05/04/2024

CODE-A

Aakash
Medical | IIT-JEE | Foundations

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AIM – 720

(*Advanced* INTENSIVE *Mastery for* 720)

MM : 720

CST – 3

Time : 3 Hrs. 20 Mins.

Complete Syllabus of NEET

Instructions:

(i) There are two sections in each subject, *i.e.* Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.
(ii) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.
(iii) Use blue/black ballpoint pen only to darken the appropriate circle.
(iv) Mark should be dark and completely fill the circle.
(v) Dark only one circle for each entry.
(vi) Dark the circle in the space provided only.
(vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

BOTANY

SECTION-A

1. Read the following statements and choose the **correct** option.

Assertion (A): Both the nucleic acids (DNA and RNA) have the ability to direct their duplication.

Reason (R): Both the nucleic acids follow the rule of base pairing and complementarity.

(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 correct but (R) is incorrect

(4) Both (A) and (R) are incorrect

2. Select the **mismatched** pair.

(1)	$\phi \times 174$ bacteriophage	–	5386 nucleotides
(2)	Lambda bacteriophage	–	48502 bases
(3)	*E. coli*	–	4.6×10^6 bp
(4)	Human	–	3.3×10^9 bp

3. Which of the following feature is **not** correctly associated with double-helix structure of DNA proposed by Watson and Crick?

(1) The backbone is constituted by sugar-phosphate
(2) The two chains have parallel polarity
(3) Occurrence of purine opposite to a pyrimidine generates uniform distance between the two strands of the helix
(4) The pitch of the helix is 3.4 nm

4. Euchromatin can be differentiated from heterochromatin, as the **former**
   (1) Is transcriptionally active
   (2) Stains dark
   (3) Is more densely packed
   (4) Lacks histone proteins

5. Observe the following features.
   (a) RuBisCO is found in bundle sheath cells
   (b) No photorespiratory losses
   (c) CO_2 saturation at about 360 $\mu l L^{-1}$ at high light intensity
   (d) Primary CO_2 acceptor is a three carbon compound

   All of the above features are true for
   (1) Tomato (2) Bell pepper
   (3) *Sorghum* (4) Cactus

6. Which of the following is the most crucial step of the Calvin cycle?
   (1) Reduction (2) Regeneration
   (3) Carboxylation (4) Decarboxylation

7. Consider the following characteristics of a female individual inflicted with certain disorder.
   (i) Partially open mouth and broad palm
   (ii) Small round head
   (iii) Furrowed tongue
   (iv) Physical, psychomotor and retarded mental development

   The karyotype analysis of such an individual will show.
   (1) 45 chromosomes with XO sex chromosome
   (2) 47 chromosomes with XYY sex chromosome
   (3) Trisomy of chromosome number 21
   (4) 47 chromosomes with XXY sex chromosome

8. ZZ–ZW type of sex determination can be found in
   (1) Grasshopper (2) Birds
   (3) Human (4) *Drosophila*

9. Given below are two statements.

   Statement I: Mendel selected 7 true-breeding pea plant varieties, as pairs which were similar except for one character with contrasting traits.

   Statement II: Mendel's experiment had a large sampling size, which gave greater credibility to the data that he collected.

   In the light of the above statements, choose the **correct** answer from the options given below.
   (1) Statement I is correct but statement II is incorrect
   (2) Statement I is incorrect but statement II is correct
   (3) Both statement I and statement II are correct
   (4) Both statement I and statement II are incorrect

10. How many substrate level phosphorylation reactions will occur for complete oxidation of one molecule of glucose in aerobic respiration?
    (1) Six (2) Two
    (3) Five (4) Three

11. Which among the following is **not** considered as narrowly utilitarian services of an ecosystem?
    (1) Medicines
    (2) Construction material
    (3) Pollination
    (4) Firewood

12. How many national parks, biosphere reserves and wildlife sanctuaries are present in India respectively?
    (1) 14, 90, 448 (2) 34, 12, 448
    (3) 14, 448, 90 (4) 90, 14, 448

13. In the dihybrid crosses conducted by T.H. Morgan on *Drosophila*, what is the percentage of recombinant type of individuals in F_2 generation when yellow body and white eye female is crossed with the wild type male?
    (1) 37.2% (2) 1.3%
    (3) 98.7% (4) 62.8%

Space for Rough Work

14. All of the following statements are **incorrect** w.r.t. the Binomial nomenclature, **except**
(1) Biological names are generally in Greek and written in italics.
(2) The first word in a biological name represents the genus while second component denotes the specific epithet.
(3) Both genus and species in a biological name, when handwritten are separately underlined, or printed in Latin to indicate their Latin origin.
(4) The genus starts with a small letter while the specific epithet starts with a capital letter.

15. Read the following statements w.r.t. Basidiomycetes. Choose the option for **correct** ones.
(a) Commonly known forms are mushrooms, bracket fungi or puff balls.
(b) The basidiospores are endogenously produced in the basidium.
(c) The sex organs are absent.
(d) Karyogamy and meiosis takes place in the basidium producing four basidiospores.
(1) (a), (b) and (c) (2) (a), (c) and (d)
(3) (b) and (d) only (4) (b), (c) and (d)

16. TMV is/has
(1) dsRNA in polyhedral head
(2) ssDNA inside helical capsid
(3) A Ribovirus
(4) Inert inside host

17. When a leaf lamina is entire or when incised, the incisions do not touch the midrib, then it is called
(1) Whorled leaf
(2) Simple leaf
(3) Pinnately compound leaf
(4) Palmately compound leaf

18. Which of the following is **not** a stem modification?
(1) Flattened structure of *Opuntia*
(2) Thorns in *Citrus*
(3) Cladode in *Asparagus*
(4) Pitcher in *Nepenthes*

19. Match the columns and select the **correct** option.

	Column I		Column II
a.	Epiphyllous stamens	(i)	Lily
b.	Gamosepalous stamens	(ii)	Lotus
c.	Diadelphous stamens	(iii)	Brinjal
d.	Apocarpous gynoecium	(iv)	Lupin

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

20. Lens-shaped openings in woody trees which permit the gaseous exchange between the outer atmosphere and internal tissues of stem is called
(1) Lenticels (2) Subsidiary cells
(3) Stomata (4) Mesophyll cells

21. Find the **correctly** matched pair.
(1) Monocot root – Radial, endarch vascular bundles
(2) Monocot stem – Conjoint, exarch vascular bundles
(3) Dicot root – Small and inconspicuous pith
(4) Dicot stem – Scattered vascular bundles

22. In which of the following phases of geometrical growth, rate of growth is very slow?
(1) Log phase
(2) Lag phase
(3) Stationary phase
(4) Exponential phase

23. Pollen grains of rice and wheat lose viability within_____ of their release.
Select the **correct** option to fill the above blank.
(1) 24 hours
(2) 30 minutes
(3) 1 week
(4) Several months

Space for Rough Work

24. Select the **incorrectly** matched pair.
    (1) *Papaver* – Multicarpellary syncarpous gynoecium
    (2) *Michelia* – Multicarpellary apocarpous gynoecium
    (3) Wheat – Many ovules in an ovary
    (4) Mango – Single ovule in an ovary

25. Which of the following is an example of cell devoid of nuclear membrane and mitochondria?
    (1) Bacterial cell
    (2) Mesophyll cell
    (3) Protist
    (4) Sperm cell

26. Stroma of the chloroplast contains all of the following, **except**
    (1) Enzymes for synthesis of carbohydrates and proteins
    (2) Circular DNA
    (3) Ribosomes
    (4) Enzymes for aerobic respiration

27. Polysome consists of
    (1) Many ribosomes attached to each other in a linear arrangement
    (2) Several ribosomes attached to a single mRNA
    (3) Many ribosomes attached to a strand of endoplasmic reticulum
    (4) Single ribosome attached on a single mRNA

28. Read the following statements and choose the **correct** option.

    Statement A: Plants can show mitotic divisions in both haploid and diploid cells.

