pericycle in a dicot root?
- 1) It stores food
 - 2) It initiates the formation of lateral roots and vascular cambium during secondary growth
 - 3) It prevents water loss through suberin deposition
 - 4) It provides mechanical support to the endodermis
11. What is the arrangement of microtubules in the axoneme of eukaryotic cilia and flagella?
- 1) 9 + 3 array
 - 2) 9 + 2 array
 - 3) 6 + 4 array
 - 4) 8 + 2 array
12. What is the primary function of the nucleolus in a eukaryotic cell?
- 1) It stores genetic material in the form of DNA
 - 2) It synthesizes ribosomal RNA (rRNA)
 - 3) It regulates the transport of RNA and proteins through nuclear pores
 - 4) It is involved in cell division by forming spindle fibers

13. Why does the velocity of an enzymatic reaction stop increasing beyond a certain substrate concentration?
- 1) The enzyme molecules are saturated with substrate molecules
 - 2) The substrate molecules degrade at higher concentrations
 - 3) The enzyme loses its activity at higher substrate concentrations
 - 4) The reaction reverses at higher substrate concentrations

14. Match the types of cofactors with their examples:

I) Prosthetic group	A) Haem in peroxidase and catalase
II) Co-enzyme	B) NAD and NADP
III) Metal ion	C) Zinc in carboxypeptidase

- 1) I-A, II-B, III-C
- 2) I-B, II-C, III-A
- 3) I-C, II-A, III-B
- 4) I-A, II-C, III-B

15. Match the phases of Prophase I in Meiosis I with their key characteristics:

Phase	Characteristic
I) Leptotene	A) Chromosomes become visible and start condensing
II) Zygotene	b) Homologous chromosomes pair and synaptonemal complex forms
III) Pachytene	C) Crossing over occurs, recombination nodules appear
IV) Diplotene	D) Dissolution of synaptonemal complex and chiasmata form
V) Diakinesis	E) Terminalisation of chiasmata, spindle assembly begins

- 1) I-A, II-B, III-C, IV-D, V-E
- 2) I-B, II-C, III-E, IV-A, V-D
- 3) I-C, II-D, III-A, IV-E, V-B
- 4) I-E, II-A, III-B, IV-C, V-D

16. Match the stages of meiosis with their key events:

Stage	Event
I) Metaphase I	A) Homologous chromosomes align at the equatorial plate
II) Anaphase I	B) Homologous chromosomes separate, sister chromatids remain attached
III) Metaphase II	C) Chromosomes align at the equator sister chromatids face opposite poles
IV) Anaphase II	D) Centromeres split, sister chromatids move to opposite poles

- 1) I-A, II-B, III-C, IV-D
- 2) I-B, II-A, III-D, IV-C
- 3) I-C, II-D, III-B, IV-A
- 4) I-A, II-C, III-B, IV-D

17. Which of the following statements about early experiments on photosynthesis is incorrect?

- 1) Priestley concluded that plants restore to the air whatever breathing animals and burning candles remove
- 2) Jan Ingenhousz demonstrated that sunlight is essential for plants to purify air
- 3) Priestley observed oxygen bubbles forming around green parts of aquatic plants in sunlight
- 4) Ingenhousz identified the bubbles formed around green parts of aquatic plants as oxygen

18. Which of the following correctly explains the division of labour within the chloroplast?

- 1) The grana is responsible for sugar synthesis, and the stroma is responsible for ATP production
- 2) The membrane system traps light energy and synthesizes ATP and NADPH, while the stroma is responsible for enzymatic reactions that synthesize sugar
- 3) The stroma lamellae store light energy, and the grana carry out enzymatic reactions to form starch
- 4) The matrix stroma produces light energy, while the membrane system forms sugars

19. Which pigment is considered the chief pigment associated with photosynthesis, and why?

- 1) Chlorophyll b, because it absorbs light in the yellow-green region
- 2) Carotenoids, because they protect chlorophyll from photooxidation
- 3) Chlorophyll a, because it shows maximum absorption in the blue and red regions of light
- 4) Xanthophylls, because they reflect yellow light for photosynthesis

20. What is the primary function of pyruvate dehydrogenase in aerobic respiration?

- 1) To convert glucose into pyruvate in the cytoplasm
- 2) To oxidatively decarboxylate pyruvate into acetyl CoA in the mitochondrial matrix
- 3) To synthesize ATP directly from pyruvate
- 4) To reduce oxygen into water during aerobic respiration

21. What is the net ATP gain when one molecule of glucose is fermented to alcohol or lactic acid?

- 1) 0 ATP
- 2) 2 ATP
- 3) 4 ATP
- 4) 36 ATP

22. Assertion (A): Removal of the shoot tip (decapitation) promotes the growth of lateral buds.

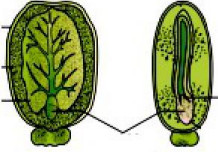
Reason (R): The apical bud produces auxins, which inhibit the growth of lateral buds

- 1) A and R are true, and R is the correct explanation of A
- 2) A and R are true, but R is not the correct explanation of A
- 3) Assertion (A) is true, but Reason (R) is false
- 4) Assertion (A) is false, but Reason (R) is true

23. What is the role of gibberellins in plants with a rosette habit?

- 1) Inhibits flowering and seed production
- 2) Promotes bolting by elongating internodes before flowering
- 3) Enhances the development of lateral roots
- 4) Delays the maturity period of juvenile plants

24. The diagram represents the internal structure of a seed. Which seed is shown in the image?



- 1) Bean seed (dicot, non-endospermic)
 - 2) Pea seed (dicot, non-endospermic)
 - 3) Castor seed (dicot, endospermic)
 - 4) Maize seed (monocot, endospermic)
25. Read the following statements about seeds and fruits. Identify the incorrect statement:
- a) Non-albuminous seeds have no residual endosperm as it is completely consumed during embryo development.
 - b) Albuminous seed Store food in cotyledon.
 - c) The micropyle facilitates the entry of oxygen and water during seed germination.
 - d) The pericarp is the wall of the ovary that develops into the wall of the fruit.
 - e) False fruits develop only from the ovary.
- 1) a and d
 - 2) b and e
 - 3) c and d
 - 4) b and d
26. Which of the following statements best explains Mendel's Law of Independent Assortment?
- 1) The alleles of a single gene segregate equally during gamete formation
 - 2) The segregation of one pair of alleles is independent of the segregation of another pair of alleles during gamete formation
 - 3) Dominant traits are always inherited together with recessive traits in hybrids
 - 4) The phenotype ratio of a dihybrid cross is always 3:1
27. What is the phenomenon called when a single gene exhibits multiple phenotypic effects?
- 1) Polygenic inheritance
 - 2) Epistasis
 - 3) Pleiotropy
 - 4) Codominance
28. Which of the following statements about human skin colour is true in the context of polygenic inheritance?
- 1) Human skin colour is controlled by a single gene with dominant and recessive alleles
 - 2) Human skin colour is influenced by three or more genes as well as environmental factors
 - 3) Human skin colour is not affected by environmental factors, only by genetic makeup
 - 4) Human skin colour exhibits codominance rather than polygenic inheritance
29. Which of the following scenarios will allow the lac operon to be expressed in *E. coli*?
- 1) Presence of glucose and absence of lactose in the growth medium
 - 2) Presence of lactose and absence of glucose in the growth medium
 - 3) Presence of both glucose and lactose in the growth medium
 - 4) Absence of both glucose and lactose in the growth medium
30. What is the role of untranslated regions (UTRs) in mRNA?
- 1) They are translated into polypeptides
 - 2) They code for start and stop codons
 - 3) They facilitate efficient translation but are not translated into polypeptides
 - 4) They degrade mRNA after translation
31. What is the role of release factors and rho (ρ) factor in transcription and translation?
- 1) Release factors initiate transcription, and rho (ρ) factor terminates it
 - 2) Release factors terminate translation, and rho (ρ) factor terminates transcription
 - 3) Release factors elongate the mRNA strand, and rho (ρ) factor initiates translation
 - 4) Both release factors and rho (ρ) factor are involved in elongation of polypeptides
32. Which of the following statements about cyanobacteria is correct?
- 1) Cyanobacteria are heterotrophic microbes that depend on organic matter for nutrition
 - 2) Cyanobacteria, like *Anabaena* and *Nostoc*, can fix atmospheric nitrogen and improve soil fertility
 - 3) Cyanobacteria are found only in aquatic environments and not on land
 - 4) Cyanobacteria are used to reduce atmospheric nitrogen levels in the environment