    Statement B: In animals, mitotic cell division is only seen in the diploid somatic cells without any exception.
    (1) Only statement A is correct
    (2) Only statement B is correct
    (3) Both the statements are correct
    (4) Both the statements are incorrect

29. A mitotic apparatus is composed of all, **except**
    (1) Spindle fibres
    (2) Asters
    (3) Microtubules
    (4) Centromere

30. Select the **odd** one w.r.t. significance of mitosis.
    (1) Healing and regeneration
    (2) Introduction of genetic variations
    (3) Repairing of worn out cells
    (4) Growth of multicellular organisms

31. Which of the following statement is **not** correct regarding green algae?
    (1) They have storage bodies called pyrenoids which contain protein besides starch.
    (2) The major pigment is chlorophyll *a* and *b*.
    (3) *Volvox* is the colonial green alga while *Ulothrix* is filamentous.
    (4) They reproduce sexually by non motile gametes only.

32. Read the following statements and select the option for **correct** ones.
    (i) Oogamous type of reproduction is present in *Volvox*, *Fucus* and *Polysiphonia*.
    (ii) Floridean starch is structurally very similar to amylopectin and glycogen.
    (iii) Food is stored as complex carbohydrates which may be in the form of laminarin or mannitol in brown algae.
    (iv) Algin is a hydrocolloid which has very poor water holding capacity.
    (1) (i), (ii) and (iv)
    (2) All except (ii)
    (3) (i), (ii) and (iii)
    (4) (ii) and (iii) only

33. Which of the following organic acid is obtained from *Acetobacter aceti*?
    (1) Citric acid
    (2) Lactic acid
    (3) Acetic acid
    (4) Butyric acid

Space for Rough Work

34. Which of the following statements is **incorrect**?
(1) Competitive exclusion states that two closely related species competing for the same resources cannot co-exist indefinitely and competitively inferior one will be eliminated.
(2) Barnacles growing on the back of whale benefits in the form of shelter and whale remains unaffected.
(3) Association of cattle egret and grazing cattle represents commensalism.
(4) Introduction of Abingdon tortoise resulted in exclusion of goats from Galapagos island

35. Read the following statements and select the **correct** option.

Statement A: Gross primary productivity is the rate of production of organic matter by producers during photosynthesis per unit time and area.

Statement B: Net primary productivity is the rate of organic matter stored by producers in excess of respiratory utilization per unit time and area.

(1) Only statement A is correct
(2) Only statement B is correct
(3) Both the statements are correct
(4) Both the statements are incorrect

SECTION-B

36. Which of the following organism is used by Meselson and Stahl to prove that the DNA replication is semi-conservative in nature?
(1) Bacteriophage
(2) Mice
(3) *Streptococcus pneumoniae*
(4) *E. coli*

37. All of the following codons do not have their specific tRNA, **except**
(1) UUU (2) UAA
(3) UGA (4) UAG

38. Select the genotype of couple that can have all four types of blood groups in their offsprings?

	Male		**Female**
(1)	I^AI^B	×	I^AI^B
(2)	I^AI^O	×	I^AI^B
(3)	I^AI^O	×	I^BI^O
(4)	I^AI^B	×	I^BI^O

39. Which enzyme catalyse the first irreversible reaction of glycolysis?
(1) Phosphofructokinase
(2) Aldolase
(3) Enolase
(4) Hexokinase

40. Which of the following feature is **incorrect** w.r.t. saprophytic protists.
(1) Under suitable conditions, they form an aggregation called plasmodium
(2) Their body moves along decaying twigs and leaves engulfing organic material
(3) Spores are extremely resistant and survive for many years, even under adverse conditions
(4) Reproduction is only by asexual mode

41. Read the following statements and select the **correct** option.

Statement A: There may be a variation in the length of filaments within a flower, as in *Salvia* and mustard.

Statement B: In the seeds of cereals such as maize the seed coat is membranous and generally fused with the fruit wall.

(1) Only statement A is correct
(2) Only statement B is correct
(3) Both statements A and B are correct
(4) Both statements A and B are incorrect

Space for Rough Work

42. Find out the **incorrect** statement(s) w.r.t. dicot leaf.
(i) Lesser number of stomata on abaxial surface as compared to adaxial surface.
(ii) Mesophyll is differentiated into palisade and spongy parenchyma.
(iii) Thicker veins have large vascular bundles and thinner veins have small vascular bundles.
(iv) Vascular bundle is surrounded by bundle sheath cells.
(1) Only (i) (2) Only (i) and (iii)
(3) Only (ii) and (iii) (4) Only (iv)

43. In the light of given statements, choose the **correct** answer from the options given below.
Statement I: In tomatoes, parthenocarpy can be induced by auxins.
Statement II: Abscission of older mature leaves is promoted by auxins.
(1) Both statements are correct
(2) Only statement I is correct
(3) Only statement II is correct
(4) Both statements are incorrect

44. Read the following statements and choose the option for **correct** ones.
(i) Some species of *Asteraceae* and grasses have specialised mechanism of seed production without fertilisation.
(ii) If hybrids made into apomicts, there is segregation of characters in the progeny.
(iii) Apomixis is a form of asexual reproduction that mimics sexual reproduction.
(iv) In many *Citrus* varieties, some cells of nucellus surrounding the embryo sac start dividing, protrude into embryo sac and develop into embryos.
(1) (i), (iii), (iv) only (2) (i), (ii), (iii) only
(3) (ii), (iii), (iv) only (4) (iii) and (iv) only

45. Name the stage of cell cycle at which centrosome radiates out microtubules.
(1) Anaphase (2) Prophase
(3) Metaphase (4) Telophase

46. Which of the following feature is **not** true for endoplasmic reticulum?
(1) Smooth endoplasmic reticulum makes lipids
(2) SER is frequently observed in the cells actively involved in protein synthesis and secretion
(3) It modifies chemicals that are toxic to the cell
(4) RER is continuous with the outer membrane of the nucleus

47. Select the **incorrectly** matched pair.

(1)	*Ulothrix*	–	Gametes are flagellated
(2)	*Spirogyra*	–	Gametes are non-flagellated
(3)	Phaeophyceae	–	Gametes bear two laterally attached flagella
(4)	Rhodophyceae	–	Gametes bear 2-8, equal apical flagella

48. Read the following statements and select the **correct** option.
Statement A: Lipase are used in detergent formulation and are helpful in removing oily stains.
Statement B: Streptokinase is produced by *Streptococcus* and used as 'clot buster' for removing clots from the blood vessels.
(1) Only statement A is correct
(2) Only statement B is correct
(3) Both the statements are correct
(4) Both the statements are incorrect

49. In which of the following population interaction, one species is harmed and other species is neither benefited nor harmed?
(1) Mutualism (2) Predation
(3) Commensalism (4) Amensalism

Space for Rough Work

50. Which of the following option represents the **correct** sequence of detritus and organisms in detritus food chain.
(1) Detritus → Earthworm → Sparrow → Falcon
(2) Detritus → Sparrow → Falcon → Earthworm
(3) Falcon → Sparrow → Detritus → Earthworm
(4) Detritus → Falcon → Sparrow → Earthworm