33. What is the key belief of organic farmers regarding biodiversity?
- 1) Biodiversity increases the cost of farming
 - 2) Biodiversity harms the ecosystem by promoting pests
 - 3) Biodiversity enhances the health and sustainability of the ecosystem
 - 4) Biodiversity reduces crop yield
34. In which part of the insect's body is the Bt protoxin activated?
- 1) Stomach
 - 2) Midgut
 - 3) Intestine
 - 4) Salivary glands
35. Which of the following is NOT one of the three critical research areas of biotechnology?
- 1) Providing improved catalysts like microbes or enzymes
 - 2) Engineering optimal conditions for catalyst action
 - 3) Downstream processing to purify organic compounds
 - 4) Designing new habitats for endangered species
36. Which of the following statements best describes the role of biotechnology in large-scale production?
- 1) It focuses only on altering the chemistry of DNA for genetic studies
 - 2) It involves ferrying foreign DNA into host organisms for production and marketing of functional products
 - 3) It emphasizes the natural multiplication of organisms without any genetic modification
 - 4) It excludes the use of bioreactors for large-scale production
37. What are proteins called when they are encoded by a gene expressed in a heterologous host?
- 1) Native proteins
 - 2) Recombinant proteins
 - 3) Structural proteins
 - 4) Functional proteins
38. What is the term used for a gene that helps identify and select transformed cells during recombinant DNA experiments?
- 1) Indicator gene
 - 2) Selectable marker
 - 3) Regulatory gene
 - 4) Structural gene
39. Which technique is used to check the progression of restriction enzyme digestion of DNA?
- 1) Polymerase chain reaction (PCR)
 - 2) Southern blotting
 - 3) Agarose gel electrophoresis
 - 4) Centrifugation
40. What is the correct sequence of steps in recombinant DNA technology?
- 1) Ligation → Isolation of DNA → Transfer into host → Culturing → Extraction of product
 - 2) Isolation of DNA → Fragmentation → Ligation → Transfer into host → Culturing → Extraction of product
 - 3) Fragmentation → Culturing → Ligation → Transfer into host → Isolation of DNA → Extraction of product
 - 4) Transfer into host → Isolation of DNA → Culturing → Fragmentation → Ligation → Extraction of product
41. How can recombinant colonies be differentiated from non-recombinant colonies in the presence of a chromogenic substrate?
- 1) Recombinant colonies appear blue, while non-recombinant colonies remain colorless
 - 2) Recombinant colonies remain colorless, while non-recombinant colonies appear blue
 - 3) Recombinant and non-recombinant colonies appear blue
 - 4) Both recombinant and non-recombinant colonies remain colorless
42. Assertion (A): tRNA is known as an adapter molecule in protein synthesis.
Reason (R): tRNA reads the mRNA codon through its anticodon and binds to a specific amino acid to facilitate translation.
- 1) A and R are true, and R is the correct explanation of A
 - 2) A and R are true, but R is not the correct explanation of A
 - 3) Assertion (A) is true, but Reason (R) is false
 - 4) Assertion (A) is false, but Reason (R) is true
43. How have mutation studies contributed to our understanding of the relationship between genes and DNA?
- 1) By showing that mutations occur only in proteins
 - 2) By demonstrating that changes in DNA sequence can alter gene expression
 - 3) By proving that all mutations are beneficial for the organism
 - 4) By identifying that mutations are unrelated to genetic material

44. What difficulty arises in predicting the nucleotide sequence of mRNA from a given amino acid sequence?
- Each amino acid is coded by only one specific codon
 - The genetic code is ambiguous, and one codon can specify multiple amino acids
 - The genetic code is degenerate, meaning multiple codons can code for the same amino acid
 - The sequence of amino acids directly specifies the tRNA sequence, not the mRNA sequence
45. Why are regulatory sequences sometimes referred to as regulatory genes?
- Because they code for structural proteins
 - Because they influence the expression of structural genes by regulating transcription
 - Because they are responsible for DNA replication
 - Because they alter the genetic code of structural genes

ZOOLOGY

46. Read the following and choose the correct statements
- Pons consists of fibre tracts that interconnect different regions of the brain.
 - Midbrain is located between thalamus/hypothalamus of forebrain and pons of hindbrain.
 - Greyish appearance of cerebral cortex is due to the presence of concentrated myelinated axons.
 - Inner parts of cerebrum along with hippocampus and amygdala forms brain stem.
 - The cerebellar hemispheres are connected by a tract of nerve fibres called corpus callosum.
- a, b and e only
 - b, c and d only
 - a and b only
 - c and d only
47. Pituitary hormones stimulates the synthesis and secretion of steroid hormones like
- estrogen and relaxin
 - testosterone and Cortisol
 - progesterone and inhibin
 - aldosterone and adrenaline

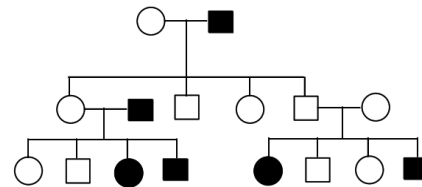
48. Read the following and choose the correct statements.
- Relaxin is produced by both placenta and ovary.
 - Inhibin is produced by both testis and ovary.
 - Somatostatin is produced by both hypothalamus and pituitary.
 - Human chorionic gonadotropin is produced by both trophoblast cells and placenta.
 - Androgenic steroids are produced by both adrenal cortex and testis.
- all except d
 - all except c
 - all except e
 - all except b

49. Match the following.

A) Multiload 375	I) Prevent RTFs
B) Lactational amenorrhea	II) Suppress sperm motility
C) Saheli	III) Prevent ovulation
D) Nirodh	IV) Prevent implantation

- A-II, B-III, C-I, D-II
- A-I, B-IV, C-III, D-II
- A-IV, B-I, C-II, D-III
- A-II, B-III, C-IV, D-I

50. The following pedigree chart depicts the inheritance of



- Autosomal dominant
- X - linked recessive
- Autosomal recessive
- X - linked dominant

51. Read the following and choose the correct statements
- Fossils found in Java in 1891 revealed the existence of *Homo habilis* in Asia.
 - The Neanderthal man developed prehistoric cave art about 18000 years ago.
 - Homo erectus* arose in Africa and moved across continents and developed into distinct races.
 - Australopithecines* used hides to protect their body and buried their dead
 - Ramapithecus was hairy and walked like gorillas and chimpanzees.
- C, D and E only
 - A, B and E only
 - E only
 - A and E only

52. Match the following.

A) Decrease in helper T lymphocytes	I Dengue
B) Decrease in thrombocytes	II AIDS
C) Decrease in erythrocytes	III Allergy
D) Increase in IE antibodies	IV Malaria

- 1) A-II, B-I, C-III, D-IV
- 2) A-II, B-I, C-IV, D-III
- 3) A-I, B-II, C-III, D-IV
- 4) A-I, B-II, C-IV, D-III

53. Which of the following ecological pyramid is inverted?

- 1) Pyramid of biomass in a lake
- 2) Pyramid of number in a grassland
- 3) Pyramid of energy in a forest
- 4) Pyramid of number in an ocean

54. Match the following.

A) Cuscuta on hedge plant	I) Parasitism
B) Orchid on mango tree	II) Commensalism
C) Fungi on roots of higher plants	III) Mutualism
D) Warblers on the same tree	IV) Co-existence

- 1) A-I, B-II, C-III, D-IV
- 2) A-IV, B-III, C-II, D-I
- 3) A-III, B-IV, C-I, D-II
- 4) A-II, B-I, C-IV, D-III

55. Statement-I: Most of the birds are oviparous and some are viviparous.

Statement-II: All the mammals are viviparous without any exceptions.

- 1) Both statement I and statement II are correct.
- 2) Both statement I and statement II are incorrect.
- 3) Statement I is correct but statement II is incorrect.
- 4) Statement I is incorrect but statement II is correct.

56. Which of the following possess simple columnar epithelium with microvilli?

- 1) Proximal convoluted tubule
- 2) Lining of intestine
- 3) Wall of trachea
- 4) Ducts of salivary gland

57. Statement-I: Volume of air inspired through inspiratory capacity is less than that of vital capacity.

Statement-II: Volume of air expired through vital capacity is more than that of expiratory capacity.

- 1) Both statement I and statement II are correct.
- 2) Both statement I and statement II are incorrect.
- 3) Statement I is correct but statement II is incorrect.
- 4) Statement I is incorrect but statement II is correct.

58. Match the following

A) Sino - atrial node	I) Collagen fibres
B) Purkinje fibres	II) Endothelium
C) Tunica externa	III) Right atrium
D) Tunica intima	IV) Walls of ventricle

- 1) A-III, B-IV, C-I, D-II
- 2) A-IV, B-III, C-II, D-I
- 3) A-II, B-I, C-III, D-IV
- 4) A-I, B-II, C-IV, D-III

59. Glomerular filtration rate of a healthy person is

- 1) 1100 mL/min
- 2) 650 mL/min
- 3) 125 mL/min
- 4) 1.5 litres/day

60. Joint between carpals is

- 1) gliding
- 2) saddle
- 3) pivot
- 4) hinge

61. Which of the following is the primary function of medulla oblongata?

- 1) Association areas for memory and communication
- 2) Centres to control urge for eating and drinking
- 3) Receive and integrate visual and tactile inputs
- 4) Centres to control cardiovascular reflexes and gastric secretion

62. Read the following and choose the correct statements.
- Secretin acts on the exocrine pancreas and stimulates secretion of insulin and glucagon.
 - Androgens produce synthetic effects on protein and carbohydrate metabolism.
 - Glucagon reduces the cellular glucose uptake and utilization.
 - Thymosins play a major role in the differentiation of B-lymphocytes, which provide cell-mediated immunity.
 - Melatonin stimulates melanocytes and increases the pigmentation of human skin.
- b, c and e only
 - c and d only
 - b and c only
 - a, c and d only
63. Which of the following is a diploid stage?
- First polar body
 - Primary oocyte
 - Secondary oocyte
 - Second polar body
64. Which of the following contraceptive /method is not used to delay pregnancy?
- Saheli
 - Nirodh
 - Intra uterine device
 - Vasectomy
65. Select the correct statements with respect to mechanism of sex determination in grasshopper.
- It is an example of female heterogamety
 - Male produces two different types of gametes either with or without X chromosome.
 - Total number of chromosomes (autosomes and sex chromosomes) is same in both males and females.
 - All eggs bear an additional X chromosome besides the autosomes. Choose the correct answer from the options given below
- B and D only
 - A, C and D only
 - A only
 - A and C only
66. Which of the following is not an effect of cocaine?
- Interferes with the transport of dopamine
 - Potent stimulating action on central nervous system
 - Produces a sense of euphoria and increased energy
 - Acts as depressant and slows down body functions
67. Which of the following enzyme is crucial for the immune system to function?
- Phenylalanine hydroxylase
 - Homogentisate dioxygenase
 - Beta galactosidase
 - Adenosine deaminase
68. Statement-I: Loss of biodiversity in a region leads to increased resistance to environmental perturbations.
Statement-II: Careful analysis of records shows that extinctions across taxa are not random.
- Both statement I and statement II are correct.
 - Both statement I and statement II are incorrect.
 - Statement I is correct but statement II is incorrect.
 - Statement I is incorrect but statement II is correct.
69. Which of the following chordates belong to the same subphylum?
- Amphioxus* and *Ascidia*
 - Scoliodon* and *Salpa*
 - Balanoglossus* and *Balaenoptera*
 - Hippocampus* and *Hemidactylus*
70. Which of the following structures do not open into the genital chamber of female cockroaches?
- A single median oviduct
 - Spermatheca
 - A pair of anal cerci
 - A pair of collateral glands
71. If N is the population density at time ' t ', then its density at time $t + 1$ is
- $\frac{dN}{dt} = rN$
 - $N_t + [(B + I) - (D + E)]$
 - $N_0 e^{rt}$
 - $\frac{dN}{dt} = rN \left(\frac{K-N}{K} \right)$
72. Assertion (A): At puberty only 60,000 - 80,000 primary follicles are left in each ovary.
Reason (R): A large number of these follicles degenerate from birth to puberty.
- A and R are true but R is not the correct explanation of A
 - (A) is true but (R) is false.
 - (A) is false but (R) is true.
 - A and R are true and R is the correct explanation of A.

73. Match the Columns based on antagonistic functioning.

A) Progesterone	I) Parathormone
B) Glucagon	II) Atrial natriuretic peptide
C) Thyrocalcitonin	III) Oxytocin
D) Anti diuretic hormone	IV) Insulin

- 1) A-III, B-IV, C-II, D-I
- 2) A-IV, B-III, C-II, D-I
- 3) A-III, B-IV, C-I, D-II
- 4) A-IV, B-III, C-I, D-II

74. Select the correct set of assisted reproductive technologies?

- 1) RJT and RJD
- 2) AI and RTI
- 3) RJI and IVF
- 4) ZIFT and MTP

75. Which of the following is a salient observation drawn from human genome project?

- 1) The human genome contains 30,000 million bp
- 2) Expressed sequence tags make up very large portion of human genome
- 3) Single nucleotide polymorphism occur about 1.4 million locations
- 4) Repeated sequences have no role in maintaining chromosome structure and dynamics

76. Assertion (A): Darwin's theory of natural selection states that populations are stable in size except seasonal fluctuations.

Reason (R): Members of population vary in characteristics even though they look superficially similar.

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

77. Which of the following are mainly involved in the generation of acquired immune response?

- 1) Antibodies and B - lymphocytes
- 2) Interferons and neutrophils
- 3) Lysozyme and NK cells
- 4) Interleukins and monocytes

78. Which of the following is used in the treatment of emphysema?

- 1) Alpha lactalbumin
- 2) β - lactalbumin
- 3) β - 1 - antitrypsin
- 4) α -1- antitrypsin

79. Which of the following organism breed only once in its life time?

- 1) African flamingo
- 2) Australian kangaroo
- 3) Pacific salmon
- 4) Siberian crane

80. Statement-I: Humus is highly resistant to microbial action and undergoes decomposition at an extremely slow rate.

Statement-II: The breakdown of humus into inorganic nutrients is known as humification.

- 1) Both statement I and statement II are correct.
- 2) Both statement I and statement II are incorrect.
- 3) Statement I is correct but statement II is incorrect.
- 4) Statement I is incorrect but statement II is correct.

81. Which of the following became extinct due to over-exploitation?

- 1) African catfish
- 2) Passenger pigeon
- 3) Water hyacinth
- 4) Bengal tiger

82. Which of the following component is the characteristic feature of Hemichordata?

- 1) Notochord
- 2) Spinal cord
- 3) Stomochord
- 4) Umbilical cord

83. Which of the following is correct about frog?

- 1) Midbrain is characterized by a pair of optic lobes
- 2) Kidneys have structural and functional connection with the ovaries
- 3) Ventricle opens into sac like sinus venosus on the ventral side of the heart
- 4) Liver secretes bile that is stored in the stomach

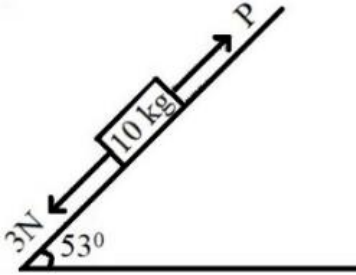
84. Which of the following factor is favourable for the formation of oxyhaemoglobin?
- 1) High partial pressure of oxygen
 - 2) High partial pressure of carbondioxide
 - 3) Higher hydrogen ion concentration
 - 4) Higher temperature of body parts
85. Assertion (A): End of QRS complex marks the end of ventricular systole.
Reason (R): T wave represents the return of ventricles from excited to normal state.
- 1) A and R are true and R is the correct explanation of A.
 - 2) A and R are true but R is not the correct explanation of A.
 - 3) (A) is true but (R) is false.
 - 4) (A) is false but (R) is true
86. Statement-I: Osmoreceptors in the body are activated by changes in blood volume, body fluid volume and ionic concentration.
Statement-II: An excessive loss of fluid from the body can activate osmoreceptors, which stimulate the hypothalamus to release ADH.
- 1) Both statement I and statement II are correct.
 - 2) Both statement I and statement II are incorrect.
 - 3) Statement I is correct but statement II is incorrect.
 - 4) Statement I is incorrect but statement II is correct.
87. Statement-I: Each muscle fibre is lined by the plasma membrane called fascia.
Statement-II: The 'A' and 'I' bands are arranged alternately throughout the length of the myofibril in a skeletal muscle.
- 1) Both statement I and statement II are correct.
 - 2) Both statement I and statement II are incorrect.
 - 3) Statement I is correct but statement II is incorrect.
 - 4) Statement I is incorrect but statement II is correct.
88. In DNA fingerprinting, autoradiography is used for the
- 1) Separation of DNA fragments based on electric charge
 - 2) Detection of hybridized DNA fragments on photographic film
 - 3) Transfer of separated DNA fragments to nitrocellulose membrane.
 - 4) Digestion of DNA by restriction endonucleases

89. Which of the following explains analogy?
- 1) All mammals share similarities in pattern of bones of forelimbs
 - 2) Same structure developed along different directions
 - 3) Different structures evolving for the same functions
 - 4) Similar anatomical structures to different needs reveal common ancestry
90. Arrange the following events of an action potential in a proper sequence
- a) Efflux of K^+
 - b) Depolarisation
 - c) Influx of Na^+
 - d) Repolarisation
- 1) c \rightarrow d \rightarrow a \rightarrow b
 - 2) c \rightarrow a \rightarrow b \rightarrow d
 - 3) a \rightarrow b \rightarrow c \rightarrow d
 - 4) c \rightarrow b \rightarrow a \rightarrow d