ZOOLOGY

SECTION-A

51. The DNA fragments after the restriction enzyme digestion can be separated by using the technique called
(1) Spirometry
(2) Gel electrophoresis
(3) Magnetic resonance imaging
(4) PCR

52. Which of the following ions are associated with clotting of blood?
(1) Ca^{+2} (2) Cu^{+2}
(3) Zn^{+2} (4) Na^{+}

53. In humans, osteocytes are present in the spaces known as
(1) Lacunae (2) Lamellae
(3) Sinuses (4) Bone marrow

54. Branchial respiration is shown by all, **except**
(1) Aquatic arthropods (2) Molluscs
(3) Chondrichthyes (4) Reptiles

55. Select the option representing the correct combination of excretory products eliminated by sebaceous glands.
(1) Cholesterol, biliverdin and degraded steroid hormones
(2) Urea, lactic acid and NaCl
(3) Sterols, hydrocarbons and waxes
(4) Bilirubin, vitamins and drugs

56. The most distinctive feature of *Asterias* and *Antedon* is the presence of
(1) Ciliated comb plates
(2) Water canal system
(3) Flagellated collar cells
(4) Water vascular system

57. In a standard ECG, what does the end of T-wave represents?
(1) Initiation of depolarisation of atria
(2) End of ventricular systole
(3) Initiation of depolarisation of ventricles
(4) End of atrial systole

58. Somatic neural system and autonomic neural system are the two divisions of
(1) Peripheral neural system
(2) Central neural system
(3) Sympathetic neural system
(4) Parasympathetic neural system

59. Select the **incorrect** match.
(1) Collagen – Intercellular ground substance
(2) GLUT-4 – Enables glucose transport into cells
(3) Insulin – Steroid hormone
(4) Receptor – Sensory reception

60. Choose the **correct** statement w.r.t. members of class Cyclostomata.
(1) All are endoparasites in most of the fishes.
(2) They have a sucking and circular mouth.
(3) Their body is devoid of scales and unpaired fins.
(4) Cranium is cartilaginous but vertebral column is bony.

Space for Rough Work

61. The cells of nervous system that do not conduct nerve impulses and play an important role in providing protection and giving support to the structural and functional unit of nervous system are
(1) Nerve cells (2) Neuroglial cells
(3) Neurons (4) Macrophages

62. In a sarcomere, 'H' zone consists of
(1) Only dark band containing myosin
(2) Only light band containing actin
(3) Both light and dark bands
(4) Neither light nor dark bands

63. Select the **correct** match w.r.t. different methods of contraception.

(1)	Coitus interruptus	–	Male partner withdraws his penis immediately after ejaculation
(2)	Lactational amenorrhea	–	Effective up to a minimum period of 10 months following parturition
(3)	Condoms	–	Available for males only
(4)	Barrier methods	–	Ovum and sperms are prevented from physically meeting

64. The scientist who disapproved the proposal given by Ernst Heckel noted that
(1) Certain features during embryonic stage common to all vertebrates are also present in their adults.
(2) Embryos never pass through the adult stages of other animals.
(3) Living organisms that we see today were created as such.
(4) The diversity was always the same since creation and will be the same in the future also.

65. A researcher wants to extract the genomic DNA from a bacteria. In order to do so, he would use all of the given enzymes, **except**
(1) Protease (2) DNase
(3) Lysozyme (4) Ribonuclease

66. Read the following statements and select the **correct** option.
Statement I: Nucleic acid is the genetic material of all organisms without any exception.
Statement II: Bioprocess engineering includes techniques to alter the chemistry of genetic material.
(1) Both statements I and II are correct
(2) Both statements I and II are incorrect
(3) Only statement I is correct
(4) Only statement II is correct

67. The hormone oxytocin is responsible for milk ejection. Select the structure from the options given below through which milk is sucked out by the baby.
(1) Mammary duct (2) Mammary tubule
(3) Mammary ampulla (4) Lactiferous duct

68. Match Column I with Column II and select the **correct** option.

	Column I		**Column II**
a.	Golden rice	(i)	Milk contained human β-antitrypsin
b.	C-peptide	(ii)	Agriculture
c.	Rosie	(iii)	Vitamin-A enriched
d.	Green revolution	(iv)	Present in proinsulin
		(v)	Transgenic cow

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

Space for Rough Work

69. Select the **correct** option w.r.t. frogs.
(1) Maintain a constant body temperature
(2) They show protective coloration
(3) They drink water
(4) Belong to the same class as of *Calotes*

70. In a human female, on an average, how many primary follicles are left in ovaries at puberty?
(1) 40,000 to 60,000
(2) 60,000 to 80,000
(3) 1,20,000 to 1,60,000
(4) 80,000 to 1,00,000

71. In humans, which of the following conditions is responsible for higher intrapulmonary pressure than the atmospheric pressure?
(1) Contraction of diaphragm
(2) Contraction of external inter-costal muscles
(3) Relaxation of diaphragm and external inter-costal muscles
(4) Relaxation of additional muscles of abdomen

72. Consider the following statements.
Statement (A): The malignant malaria is caused by *Plasmodium falciparum*.
Statement (B): The malarial parasite reproduces sexually in the liver cells, bursting the cells and releasing sporozoites into the blood.
In the light of above statements, select the **correct** option.
(1) Both statements (A) and (B) are correct
(2) Only statement (A) is correct
(3) Only statement (B) is correct
(4) Both statements (A) and (B) are incorrect

73. Choose the **correct** option to compiete the analogy.
Bipolar neuron : Cyton with one axon and one dendrite : : Unipolar neuron : _____
(1) Cyton only
(2) Cyton with one axon only
(3) Cyton with one dendrite only
(4) Cyton with two or more dendrites

74. The two key concepts of Darwinian theory of evolution are
(1) Saltation and mutation
(2) Branching descent and natural selection
(3) Natural selection and mutation
(4) Genetic drift and founder's effect

75. The first transgenic cow produced human protein-enriched milk that contained 'X' of protein. The value of 'X' is
(1) 2.4 mg per litre (2) 2.4 gms per millilitre
(3) 2.4 gms per litre (4) 24 mg per millilitre

76. Select the **incorrect** match from the following.

(1)	Tobacco	–	Contains nicotine
(2)	Heroin	–	Acts as a depressant
(3)	Cannabinoids	–	Abused by some sportspersons
(4)	Morphine	–	Also called coke

77. The total number of floating ribs in an adult human is
(1) Equal to the number of sacral vertebrae in man
(2) More than the number of tarsals in one limb of man
(3) Less than the number of carpals in one limb of man
(4) Twice the number of patella in one limb of man

78. According to the census report of 2011, the population growth rate of India was
(1) More than 20/1000/year
(2) Less than 20/1000/year
(3) Exactly 20/1000/year
(4) More than 20/100/year

Space for Rough Work

79. All of the following statements are correct w.r.t. periodic abstinence, **except**
(1) It is a natural method of conception.
(2) The couples avoid from coitus from day 10th to 17th of the 28 days menstrual cycle.
(3) The failure rate of this method is higher than that of IUDs and implants.
(4) The method works on the principle of avoiding chances of ovum and sperms meeting.