PHYSICS

91. 20 divisions on the main scale of a Vernier callipers coincides with 21 divisions on the Vernier scale. If each division on the main scale is of 0.5mm, the least count of the instrument in mm is
- 1) 1 / 42
 - 2) 20 / 21
 - 3) 5 / 20
 - 4) 5 / 21
92. Two bodies of different masses are dropped from heights of 16 m and 25 m respectively. Ignoring the air resistance, the ratio of the time taken by them to reach the ground is
- 1) 25 / 16
 - 2) 5 / 4
 - 3) 4 / 5
 - 4) 16 / 25
93. A projectile is thrown at angle β with vertical. It reaches a maximum height H. The time taken to reach the highest point of its path is
- 1) $\sqrt{\frac{8H}{g}}$
 - 2) $\sqrt{\frac{2H}{g}}$
 - 3) $\sqrt{\frac{H}{2g}}$
 - 4) $\sqrt{\frac{2H}{g \cos \beta}}$

94. A block of mass 10 kg is kept on a rough inclined plane as shown in the figure. A force of 3N is applied on the block. The coefficient of static friction between the plane and the block is 0.6. What should be the minimum value of force P, such that the block does not move downward? (Take $g = 10 \text{ ms}^{-2}$ and $\sin 53^\circ = 0.8$)



- 1) 47 N
2) 119 N
3) zero
4) 35 N
95. A cricket player catches a ball of mass 120g moving with 25 m/s speed. If the catching process is completed in 0.1 s then the magnitude of force exerted by the ball on the hand of player will be (in SI unit):
1) 30
2) 24
3) 12
4) 25
96. A family uses 10 kW of power. Direct solar energy is incident on horizontal surface at a rate of 250 W per square meter. If 20% of its energy is converted into useful electric energy, how large area is needed to meet family demand of power.
1) 200 m^2
2) 220 m^2
3) 50 m^2
4) 40 m^2
97. A stationary shell explodes into two fragments, having masses in the ratio of 1:2. The heavier fragment attains a Kinetic energy of 100 J. The kinetic energy released in the explosion is
1) 200 J
2) 150 J
3) 300 J
4) 600 J

98. Two bodies of masses 2 kg and 4 kg initially at rest are moving with velocities 20 ms^{-1} and 10 ms^{-1} towards each other due to mutual gravitation attraction. What is the velocity of their centre of mass?

- 1) 5 ms^{-1}
2) 6 ms^{-1}
3) 8 ms^{-1}
4) zero

99. A ring of radius r and mass m rotates about a diametric axis passing through its centre with angular velocity ω . Its kinetic energy is

- 1) $mr^2\omega^2$
2) $\frac{mr\omega^2}{2}$
3) $\frac{mr^2\omega^2}{4}$
4) $\frac{mr^2\omega^2}{2}$

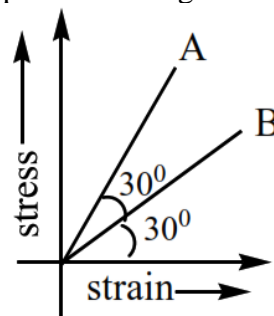
100. A person standing on a rotating platform has his hands lowered. If he suddenly stretches out his arms then the angular momentum of the system

- 1) Becomes zero
2) Increases
3) Decreases
4) Remains the same

101. A thin weightless bag suspended to spring balance is filled with 2 kg of water and then immersed in water. The reading of spring balance is

- 1) 2 kgwt
2) 2.5 kgwt
3) 1.75 kgwt
4) zero

102. Stress-strain curves for two rods A and B are shown. The two rods of equal area of cross sections, lengths ' l ' and $3l$, made of different materials are equally strained. The ratio of potential energies stored in the rods A and B is



- 1) 1 : 3
2) 3 : 1
3) 1 : 1
4) 9 : 1

103. A drop of liquid of diameter 2.8 mm breaks up into 125 identical drops. The change in energy is nearly ($S = 75 \text{ dyne cm}^{-1}$)

- 1) Zero
- 2) $7.4 \times 10^{-9} \text{ J}$
- 3) $7.4 \times 10^{-6} \text{ J}$
- 4) $7.4 \times 10^{-4} \text{ J}$

104. Two spheres of radii in the ratio 1:2 and densities in the ratio 2:1 and of same specific heat, are heated to same temperature and left in the same surrounding. Their rate of cooling will be in the ratio

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

105. It is hotter for the same distance over the top of a fire than it is in the side of it, mainly because

- 1) Air conducts heat upwards only
- 2) Heat is radiated only upwards
- 3) In addition to radiation, convection also takes heat upwards
- 4) Convection, conduction and radiation all contribute significantly transferring heat upwards

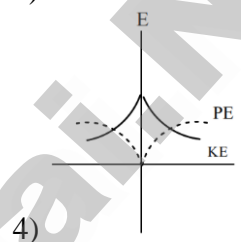
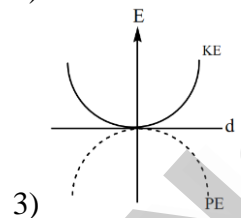
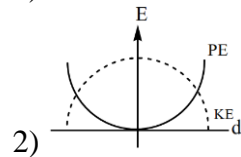
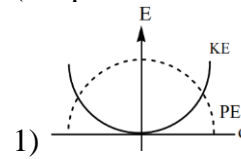
106. Considering earth as a uniform solid sphere, the difference between acceleration due to gravity at poles and at equator is 'x'. If the earth starts rotating with double the present angular speed, the difference becomes.

- 1) $> 4x$
- 2) zero
- 3) $4x$
- 4) $9x$

107. A planet is revolving around the sun in an elliptical orbit. During its motion from A to B, which quantity remains constant?

- 1) Angular velocity
- 2) Momentum
- 3) Tangential velocity
- 4) Areal velocity about sun

108. For a simple pendulum, a graph is plotted between its kinetic energy (KE) and potential energy (PE) against its displacement d . Which one of the following represents these correctly? (Graphs are not drawn to scale)



109. The number of degrees of freedom for a diatomic gas like Cl_2 , taking vibrational mode into account is

- 1) 2
- 2) 5
- 3) 6
- 4) 7

110. Match the following

(a) Isothermal	(i) Pressure constant
(b) Isochoric	(ii) Temperature constant
(c) Adiabatic	(iii) Volume constant
(d) Isobaric	(iv) Heat content is constant

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

111. 1g of a liquid at its boiling point is converted to vapour at $3 \times 10^5 \text{ Pa}$ pressure. If increase in the volume is 1600 cm^3 during this phase change, then the increase in internal energy in the process will be:

(Latent heat of liquid is 500 cal g^{-1})

- 1) 1620 cal
- 2) 1620 J
- 3) 1620 erg
- 4) 1620 eV

112. A cylinder of fixed capacity 44.8 litres contains helium gas at standard temperature and pressure. The amount of heat needed to raise the temperature of the gas in the cylinder by 15.0°C is nearly

- 1) 45 J
- 2) 374 J
- 3) 90 J
- 4) 623 J

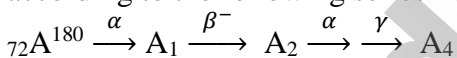
113. Two identical charged spheres are suspended by strings of equal length. The strings make an angle θ with each other. When suspended in water the angle remains the same. If density of the material of the sphere is 1.5g/cc , the dielectric constant of water will be ___ (Take density of water = 1g/cc)

- 1) 5
- 2) 3
- 3) 4
- 4) 1.5

114. Two identical bulbs when connected in series to a battery, consume electric power of 60W. If these bulbs are now connected in parallel combination to the same battery, electric power consumed will be:

- 1) 60W
- 2) 240W
- 3) 120 W
- 4) 30W

115. A hypothetical radioactive nucleus decays according to the following series



If the mass number and atomic number of A are respectively 180 and 72. Then to atomic number and mass number of A_4 will respectively be

- 1) 69,171
- 2) 70,172
- 3) 68,172
- 4) 69,172

116. Hydrogen atom from excited state comes to the ground state by emitting a photon of wavelength λ . If R is the Rydberg constant, the principal quantum number n of the excited state is

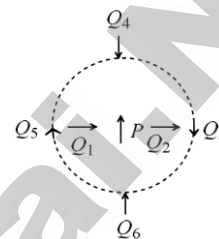
- 1) $\sqrt{\frac{\lambda R}{\lambda R - 1}}$
- 2) $\sqrt{\frac{\lambda}{\lambda R - 1}}$
- 3) $\sqrt{\frac{\lambda R^2}{\lambda R - 1}}$
- 4) $\sqrt{\frac{\lambda R}{\lambda R + 1}}$

117. Statement(A): Increasing the current sensitivity of moving coil galvanometer may not necessarily increase its voltage sensitivity

Statement(B): A charged particle moves through a magnetic field perpendicular to field direction. Then its momentum changes but the kinetic energy is constant

- 1) A is true, B is false
- 2) A is false, B is true
- 3) Both A and B are true
- 4) Both A and B are false

118. The figure shows the various positions (labelled by subscripts) of small magnetised needles P and Q. The arrows show the direction of their magnetic moment and all are of same magnitude. Which configuration corresponds to the lowest potential energy among all the configurations shown



- 1) PQ_3
- 2) PQ_4
- 3) PQ_5
- 4) PQ_6

119. Assertion (A): Soft iron is preferred to steel as the core of transformer.

Reason (R): Steel has less retentivity than soft iron, but it has high coercivity than soft iron.

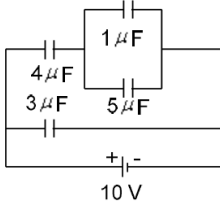
- 1) A and R are correct R is the correct explanation of A
- 2) A and R are correct but R is not the correct explanation of A
- 3) A is not correct but R is correct
- 4) A is correct but R is not correct

120. Electric field strength due to a short dipole of dipole moment ' \vec{P} ' at a distance 'r' on its equatorial line is

- 1) $\frac{1}{4\pi\epsilon_0} \left(\frac{-\vec{P}}{r^3} \right)$
- 2) $\frac{1}{4\pi\epsilon_0} \left(\frac{2\vec{P}}{r^3} \right)$
- 3) $\frac{1}{4\pi\epsilon_0} \left(\frac{\vec{P} \cdot \vec{r}}{r^3} \right)$
- 4) $\frac{1}{4\pi\epsilon_0} \left(\frac{\vec{P} \times \vec{r}}{r^3} \right)$

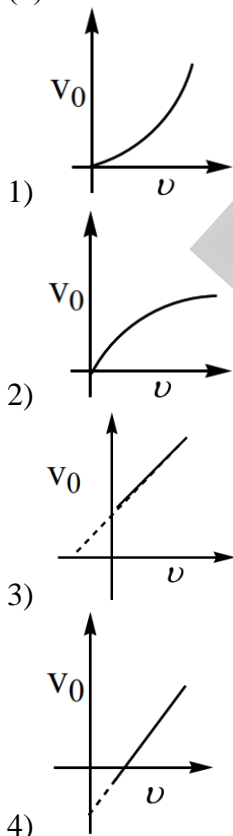
121. A $4\mu\text{F}$ capacitor is charged to 400V and then its plates are joined through a resistance 50Ω . The heat produced in the resistance is
- 1) 1.6 J
 - 2) 0.32 J
 - 3) 0.64 J
 - 4) 1.28 J

122. For the circuit shown in figure the charge on $4\mu\text{F}$ capacitor is



- 1) $40\mu\text{C}$
 - 2) $30\mu\text{C}$
 - 3) $24\mu\text{C}$
 - 4) $54\mu\text{C}$
123. In a resonance tube, using a tuning fork of frequency 325 Hz , two successive resonance length are observed as 25.4 cm and 77.4 cm respectively. The velocity of sound in air is
- 1) 338 ms^{-1}
 - 2) 328 ms^{-1}
 - 3) 330 ms^{-1}
 - 4) 320 ms^{-1}

124. For a photo electric cell the graph showing variation of cut off voltage (V_0) with frequency (ν) of incident radiation is best represented by



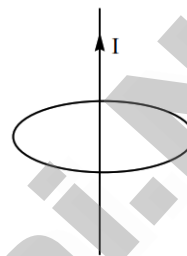
125. Which of the following is true?

- 1) Forbidden energy gap of semiconductors is $>3\text{eV}$
- 2) In an unbiased p-n junction diode, electrons diffuse from n-region to p-region
- 3) NOT gate is a universal gate
- 4) Solar cell is forward biased

126. Meter bridge works on the principle of

- 1) Law of conservation of energy
- 2) Wheatstone's bridge and its balance condition
- 3) Ohm's law
- 4) Ampere's circuital law

127. A thin long straight conductor is along the axis of a circular loop. If the current in the straight conductor is increasing then



- 1) Induced current flows in the circular loop
- 2) Induced current flows in clockwise
- 3) Emf is induced but, induced current is zero
- 4) Induced current is zero as emf is not induced at all

128. A thin, long, straight conductor carries a current 0.5A vertically up. If a particle of mass 1 mg carrying a charge of 1 nC is projected with a velocity of 1800 kmph towards east, on the east of conductor at a distance 5cm from it. The acceleration of the particle at that instant is

- 1) Zero
- 2) 10^{-6} ms^{-2}
- 3) 10^{-11} ms^{-2}
- 4) 10^{-10} ms^{-2}

129. A magnet released freely in a long vertical copper tube falls with

- 1) constant acceleration
- 2) zero acceleration from the beginning
- 3) decreasing velocity but increasing acceleration
- 4) decreasing acceleration but increasing velocity

130. Statement (A): Infrared rays are used in remote switches of household electronic systems.

Statement (B): In Microwave oven, as the frequency of the microwaves match the resonant frequency of water molecules, so that energy is efficiently transferred from waves to the food item containing water molecules

- 1) Both A and B are correct
- 2) Both A and B are wrong
- 3) A is correct and B is wrong
- 4) A is wrong and B is correct.

131. An AC voltage $V=20 \sin 200 \pi t$ is applied to a series LCR circuit which drives a current $I = 10 \sin \left(200 \pi t + \frac{\pi}{3} \right)$. The average power dissipated is

- 1) 50 W
- 2) 21.6 W
- 3) 173.2 W
- 4) 200 W

132. In Young's double slit experiment, the slits of equal widths. If one slit is made narrow, then in the interference pattern

- 1) The intensities of both the maxima and the minima increase
- 2) The intensity of maxima increases and the minima has zero intensity
- 3) The intensity of maxima decreases and that of the minima increases
- 4) The intensity of maxima decreases and the minima has zero intensity

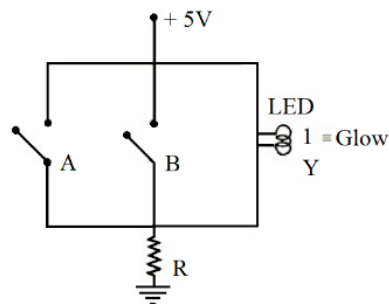
133. A mango tree is at the bank of a river and one of the branch of tree extends over the river. A tortoise lives in the river. A mango falls just above the tortoise. The acceleration of the mango falling from tree as it appears to the tortoise is (refractive index of water is $4/3$ and the tortoise is stationary)

- 1) g
- 2) $3g/4$
- 3) $4g/3$
- 4) none of these

134. The magnification of an object placed in front of a convex lens is +2. The focal length of the lens is 2.0 m. Find the distance by which the object has to be moved to obtain a magnification of -2 (in metres)

- 1) 2 m
- 2) 4 m
- 3) 1 m
- 4) 3 m

135. Name the logic gate equivalent to the diagram attached



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

CHEMISTRY

136. Match the following

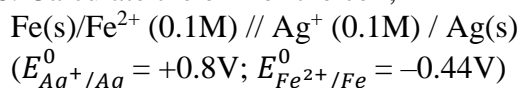
Oxide	Nature
I) CrO_3	A) Acidic
II) NO	B) Amphoteric
III) ZnO	C) Neutral
IV) V_2O_3	D) Basic

- 1) I-A, II-C, III-D, IV-B
- 2) I-B, II-B, III-D, IV-D
- 3) I-B, II-C, III-B, IV-B
- 4) I-A, II-C, III-B, IV-D

137. Which one of the following does not give foul smell when heated with chloroform and caustic potash?

- 1) Diethylamine
- 2) Methanamine
- 3) Aniline
- 4) Benzylamine

138. Calculate the emf of the cell,



- 1) 1.27 V
- 2) 1.3 V
- 3) 1.21 V
- 4) 1.18 V

139. The configuration of an element is $[\text{Rn}]5f^{14}6d^{10}7s^27p^4$. The element is

- 1) Og
- 2) Nh
- 3) Mc
- 4) Lv

140. Incorrect relation according to Bohr's theory is

- 1) $E_n \propto -\frac{z^2}{n^2}$
- 2) $V \propto -\frac{z}{n}$
- 3) $r_n \propto \frac{n^2}{z}$
- 4) $P.E \propto -\frac{2z^2}{n^2}$

141. In Lasagne's test, the organic compound containing nitrogen gives Prussian blue colour. The oxidation state of central metal ion in the complex formed is

- 1) +2
- 2) +3
- 3) +4
- 4) +1

142. Statement-I: Acetic acid dissolved in water undergoes dimerisation.

Statement-II: Na_2SO_4 dissolved in water undergoes dissociation.