80. The method of contraception that involves role of a hormone is
(1) Coitus interruptus
(2) Multiload 375
(3) Cu 7
(4) Lactational amenorrhea

81. All of the following are involved in regulation of cardiac activity in humans, **except**.
(1) Medulla oblongata
(2) Nodal tissue
(3) Corpora quadrigemina
(4) ANS

82. Choose the odd one w.r.t. the secretions of endocrine cells present in different part of GIT.
(1) Gastric inhibitory peptide
(2) Cholecystokinin
(3) Secretin
(4) Gonadotropin releasing hormone

83. Sperm formation continues even in old men, but formation of ovum ceases in women around the age of
(1) Thirty years (2) Fifty years
(3) Twenty years (4) Twenty five years

84. Select the option which is **incorrectly** matched.

(1)	Nucleotide	–	Adenylic acid
(2)	Nucleoside	–	Adenosine
(3)	Purine	–	Guanine
(4)	Pyrimidine	–	Adenine

85. All of the following belong to the category of polymeric substances under secondary metabolites, **except**
(1) Rubber (2) Curcumin
(3) Gums (4) Cellulose

SECTION-B

86. Complete the analogy and select the **correct** option.
Vertebrate brains : Homologous organs : : _____ : Analogous organs
(1) Forelimbs of whale and cheetah
(2) Heart of fishes and reptiles
(3) Eyes of *Octopus* and *Balaenoptera*
(4) Forelimbs of whales and bats

87. Match Column I with Column II and select the **correct** option w.r.t. given structures and features of muscles associated with it.

	Column I		Column II
a.	Intestine	(i)	Striated, multinucleated muscle fibres
b.	Heart	(ii)	Spindle shaped, unbranched muscle fibres
c.	Triceps	(iii)	Cylindrical, uninucleated and branched muscle fibres

(1) a(i), b(ii), c(iii) (2) a(ii), b(iii), c(i)
(3) a(iii), b(ii), c(i) (4) a(ii), b(i), c(iii)

88. **Assertion (A):** During post-industrialisation period, the tree trunks became dark due to industrial smoke and soots.
Reason (R): After industrialisation, the number of melanised moths decreased.
In the light of above statements, select the **correct** option.
(1) Both (A) and (R) are true, (R) correctly explains (A)
(2) Both (A) and (R) are true but (R) does not explain (A)
(3) (A) is true, (R) is false
(4) Both (A) and (R) are false

Space for Rough Work

89. Seminal plasma does not contain the secretion of
(1) Seminal vesicles (2) Prostate gland
(3) Bulbourethral gland (4) Urethra

90. Select the indirect method of gene transfer among the following.
(1) Gene gun
(2) Biolistics
(3) Microinjection
(4) Vector mediated transfer

91. Choose the vector by which nematode specific genes were introduced into the host plant.
(1) pBR322 (2) *Agrobacterium*
(3) *E. coli* (4) Retrovirus

92. Which of the following is correct w.r.t. an adult human under normal physiological conditions?
(1) On an average excretes 100 to 150 mL of urine per day.
(2) The urine formed is a dark yellow coloured watery fluid which is slightly basic.
(3) On an average, 25-30 mg of urea is excreted out per day.
(4) The process of release of urine is called micturition.

93. Select the **correct** statement w.r.t. immunity in higher vertebrates.
(1) Acquired immunity is non-specific.
(2) The T-cells themselves do not secrete antibodies.
(3) The body is able to differentiate between 'self' and 'nonself' cells in auto-immune diseases.
(4) Since antibodies are found in the blood, the response given by them is called as cell-mediated immune response.

94. How many statements are correct w.r.t. CNS in humans?
(a) Brain stem forms connections between the brain and spinal cord.
(b) Cerebellum has very convoluted surface.
(c) Cerebral aqueduct is a canal passing through cerebrum.
(d) Brain stem comprises pons, cerebellum and medulla.
Choose the **correct** option.
(1) Two (2) One
(3) Four (4) Three

95. Choose the **incorrect** option w.r.t. pituitary gland in humans.
(1) The pituitary gland is located in a bony cavity called sella turcica and is attached to hypothalamus by a stalk.
(2) Adenohypophysis consists of two portions pars distalis and pars nervosa.
(3) Posterior pituitary stores and releases two hormones called oxytocin and vasopressin.
(4) In humans, the pars intermedia is almost merged with pars distalis.

96. The enzymes that catalyse removal of groups from substrates by mechanisms other than hydrolysis belong to the class
(1) Dehydrogenases (2) Lyases
(3) Oxidoreductases (4) Hydrolases

97. A triangular structure named 'X' is present as an additional chamber in the heart of a frog. Select the **correct** option which represents 'X'.
(1) Sinus venosus (2) Pericardium
(3) Vena cava (4) Aorta

Space for Rough Work

98. Which of the following is **correct** w.r.t. pulmonary ventilation?
(1) Also known as cellular respiration
(2) Atmospheric air is drawn in and CO_2 rich alveolar air is released out
(3) Utilization of O_2 by the cells for anabolic reactions
(4) Active transport of O_2 and CO_2 between blood and tissues

99. How many of the organisms given in the box below belong to the phylum Echinodermata?

Aplysia, *Antedon*, *Echinus*, *Ophiura*, *Ascaris*, *Euspongia*

Select the correct option.
(1) Four (2) Three
(3) Two (4) One

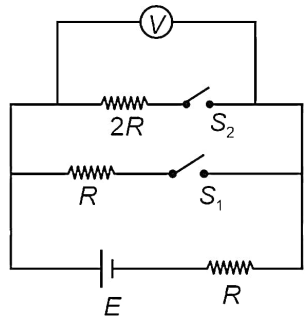
100. How many copies will be obtained after 10 PCR cycles, if a double stranded DNA template is used?
(1) 256 (2) 1024
(3) 512 (4) 1042

PHYSICS

SECTION-A

101. A hollow cylindrical wire of resistivity ρ, inner radius R, outer radius $2R$ and length l has current flowing in it along its length. The resistance offered by it is
(1) $\frac{\rho l}{4\pi R^2}$ (2) $\frac{\rho l}{2\pi R^2}$
(3) $\frac{\rho l}{\pi R^2}$ (4) $\frac{\rho l}{3\pi R^2}$

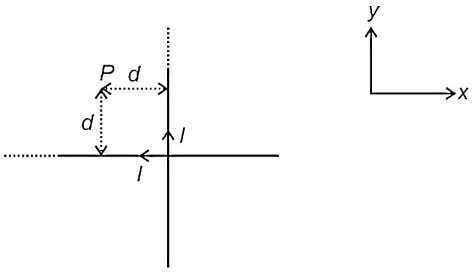
102. In the circuit shown in figure, reading of voltmeter is V_1 when only S_1 is closed, reading of voltmeter is V_2 when only S_2 is closed and reading of voltmeter is V_3 when both S_1 and S_2 are closed. Then



(1) $V_1 > V_2 > V_3$ (2) $V_3 > V_2 > V_1$
(3) $V_3 > V_1 > V_2$ (4) $V_2 > V_1 > V_3$

103. A galvanometer having a resistance of 10 Ω gives a full-scale deflection for a current of 0.1 A. The value of shunt resistance to convert the galvanometer into an ammeter which can read a maximum of 10 A current is
(1) $\frac{10}{199}\ \Omega$ (2) $\frac{100}{99}\ \Omega$
(3) $\frac{10}{99}\ \Omega$ (4) Infinite

104. Two very long, straight and insulated wires are kept at 90° angle from each other in x–y plane as shown.The wires carry currents of equal magnitude I, whose directions are shown in figure. The net magnetic field at point P will be



(1) Zero (2) $\frac{-\mu_0 I}{2\pi d}(\hat{x}+\hat{y})$
(3) $\frac{\mu_0 I}{\pi d}(\hat{z})$ (4) $\frac{\mu_0 I}{2\pi d}(\hat{x}+\hat{y})$

Space for Rough Work

105. The relative permeability of a diamagnetic substance is represented by μ_r and its susceptibility is denoted by χ, then

(1) $\mu_r > 1, \chi > 0$ (2) $\mu_r > 1, \chi > 1$

(3) $\mu_r > 0, \chi < 0$ (4) $\mu_r < 0, \chi < 0$

106. **Assertion (A) :** The matter wave associated with a moving particle has wavelength, $\lambda = \frac{h}{mv}$ (where symbols have their usual meanings).

Reason (R): Photoelectric effect is a phenomenon that supports wave nature of light.

(1) Both A and R are true but R is NOT the correct explanation of A

(2) Both A and R are true and R is the correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

107. How much mass has to be converted into energy to produce electric power of 800 MW for 1.5 hour?

(1) 1.2×10^{-5} kg (2) 2.4×10^{-5} kg

(3) 4.8×10^{-5} kg (4) 9.6×10^{-5} kg

108. If the energy of a photon of light (λ = 775 nm) equals the band gap of semiconductor, the minimum energy required to create hole electron pair is

(1) 1.1 eV (2) 1.3 eV

(3) 2.4 eV (4) 1.6 eV

109. When the voltage drop across a P-N junction diode is increased from 0.70 V to 0.75 V, the change in the diode current is 10 mA. The dynamic resistance of the diode is

(1) 5 Ω (2) 2.5 Ω

(3) 15 Ω (4) 10 Ω

110. If a conducting cube of side 10 cm has charge of 12 μC, then surface charge density of cube is

(1) 100 $\mu C/m^2$ (2) 200 $\mu C/m^2$

(3) 400 $\mu C/m^2$ (4) 50 $\mu C/m^2$

111. The work done in moving a neutron between two points having potential difference 20 V is

(1) 3.2×10^{-18} J (2) 1.6×10^{-18} J

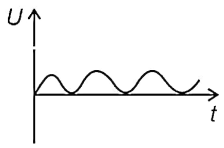
(3) 1.6×10^{-19} J (4) Zero

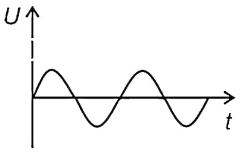
112. If the length of a string tied to two rigid supports is 20 cm. Then the maximum wavelength (in cm) of a stationary wave produced on it is

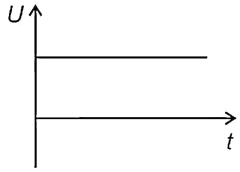
(1) 80 cm (2) 20 cm

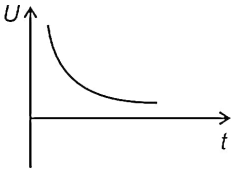
(3) 40 cm (4) 10 cm

113. A body undergoes S.H.M. The variation of its potential energy U with time t is best represented by

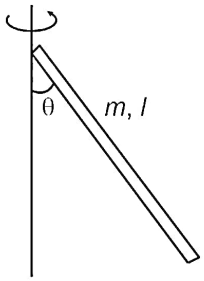
(1) 

(2) 

(3) 

(4) 

114. Moment of inertia of given rod of mass m and length l about the axis shown below, is



(1) $\frac{ml^2}{12}\sin^2\theta$ (2) $\frac{ml^2}{3}\sin^2\theta$

(3) $\frac{ml^2}{12}\cos^2\theta$ (4) $\frac{ml^2}{4}\cos^2\theta$

115. Orbital speed for a satellite whose orbit is close to Earth's surface is approximately

(1) 8000 m/s (2) 11.2 m/s

(3) 11.2 km/s (4) 8 m/s

Space for Rough Work

116. A graph is plotted between the extension (Δl) of a wire of length (L) suspended from the top of a roof at one end with load (W) connected to the other end. If the cross sectional area of wire is A_0 and Young's modulus is Y then the slope of the graph is given by (Assume the extension of wire within proportional limit)

(1) $\frac{LY}{A_0}$ (2) $\frac{L}{A_0 Y}$

(3) $\frac{A_0}{Y}$ (4) $\frac{L}{Y}$

117. A ballet dancer folds her arms during her performance. This results in

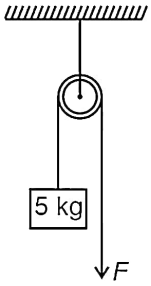
(1) Increase in her angular momentum

(2) Increase in her angular velocity

(3) Increase in her moment of inertia

(4) Both (1) and (2)

118. A 5 kg mass initially at rest is pulled with constant upward acceleration of 5 m s^{-2} using the light and smooth pulley as shown.



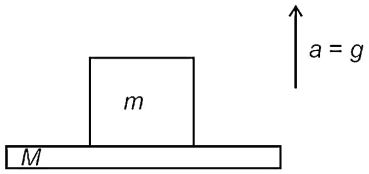
The work done by force in first 2 s is

(Given g = 10 m s^{-2})

(1) Zero (2) 750 J

(3) 300 J (4) 9700 J

119. A block of mass m is kept on a platform of mass M. The platform starts from rest with constant acceleration g vertically upward direction, as shown. The power delivered by normal reaction on block at any time t is



(1) $2mg^2t$ (2) $4mg^2t$

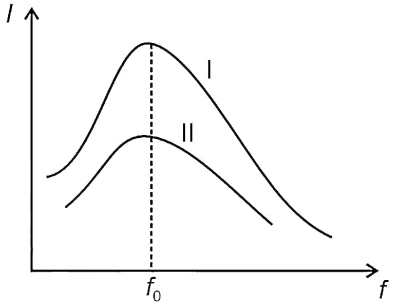
(3) $4mgt$ (4) $2mgt$

120. Which of the following is not the unit of magnetic flux?

(1) Weber (2) Volt s^{-1}

(3) T m^2 (4) kg m^2 s^{-2} A^{-1}

121. The variation of current with frequency in an RLC series circuit with L = 1.00 mH and C = 1.00 nF for two different values of resistance is shown.



Based upon above information we can conclude that

(1) $R_{II} < R_I$

(2) $R_I = R_{II}$

(3) $R_{II} > R_I$

(4) Insufficient information

122. Consider the following statements.

Statement (A) : A unitless physical quantity must be dimensionless.

Statement (B) : A dimensionless physical quantity must be unitless.

Which of the following option is correct?

(1) Statement (A) is incorrect while statement (B) is correct

(2) Statement (B) is incorrect while statement (A) is correct

(3) Statement (A) and (B) both are correct

(4) Statement (A) and (B) both are incorrect

Space for Rough Work

123. The excess pressure in case of an air bubble in a liquid is (R = Radius of drop or bubble and symbols have their usual meaning).

(1) $\frac{4T}{R}$ (2) $\frac{T}{R}$

(3) $\frac{2T}{R}$ (4) $\frac{3T}{R}$

124. The temperature of a substance increases by 54°C. On the kelvin scale this increase is equal to

(1) 327 K (2) 2.27 K

(3) 54 K (4) 4 K

125. The Mayer's relation between C_P and C_V is given by (Assume number of moles of gas to be one and symbols have usual meaning.)