- 1) I is correct, II is incorrect
- 2) I and II are correct
- 3) I is incorrect, II is correct
- 4) I and II are incorrect

143. Match the following.

Process	ΔG
I) $\text{H}_2\text{O}(l) \xrightarrow{273.15K} \text{H}_2\text{O}(s)$	A) zero
II) $3\text{O}_2(g) \rightarrow 2\text{O}_3(g)$	B) Positive
III) $\text{H}_2\text{O}(l) \xrightarrow{378.99K} \text{H}_2\text{O}(g)$	C) Negative

- 1) I-C, II-A, III-B
- 2) I-A, II-B, III-C
- 3) I-C, II-B, III-A
- 4) I-B, II-C, III-A

144. Galena is

- 1) PbS
- 2) SnO₂
- 3) PbCO₃
- 4) Ag₂S

145. With the molecular formula, C_4H_6 an organic compound contains sp, sp² and sp³ carbon atoms. The IUPAC name of the organic compound

- 1) Buta-1,3-diene
- 2) But-1-en-3-yne
- 3) Buta-1,2-diene
- 4) Cyclobut-1-ene

146. Basic buffer among the following is

- 1) 1 mole of H_2SO_4 + 2 moles of NH_4OH
- 2) 2 moles of NH_4OH + 2 moles of CH_3COOH
- 3) 2 moles of CH_3COOH + 1 mole NaOH
- 4) 2 moles of NH_4OH + 1 mole of HCl

147. $\text{A} + \text{B} \rightarrow \text{products}$. When [B] is kept constant and [A] is quadrupled then rate doubles. When both [A] and [B] are doubled then rate doubles. Order with respect to 'B' is

- 1) 1
- 2) 1/2
- 3) 2
- 4) -1

148. $\text{XeF}_4 \xrightarrow[143K]{z'} \text{XeF}_6$. 'X' is

- 1) O_2F_2
- 2) SF_4
- 3) F_2
- 4) SF_6

149. Assertion (A): Glucose penta acetate cannot react with NH_2OH

Reason (R): Glucose penta acetate has a hemiacetal structure

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

150. The complex which does not give precipitate with AgNO_3 solution is

- 1) $\text{CoCl}_3.4\text{NH}_3$
- 2) $\text{CoCl}_3.5\text{NH}_3$
- 3) $\text{CoCl}_3.3\text{NH}_3$
- 4) $\text{CoCl}_3.6\text{NH}_3$

151. $\text{N}_2(g) + 3\text{H}_2(g) \rightleftharpoons 2\text{NH}_3(g)$. According to Lechatlier's principle, decomposition of NH_3 is favoured

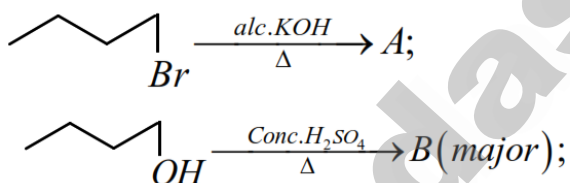
- (A) At high 'T'
 - (B) At low 'T'
 - (C) At high 'P'
 - (D) At low 'P'
- 1) A and C
 - 2) A and D
 - 3) B and C
 - 4) B and D

152. A) Aniline can be purified by steam distillation.
 B) Aniline + CHCl_3 mixture can be separated by distillation
 C) Glycerol can be recovered from spent lye by vacuum distillation
 D) Silica gel can be used as a stationary phase in thin layer chromatography. Correct statements are
- 1) A, C and D only
 - 2) A, B, C and D
 - 3) B and D only
 - 4) A, B and D only

153. $\text{C}_6\text{H}_6 \xrightarrow[\text{AlCl}_3]{\text{Cl}_2} \text{A} \xrightarrow[\text{Na/ether}]{\text{CH}_2\text{Cl}} \text{B}$. Compound B is
- 1) Chlorobenzene
 - 2) Toluene
 - 3) o-Dichlorobenzene
 - 4) Biphenyl

154. Statement-I: Wave function (Ψ) has no physical meaning
 Statement-II: Spin quantum number is derived from schrodinger wave equation.
- 1) I is correct, II is incorrect
 - 2) I and II are correct
 - 3) I is incorrect, II is correct
 - 4) I and II are incorrect

155.



A and B are

- 1) Same compounds
 - 2) Pair of positional isomers
 - 3) Pair of chain isomers
 - 4) Pair of geometrical isomers
156. Solubility of $\text{Zr}_3(\text{PO}_4)_4$ is 10^{-8} M. K_{SP} of Zirconium phosphate is 6.912×10^{-x} 'x' is
- 1) 56
 - 2) 53
 - 3) 60
 - 4) 51

157. Incorrect statement is

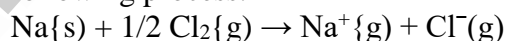
- 1) n-hexane+n-heptane form an ideal solution
- 2) Blood is isotonic with 0.9% (w/v) NaCl solution.
- 3) 1 mole of HCl dissolved in one litre solution is 1N HCl solution
- 4) Vapour pressure of a liquid is a colligative property

158. $(\text{CH}_3)_3\text{CBr} \xrightarrow{\text{C}_2\text{H}_5\text{ONa}} \text{X}$. 'X' is
- 1) A saturated hydrocarbon
 - 2) A symmetrical ether
 - 3) An unsaturated hydrocarbon
 - 4) An unsymmetrical ether

159. IP₂ is highest for

- 1) S
- 2) Cl
- 3) P
- 4) Si

160. Enthalpy of atomization of sodium 108 kJ/mole. Enthalpy of atomization of chlorine is 242 kJ/mole. Ionization enthalpy of sodium is 492 kJ/mole. What additional information is required to find the enthalpy change for the following process.



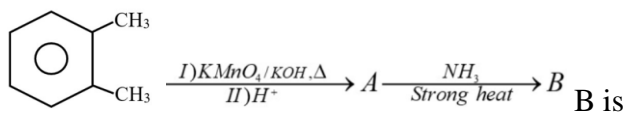
- 1) Ionization enthalpy of chlorine
- 2) Enthalpy of sublimation of sodium
- 3) Electron gain enthalpy of chlorine
- 4) Bond dissociation enthalpy of chlorine

161. I) $(\text{CH}_3)_2\text{C} = \text{C}(\text{CH}_3)_2 \xrightarrow{\text{KMnO}_4/\text{H}^+}$
- II) $(\text{CH}_3)_2\text{C} = \text{C}(\text{CH}_3)_2 \xrightarrow[\text{Zn} + \text{H}_2\text{O}]{\text{O}_2}$

Only acetone is formed as product in

- 1) I only
- 2) II only
- 3) Both I and II
- 4) Neither I nor II

162.



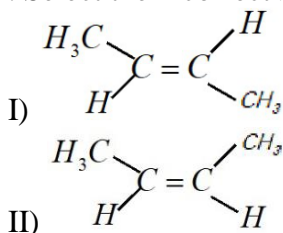
B is

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

163. Bond order is least in

- 1) O_2^-
- 2) O_2^+
- 3) C_2^{2-}
- 4) C_2

164. Select the incorrect statement



- 1) Boiling point of I < II
- 2) Dipole moment of II is zero
- 3) Melting point of I > II
- 4) Stability of I > II

165. $MnO_2 + NH_4^+ + e^- \rightarrow MnO(OH) + NH_3$. This half reaction occurs at

- 1) Cathode in dry cell
- 2) Cathode in mercury cell
- 3) Cathode in Ni-Cd cell
- 4) Cathode in Lead accumulator

166. The order of electronegativity of 16th group elements is:

- 1) $S > Se > Te > Po > O$
- 2) $Se > S > Te > O > Po$
- 3) $O > S > Se > Te > Po$
- 4) $Te > O > Se > Po > S$

167. Internal energy is

- 1) A state function and intensive property
- 2) A state function and extensive property
- 3) A path function and extensive property
- 4) A path function and intensive property

168. Hexaamminechromium (III) sulphate is

- 1) $[Cr(NH_2)_6]_2(SO_4)_3$
- 2) $[Cr(NH_3)_6](SO_4)$
- 3) $[Cr(NH_3)_6]_2(SO_4)_3$
- 4) $[Cr(NH_2)_6](SO_4)$

169. Identify incorrect statements about the reactivity of ethyl alcohol.

- A) It readily reacts with Na
 - B) It readily reacts with HCl + anhydrous $ZnCl_2$
 - C) It can react with NaOI
- 1) A, B and C
 - 2) A and C only
 - 3) B only
 - 4) B and C only

170. $A + B \rightleftharpoons C$, $K_{eq} = 10^{-2}$. At certain instant $[A] = [C] = 10^{-4}$ and $[B] = 10^{-1}$. Correct statement is

- 1) $Q_c > K_c$, reaction proceeds in forward direction
- 2) $Q_c > K_c$, reaction proceeds in backward direction
- 3) $Q_c < K_c$, reaction proceeds in forward direction
- 4) $Q_c < K_c$, reaction proceeds in backward direction

171. 68% by mass of HNO_3 and 32% by mass of H_2O forms

- 1) Ideal solution
- 2) Minimum boiling azeotrope
- 3) Maximum boiling azeotrope
- 4) Immiscible liquid mixture

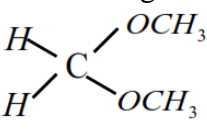
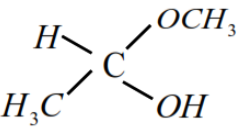
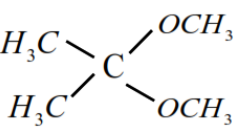
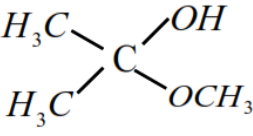
172. The species which is coloured but diamagnetic is

- 1) MnO_4^{2-}
- 2) Cr^{3+}
- 3) CrO_4^{2-}
- 4) Mn^{3+}


173. Assertion (A): Increase in temperature increases the rate of chemical reaction. Reason (R): With the increase in temperature, fraction of activated molecules increases.

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

174. Acetal among the following is

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

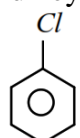
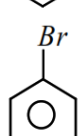
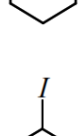
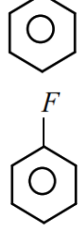
175. $\text{CH}_3\text{-C}\equiv\text{CH} \xrightarrow{\text{NaNH}_2} \text{A} \xrightarrow{\text{C}_2\text{H}_5\text{I}} \text{B}$. Functional isomer of 'B' cannot be

- 1) 
- 2) $\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}=\text{CH}_2$
- 3) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{C}\equiv\text{CH}$
- 4) $\text{CH}_2=\text{C}=\text{CH}-\text{CH}_2-\text{CH}_3$

176. The salt which undergoes anionic hydrolysis only is

- 1) CuSO_4
- 2) NaCl
- 3) CH_3COONa
- 4) HCOONH_4

177. Which of the following cannot be prepared by Sandmeyer's reaction

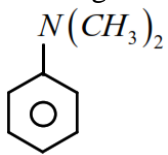
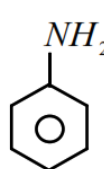
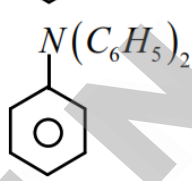
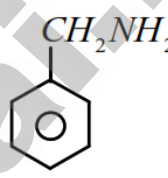
- A) 
- B) 
- C) 
- D) 

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

178. Shape of polypeptide chain is explained by _____ structure of proteins

- 1) 1°
- 2) 2°
- 3) 3°
- 4) 4°

179. p^{kb} is highest for

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

180. Bohr's theory is applicable to

- 1) H-atom
- 2) H^- ion
- 3) Be^{2+} ion
- 4) Both 1 and 3



NEET, JEE, CA, TUITION
ERODE – 12, CONTACT: 9500939789

Mock Test 4

180x4=720 MARKS

BOTANY

01. (3)
02. (2)
03. (4)
04. (1)
05. (1)
06. (3)
07. (3)
08. (3)
09. (3)
10. (2)
11. (2)
12. (2)
13. (1)
14. (1)
15. (1)
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19. (3)
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39. (3)
40. (2)
41. (2)
42. (1)
43. (2)
44. (3)
45. (2)

ZOOLOGY

46. (3)
47. (2)
48. (2)
49. (4)
50. (3)
51. (3)
52. (2)
53. (1)
54. (1)
55. (2)
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87. (4)
88. (2)
89. (3)
90. (4)

PHYSICS

091. (1)
092. (3)
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094. (1)
095. (1)
096. (1)
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098. (4)
099. (3)
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125. (2)
126. (2)
127. (4)
128. (2)
129. (4)
130. (1)
131. (1)
132. (3)
133. (3)
134. (1)
135. (3)

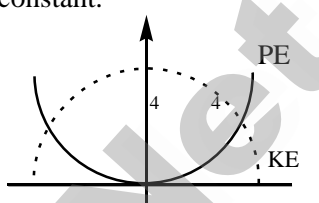
CHEMISTRY

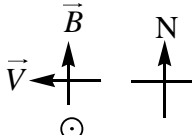
136. (4)
137. (1)
138. (3)
139. (4)
140. (2)
141. (1)
142. (3)
143. (2)
144. (1)
145. (3)
146. (4)
147. (2)
148. (1)
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152. (2)
153. (2)
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156. (2)
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165. (1)
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167. (2)
168. (3)
169. (3)
170. (2)
171. (3)
172. (3)
173. (1)
174. (1)
175. (3)
176. (3)
177. (2)
178. (2)
179. (3)
180. (1)

SOLUTIONS

PHYSICS

91. $20MSD = 21VSD$
 $LC = 1MSD - 1VSD \Rightarrow$
 $LC = 1MSD - \frac{20}{21}MSD = \frac{1}{21}MSD = \frac{1}{42}mm$
 $t = \sqrt{\frac{2h}{g}} \Rightarrow \frac{t}{t_2} = \sqrt{\frac{16}{25}} = \frac{4}{5}$
92. $H = \frac{u^2 \sin^2 \beta}{2g} \Rightarrow u \sin \beta = \sqrt{2gH}$
 But $t = \frac{T}{2} = \frac{u \sin \beta}{g} \Rightarrow t = \sqrt{\frac{2H}{g}}$
93. $P + \mu mg \cos \theta = (mg \sin \theta + 3)$
 $P = 100 \left(\frac{4}{5} - 0.6 \times \frac{3}{5} \right) + 3 = 47N$
94. $F = ma = m \frac{v}{t} = 120 \times 10^{-3} \times \frac{25}{10^{-1}} = 30N$
95. $20\% \quad 250 \times A = 10 \times 10^3$
 $A = \frac{10^4}{250} \times \frac{100}{20} = 200 m^2$
96. Momentum is conserved $\Rightarrow \frac{K_1}{K_2} = \frac{m_2}{m_1}$
 $\Rightarrow \frac{100}{K_2} = \frac{1}{2}$
 $\Rightarrow K_2 = 200J$
 $\Rightarrow \text{Total energy} = K_1 + K_2 = 300J$
97. Internal forces don't change the state of centre of mass.
98. $KE = \frac{1}{2} I \omega^2 = \frac{1}{2} \times \frac{mr^2 \omega^2}{2}$
99. Angular momentum is conserved
100. $W_{app} = mg - F_B$
 $= mg - V_{dis} \rho_w g = mg - mg$
 $= \text{zero}$
101. $U = \frac{1}{2} \times Y \times \text{strain}^2 \times \text{volume}$
 $\Rightarrow \frac{1}{2} (\text{slope of stress-strain curve}) \times \text{strain}^2 \times \text{volume}$
 $\Rightarrow \frac{U_A}{U_B} = \frac{\tan 60}{\tan 30} \times \frac{l}{3l} = 1$
102. $\Delta V = 4\pi R^2 T \left(n^{\frac{1}{3}} - 1 \right)$
 $= 4 \times \frac{22}{7} \times 1.4 \times 1.4 \times 10^{-6} \times 75 \times 10^{-3} (5-1)$
 $= 7392 \times 10^{-9} J$
 $= 7.392 \times 10^{-6} J$

103. $\Delta Q = \sigma A (T - T_0)$
 $ms\Delta T \propto A \Rightarrow \left(\frac{\Delta T}{\Delta t} \right) \propto \frac{1}{r\rho}$
 $\Rightarrow \text{Ratio of rate of cooling} = 1:1$
104. Conceptual
105. $g_\phi = g_{pole} - R\omega^2 \cos^2 \phi$
 $\Rightarrow g_{pole} - g_{eq} = (g_{pole}) - (g_{pole} - R\omega^2) = R\omega^2$
 $\Rightarrow x^1 = 4x$
106. Areal velocity of a planet around the sun is constant.
107. 
108. (3 translational + 2 potential + 2 vibrational) degrees
109. Conceptual
110. $\Delta U = \Delta Q - P\Delta V$
 $= mL - Pdv$
 $= (10^{-3} \times 500 \times 4200) - 3 \times 10^5 \times 1600 \times 10^{-6}$
 $= (2100 - 480) J = 1620J$
111. From G.M.V, number of mole of given gas = 2 and $Q = nC_v dT$
 $\Rightarrow Q = 2 \times \left(\frac{3}{2} \times 8.314 \right) \times 15 = 374.13J$
112. $F = \frac{1}{4\pi \epsilon_0} \frac{q^2}{r^2} = mg \tan \theta$
113. $F^1 = \frac{1}{4\pi \epsilon_0} \frac{1}{K} \frac{q^2}{r^2} = mg \left(1 - \frac{\rho_l}{\rho_b} \right) \tan \theta$
 $\Rightarrow \frac{1}{K} = \left(\frac{1.5 - 1}{1.5} \right) \Rightarrow k = \frac{1.5}{0.5} = 3$
114. $P = \frac{V^2}{R} \Rightarrow \frac{P^1}{P} = \frac{2R}{\left(\frac{R}{2} \right)}$
 $P^1 = 4 \times 60w = 240w$
115. Emission of α particle decreases atomic number by 2 and mass number by 4 where as emission of β particle increases atomic number by 1 unit and emission of γ causes no change in Z and A