(1) $C_P = R + C_V$ (2) $C_V = \frac{R}{\gamma - 1}$

(3) $C_V = R + C_P$ (4) $C_P = \gamma C_V$

126. If 210 J of heat is added to a gaseous system, internal energy increases by 50 J, the amount of work done by gas is

(1) 120 J (2) 210 J

(3) 270 J (4) 160 J

127. Law of conservation of linear momentum is valid, when

(1) Net force is zero and net torque may or may not be zero

(2) Net force and net torque is non-zero

(3) Net force may or may not be zero but net torque should be zero

(4) Net force is non-zero but net torque must be zero

128. A particle start revolving from rest with constant angular acceleration α in a circular path of radius R. If centripetal acceleration becomes numerically equal to fifty percent of tangential acceleration at certain instant then the magnitude of centripetal acceleration at that instant is

(1) $R\alpha$ (2) $\frac{R\alpha}{2}$

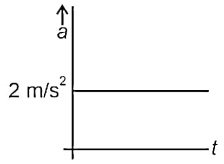
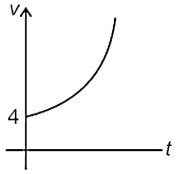
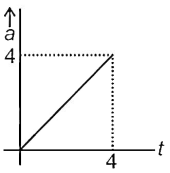
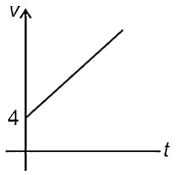
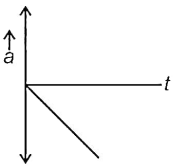
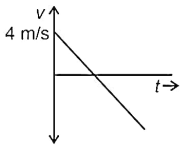
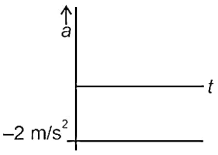
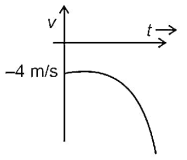
(3) $2R\alpha$ (4) $\frac{R}{2\alpha}$

129. The position of a particle moving along x-axis is given by $x = (2t^2 + 3t + 4)$ m. The velocity of the particle at time $t = 4$ s is (here x is in metre and t is in second)

(1) 15 m s^{-1} (2) 5 m s^{-1}

(3) Zero (4) 19 m s^{-1}

130. Column I contains acceleration time (a-t) graph of four particles while their corresponding velocity time (v–t) graphs are in column II. Match the column and choose the correct option (symbols have usual meanings).

Column I		Column II	
(A)	 $u = 4$ m/s	(P)	
(B)	 $u = 4$ m/s	(Q)	
(C)	 $u = -4$ m/s	(R)	
(D)	 $u = 4$ m/s	(S)	

(1) A → P; B → Q; C → R; D → S

(2) A → Q; B → P; C → S; D → R

(3) A → R; B → S; C → P; D → Q

(4) A → R; B → Q; C → S; D → P

Space for Rough Work

131. The kinetic energy of one mole of an ideal gas is $\frac{5}{2}RT$ at absolute temperature T. The molar heat capacity at constant volume for gas is

(1) $3R$ (2) $1.5R$

(3) $2.5R$ (4) $0.7R$

132. Light wave is travelling along positive y-direction. If the corresponding $\vec{E}$ vector at any time is along the positive z-axis, then the direction of $\vec{B}$ vector at that time is along

(1) Positive x-axis (2) Negative x-axis

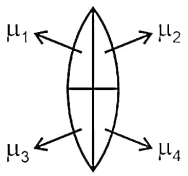
(3) Negative y-axis (4) Negative z-axis

133. When the light enters from air to glass, for which colour the angle of deviation is maximum?

(1) Red (2) Yellow

(3) Blue (4) Violet

134. How many images are formed by the lens shown, if an object is placed on its principal axis.



(1) 1 (2) 2

(3) 3 (4) 4

135. In Young's double slit experiment a minima is observed when path difference between the interfering beam is

(1) λ (2) 4λ

(3) $\frac{7\lambda}{2}$ (4) $\frac{7\lambda}{4}$

SECTION-B

136. The magnification of a compound microscope is 42. If the focal length of eye-piece is 5 cm and the image is formed at least distance of distinct vision, then the magnification of objective lens is

(1) 6 (2) 9

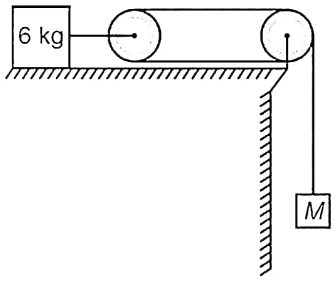
(3) 7 (4) 3

137. In Young's double slit experiment, when violet light of wavelength 4000 Å is used, 40 fringes are seen in the field of view, but when sodium light of certain wavelength is used, 60 fringes are seen in the field of view, the wavelength of sodium light is nearly

(1) 2667 Å (2) 2667 nm

(3) 267 Å (4) 2667 mm

138. A block of mass 6 kg is placed on a rough table having coefficient of friction $\mu = 0.60$. The maximum value of M for which system will remain in equilibrium, as shown in figure, is



(1) 1.5 kg (2) 2.5 kg

(3) 3.2 kg (4) 1.8 kg

139. **Assertion (A) :** Low specific heat capacity of a substance suggests that it is difficult to change its internal energy by heating.

Reason (R) : In general, specific heat capacity of a gas is significantly higher when it is heated in a closed vessel in comparison to the specific heat capacity when it is allowed to expand.

(1) Both A and R are true and R is the correct explanation of A

(2) Both A and R are true but R is NOT the correct explanation of A

(3) A is true but R is false

(4) Both A and R are false

Space for Rough Work

140. Two small spheres of radii in the ratio 2 : 5 fall through a viscous liquid with respective terminal velocities in the ratio 25 : 4. The ratio between the viscous force acting on them is

(1) 5 : 2 (2) 3 : 5

(3) 25 : 2 (4) 4 : 25

141. A physical quantity X depends on other physical quantities p, q and r such that $X = \sqrt{\frac{pq}{r^2}}$. If percentage error in p, q and r are 1%, 2%, and 2% respectively, then the maximum percentage error in the calculation of X will be

(1) 2.5% (2) 5%

(3) 3.5% (4) 7%

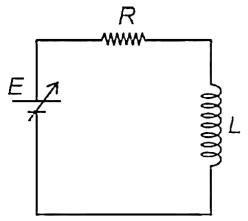
142. The rms value of the current

$i(t) = [3\sin(100\,\pi t) + 4\cos(100\,\pi t)]$ is

(1) $2\sqrt{3}$ (2) $\frac{5}{\sqrt{2}}$

(3) $\sqrt{\frac{3}{2}}$ (4) $4\sqrt{3}$

143. In the circuit shown below, the current at any time t is given by $i(t) = 2 + t$, where t is in second and i is in ampere. If $R = 2\ \Omega$ and $L = 2$ H, then emf of the battery at $t = 2$ s is



(1) 6 V (2) 8 V

(3) 10 V (4) 12 V

144. Ram (50 kg) and Shyam (80 kg) are standing on a wooden plank (floating on water) of length 10 m and mass 40 kg at two opposite ends. They both move towards each other to discuss something in a way such that Ram moves 7.5 m on the plank while Shyam covers the rest of the distance. The distance moved by the plank will be

(1) 1.03 m (2) 2.04 m

(3) 4.08 m (4) Zero

145. When a person moves from Perth (Australia) to equator, he observes the difference in acceleration due to gravity. If latitudinal angle of Perth is 37° and rotational speed of earth is 'ω' then the difference observed will be (where R represents the radius of earth)

(1) $\frac{9R\omega^2}{25}$ (2) $\frac{16R\omega^2}{25}$

(3) $\frac{11R\omega^2}{25}$ (4) $\frac{3R\omega^2}{25}$

146. Two capacitors each of capacitance C and breakdown voltage V are joined in parallel. The capacitance and breakdown voltage of the combination is

(1) $2C, \frac{V}{2}$ (2) $2C, V$

(3) $\frac{C}{2}, \frac{V}{2}$ (4) $2C, 2V$

147. An oil drop carrying a charge e has mass of 3.2×10^{-18} kg. It is falling freely in air with terminal speed. The electric field required to make the drop move upwards with the same speed is