116. $\frac{1}{\lambda} = R \left(1 - \frac{1}{n^2}\right)$
 $\frac{1}{n^2} = \left(1 - \frac{1}{R\lambda}\right)$
 $n = \sqrt{\frac{\lambda R}{\lambda R - 1}}$
117. When current sensitivity is doubled, resistance also is doubled \Rightarrow voltage sensitivity remains same
118. $U = -\vec{M} \cdot \vec{B}$
 $= -MB \cos \theta$
 For PQ_6 ; $U = -MB_A \cos 0^\circ$
 $\Rightarrow PQ_6$ has least potential energy
119. Soft iron has smaller area for hysteresis curve than that of steel hence used as core of transformer.
120. Conceptual
121. $H = \frac{1}{2} CV^2 = \frac{1}{2} \times 4 \times 10^{-6} \times (4 \times 10^2)^2 J = 0.32 J$
122. $1\mu F$ and $5\mu F$ capacitors are in parallel
 $\Rightarrow C_p = 6\mu F$; C_p & $4\mu F$ are in series
 $\Rightarrow V_1 = \left(\frac{6}{4+6}\right) \times 10V = 6V$
 \therefore charge on $4\mu F = 24\mu C$
123. $V = 2n(l_2 - l_1)$
 $= 2 \times 325(77.4 - 25.4) \times 10^{-2} ms^{-1}$
 $= 338 ms^{-1}$
124. $eV_0 = hv - \phi \Rightarrow V_0 = \frac{h}{e}v - \frac{\phi}{e}$
125. 1) for insulators
 $E_g > 3eV$
 3) NAND and NOR gates are universal gate
 4) Solar cell is not biased
126. Meter bridge uses principle of Wheatstone's bridge and its balance condition.
127. Flux through circular loop is zero as \vec{B} is in the plane of the loop.
 \Rightarrow emf induced = 0
128. 
 $F = qvB = qv \left(\frac{\mu_0 I}{2\pi r}\right)$
 $= 10^{-9} \times \left(1800 \times \frac{5}{18}\right) \times \left(2 \times 10^{-7} \times \frac{0.5}{5 \times 10^{-2}}\right) = 10^{-12} N$
 $\vec{a} = \frac{\vec{F}}{m} = \frac{10^{-12}}{10^{-6}} ms^{-2}$

129. Due to increasing eddy currents, magnet falls with decreasing acceleration and finally falls with terminal velocity
130. Conceptual
131. $V = 20 \sin 200\pi t$
 $I = 10 \sin \left(200\pi t + \frac{\pi}{3}\right)$
 $P_{avg} = V_{rms} i_{rms} \cos \phi = \frac{V_0}{\sqrt{2}} \times \frac{i_0}{\sqrt{2}} \cos \phi$
 $= \frac{20}{\sqrt{2}} \times \frac{10}{\sqrt{2}} \times \frac{1}{2} = \frac{200}{4} = 50W$
132. $I_1 < I_0$ and $I_2 = I_0$
 $\Rightarrow I_{max} < 4I_0$ and $I_{min} > 0$
133. $d_A = \mu d_R$
 $x = \frac{4}{3}y \Rightarrow \frac{d^2x}{dt^2} = \frac{4}{3} \frac{d^2y}{dt^2}$
 $\Rightarrow a_{app} = \frac{4}{3}g$
134. $m = \frac{f}{f-u} \Rightarrow -2 = \frac{2}{2-u_1} \Rightarrow u_1 = -3m$
 Also $+2 = \frac{2}{2-u_2} \Rightarrow u_2 = -1m \Rightarrow \Delta u = 2m$
135. Truth table

A	B	Y
0	0	1
1	0	0
0	1	0
1	1	0

 \Rightarrow NOR gate

CHEMISTRY

136. CrO_3 -Acidic; NO -Neutral; ZnO - amphoteric; V_2O_3 -Basic
137. Only 1 amines give foul smell in carbyl amine test
138. $Fe + 2Ag^+ \rightarrow 2Ag + Fe^{2+}$
 (0.1) (0.1M)
 $E_{cell}^0 = 0.8 - (-0.44) = 1.24$
 $E_{cell} = 1.24 - \frac{0.0591}{2} \log \frac{10^{-1}}{(10^{-1})^2}$
 $E_{cell} = 1.24 - \frac{0.0591}{2} \log 10$
 $= 1.24 - 0.03 = 1.21V$
139. $Lv = [Rn]5f^{14}6d^{10}7s^27p^4$

140. $V_n \propto \frac{Z}{n}$
141. $Fe_4[Fe(CN)_6]_3$
142. $I) CH_3COOH(aq) \rightleftharpoons CH_3COO^- + H^+$
143. I) Equilibrium
II) Non-spontaneous
III) Spontaneous
144. PbS -Galena
 SnO_2 -Tinstone
 Ag_2S -Silver glance
 $PbCO_3$ -Cerussite
145. $sp^2 \quad sp \quad sp^2 \quad sp^3$
 $H_2C = C = CH - CH_3$
146. $NH_4OH + HCl \rightarrow NH_4Cl + H_2O$

2	1	-	-
(2-1)	(1-1)	1	-

1:1 mole ratio of $NH_4Cl + NH_4OH$ mixture is a basic buffer
147. I) w.r.t 'A' $4^x = 2$
 $x = \frac{1}{2}$
- II) $2^x \cdot 2^y = 2$
 $x + y = 1$
 $y = \frac{1}{2}$
148. Conceptual
- 149.
150. $[CoCl_3 \cdot (NH_3)_3]$ -No ionizable Cl^- ion.
151. Decomposition of $NH_3(g)$ is endothermic-favoured at high 'T'
2 volume \rightarrow 4 volumefavoured at Low 'P'
152. Conceptual
153. A = C_6H_5Cl ; B = $C_6H_5CH_3$
154. Spin quantum number is not a consequence of SWE
155. (A)1-butene (E_2); B.....2-butene (E_1)
156. $K_{sp} = 6912S^7$
 $= 6912 \times 10^{-56}$
 $= 6.912 \times 10^{-53}$

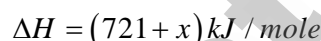
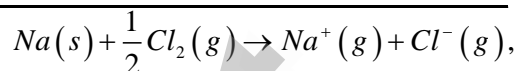
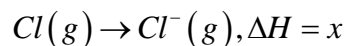
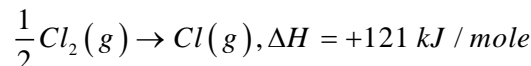
157. LVP is a colligative property

158.



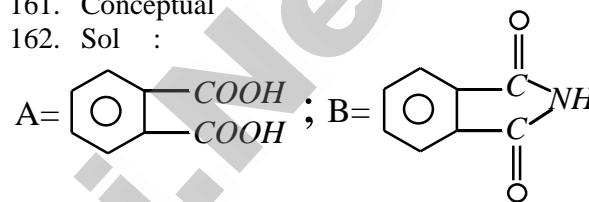
159. $S > Cl > P > Si$

160.



161. Conceptual

162. Sol :



163. 1.5, 2.5, 3,2

164. Dipolemoment of II is greater than zero.

165. Conceptual

166. Conceptual

167. Conceptual

168. $[Cr(NH_3)_6]^{3+} + SO_4^{2-}$ criss-cross

169. C_2H_5OH cannot react with Lucas reagent at room temperature.

$$170. Q_c = \frac{(10^{-4})}{(10^{-4})(10^{-1})} = 10$$

$Q_c > K_c$, reaction proceeds in backward direction

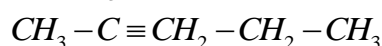
171. Shows negative deviations from Raoult's law

172. CrO_4^{2-} colour due to charge transfer phenomena

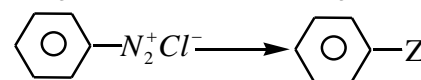
173. Conceptual

174. (1) formaldehyde acetal formed between formaldehyde and two mole of CH_3OH

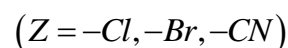
175. 'A' is $CH_3 - C \equiv \bar{C}Na^+$; B is



176. $CH_3COO^- + H_2O \rightleftharpoons CH_3COOH + OH^-$



177.



178. Conceptual

179. $3 > 2 > 1 > 4$ (p^{k_b})

180. Applicable to one electron species only.