(1) $100\ \frac{V}{m}$ (2) $400\ \frac{V}{m}$

(3) $600\ \frac{V}{m}$ (4) $200\ \frac{V}{m}$

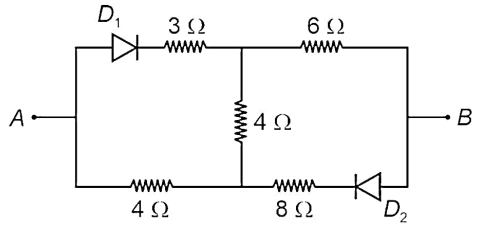
148. The ratio of the speed of the electron in the first excited state of hydrogen atom to the speed of light in a medium of refractive index 1.5 is

(1) $\frac{1}{274}$ (2) $\frac{3}{137}$

(3) $\frac{3}{548}$ (4) $\frac{1}{548}$

Space for Rough Work

149. The equivalent resistance of the circuit across *AB* is given by (Assume that diodes are ideal and $V_A > V_B$)



(1) 8.18 Ω (2) 7.44 Ω

(3) 10 Ω (4) 9.35 Ω

150. Consider the following statements and choose the correct option.

Statement I : A conducting coil connected to a resistor and attached to a d.c. voltage source loses its inductive effect after a fairly long time.

Statement II : In a series *LR* circuit connected to a d.c. source, initially the current increases exponentially.

(1) Only (I) is correct

(2) Only (II) is correct

(3) Both (I) and (II) are correct

(4) Both (I) and (II) are incorrect

CHEMISTRY

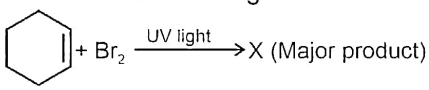
SECTION-A

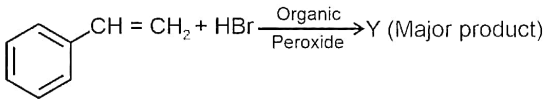
151. Which among the following elements has minimum first ionisation energy?

(1) C (2) Ge

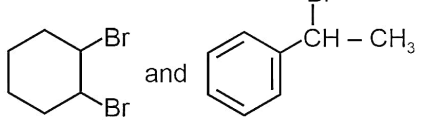
(3) Sn (4) Pb

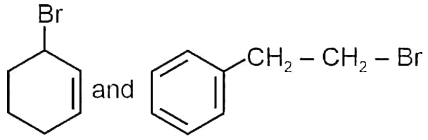
152. Consider the following reactions

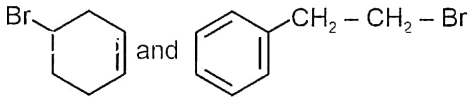


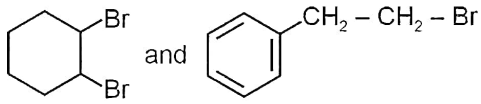


The major product (X) and (Y) respectively are

(1) 

(2) 

(3) 

(4) 

153. S_N2 reaction is fastest in

(1) $CH_2 = CH - CH_2 - Br$

(2) CH_2=CH–Br

(3) $(CH_3)_2CH - Br$

(4) $(CH_3)_3 C - Br$

154. All of the following species are electrophiles, **except**

(1) BF_3 (2) SO_3

(3) $AlCl_3$ (4) NH_3

155. Oxidation state of central carbon atom in C_3O_2 is

(1) +1 (2) +2

(3) +3 (4) 0

156. On passing chlorine gas through a hot and concentrated solution of alkali, chloride ions and chlorate ions are produced as a result of disproportionation reaction. The number of moles of NaOH required to react with 2 moles of Cl_2 is

(1) 4 (2) 5

(3) 6 (4) 8

Space for Rough Work

157. Match Column-I with Column-II and choose the correct option.

Column-I (Compounds)		Column-II (Colour)	
a.	$Na_4[Fe(CN)_5NOS]$	(i)	Yellow
b.	$Fe_4[Fe(CN)_6]_3.xH_2O$	(ii)	Blood red
c.	$[Fe(SCN)]^{2+}$	(iii)	Violet
d.	$(NH_4)_3PO_4.12MoO_3$	(iv)	Prussian blue

(1) a(ii), b(iii), c(iv), d(i) (2) a(iv), b(iii), c(i), d(ii)

(3) a(iii), b(iv), c(ii), d(i) (4) a(iii), b(iv), c(i), d(ii)

158. Which of the following halogens will give halous acid?

(1) F (2) Cl

(3) Br (4) I

159. Consider the following statements about the allotropes of phosphorous:

(a) Red phosphorous is much less reactive than white phosphorous.

(b) White phosphorous glows in dark and shows chemiluminescence.

(c) α-Black phosphorous is obtained by heating white phosphorous at 473 K under high pressure.

The correct statements are

(1) (a) and (c) only (2) (b) and (c) only

(3) (a) and (b) only (4) (a), (b) and (c)

160. Major products formed in the following reaction are

$$CH_3-O-CH_2-CH_3 + \underset{(excess)}{HI} \xrightarrow{\text{high temperature}} \text{Products}$$

(1) CH_3I and CH_3CH_2OH

(2) CH_3CH_2I and CH_3OH

(3) CH_3I and CH_3CH_2I

(4) CH_3OH and CH_3CH_2OH

161. The correct order of boiling point of the following compounds is

$$\underset{(a)}{CH_3(CH_2)_4CH_3}\ ,\ C_2H_5-\underset{(b)}{O}-C_2H_5\ ,\ \underset{(c)}{CH_3(CH_2)_3-OH}$$

(1) (b) > (a) > (c) (2) (a) > (b) > (c)

(3) (c) > (a) > (b) (4) (b) > (c) > (a)

162. Which of the following sets of quantum number is possible?

(1) $n = 3, l = 4, m = 0, s = +\frac{1}{2}$

(2) $n = 2, l = 2, m = -2, s = -\frac{1}{2}$

(3) $n = 4, l = 0, m = 0, s = +\frac{1}{2}$

(4) $n = 4, l = 3, m = -3, s = 2$

163. Correct order of melting point of the given compounds is

(1) HF > HI > HBr > HCl

(2) HI > HF > HBr > HCl

(3) HF > HI > HCl > HBr

(4) HI > HBr > HF > HCl

164. The correct order of first ionisation energy for Li, B, Be and C is

(1) Li > B > C > Be (2) Li > C > B > Be

(3) C > Be > B > Li (4) C > B > Be > Li

165. Which element has the lowest value of negative electron gain enthalpy in group 16?

(1) O (2) S

(3) Se (4) Te

Space for Rough Work

166. Given below are two statements

Statement I : In Leclanche cell, manganese is reduced from +4 oxidation state to +3 oxidation state at cathode.

Statement II : In dry cell, the electrolyte is moist paste of ammonium chloride (NH_4Cl) and zinc chloride ($ZnCl_2$).

In the light of above statements choose the correct answer.

(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

167. The equilibrium constant of the reaction

$Cu(s) + 2Ag^+(aq) \rightarrow Cu^{2+}(aq) + 2Ag(s)$; $E° = 0.46$ V at 298 K is

(1) 3.7×10^{15} (2) 2.4×10^{12}

(3) 2×10^{10} (4) 4×10^{10}

168. Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R).**

Assertion (A) : pH value of pure water varies with temperature.

Reason (R) : The ionic product of water changes with change in temperature.

In the light of above statements, choose the most appropriate answer from the option given below.

(1) **(A)** is true but **(R)** is false

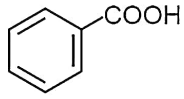
(2) Both **(A)** and **(R)** are true but **(R)** is not the correct explanation of **(A)**

(3) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**

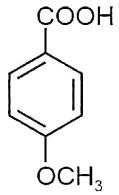
(4) **(A)** is false but **(R)** is true

169. Consider the following compounds

a. HCOOH

b. 

c. CH_3COOH

d. 

Arrange them in decreasing order of their pK_a values

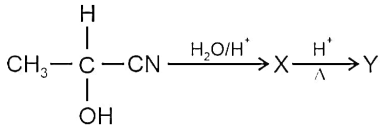
(1) a > b > c > d

(2) b > a > d > c

(3) c > d > a > b

(4) c > d > b > a

170. Consider the following reaction



Predict the product Y

(1) Lactic acid (2) Acrylic acid

(3) Crotonic acid (4) Malonic acid

171. Consider the following statements

Statement-I : Work (w) is a path function, while heat (q) is state function.

Statement-II : During free expansion of an ideal gas, w = 0 only for reversible process.

In the light of above statements choose the correct answer.

(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

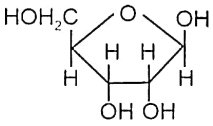
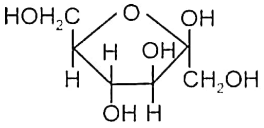
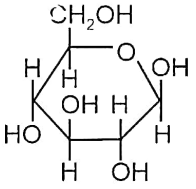
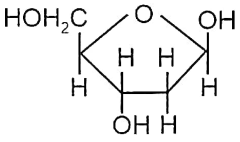
172. The number of mole(s) of AgCl precipitated per mole of $CoCl_3.4NH_3$ with excess $AgNO_3$ is

(1) 3 (2) 2

(3) 1 (4) Zero

Space for Rough Work

173. Match the structures given in column-I with their name given in column-II.

Column-I		Column-II	
a.		(i)	β-D-2-deoxyribose
b.		(ii)	β-D-Glucose
c.		(iii)	β-D-Fructose
d.		(iv)	β-D-ribose

The correct match is

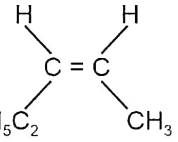
(1) a(iv), b(iii), c(ii), d(i) (2) a(i), b(iv), c(iii), d(ii)

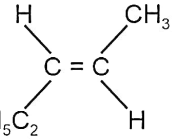
(3) a(iii), b(iv), c(i), d(ii) (4) a(iv), b(iii), c(i), d(ii)

174. Consider the following reaction sequence

$CH_3CH_2C \equiv CH \xrightarrow[(ii)\ CH_3Br]{(i)\ NaNH_2} A \xrightarrow{Na/liquid\ NH_3} B(Major)$

Major product B is

(1) 

(2) 

(3) $CH_3CH_2CH_2CH_2CH_3$

(4) $CH_3CH_2CH_2\underset{\displaystyle NH_2}{\underset{|}{C}}HCH_3$

175. Given below are the two statements

Statement I: On industrial scale, ethyne is prepared by treating calcium carbide with water.

Statement II: Ethyne liberates hydrogen gas on reaction with sodium.

In light the of above statements, choose the correct answer from the options given below.

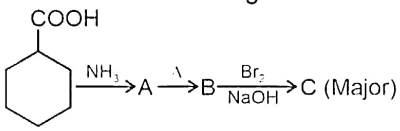
(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

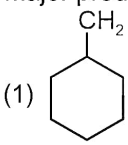
(3) Statement I is correct but statement II is incorrect

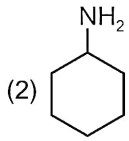
(4) Statement I is incorrect but statement II is correct

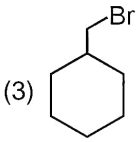
176. Consider the following reaction sequence

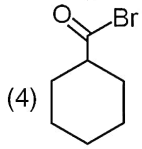


Major product C is

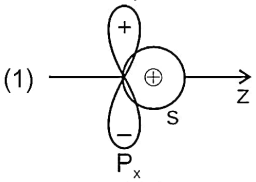
(1) 

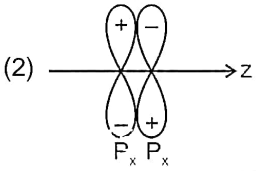
(2) 

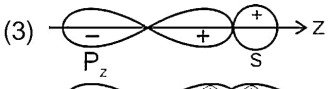
(3) 

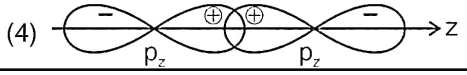
(4) 

177. Which of the given overlapping of orbitals leads to zero overlap?

(1) 

(2) 

(3) 

(4) 

Space for Rough Work

178. Hybridisation and shape of XeF_2 is
(1) sp^3d^2 and Bent (2) sp^3d^2 and Linear
(3) sp^3d and Bent (4) sp^3d and Linear

179. If 0.2 M potassium oxalate solution dissociates by 70% then the van't Hoff factor will be
(1) 2.7 (2) 2.4
(3) 2.2 (4) 3

180. If 18 g glucose is dissolved in 92 g of water, then density of the solution becomes 1.1 g mL^{-1}. The molarity of this solution will be
(1) 1.0 M (2) 1.1 M
(3) 1.5 M (4) 1.8 M

181. The maximum number of atoms are present in
(1) 64 g SO_2 (2) 8 g H_2
(3) 88 g CO_2 (4) 32 g O_3

182. 14 g of N_2 reacts with 6 g of H_2 to give NH_3. The maximum amount of NH_3 formed is
(1) 17 g (2) 34 g
(3) 51 g (4) 8.5 g

183. Given below are the two statements
Statement-I: Catalyst increases rate of reaction by decreasing activation energy.
Statement II: Catalyst can catalyse both spontaneous and non-spontaneous reactions.
In light of the above statements, choose the correct answer from the options given below.
(1) Statement I is correct but statement II is incorrect
(2) Statement I is incorrect but statement II is correct
(3) Both statement I and statement II are correct
(4) Both statement I and statement II are incorrect

184. Amount of heat released on neutralisation of 1 eq of NaOH by 1 eq of HCl in aqueous medium is
(1) 57.1 kcal (2) 28.5 kcal
(3) 13.7 kcal (4) 6.8 kcal

185. Which among the following is not a group IV ion in qualitative analysis of cations?
(1) Ni^{2+} (2) Mn^{2+}
(3) Pb^{2+} (4) Zn^{2+}

SECTION-B

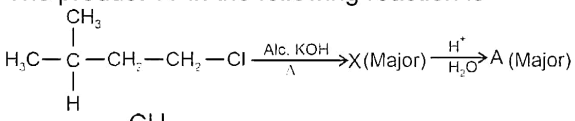
186. Choose the incorrect statement.
(1) Steam distillation is used for the separation of aniline-water mixture.
(2) Paper chromatography is a type of adsorption chromatography.
(3) Glycerol can be separated from spent-lye in soap industry using distillation under reduced pressure.
(4) Chloroform and aniline are easily separated by the technique of distillation.

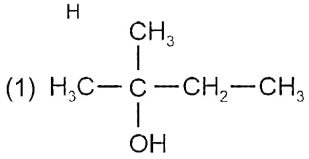
187. Match List-I with List-II and select the correct option.

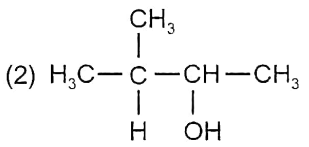
	List-I (Oxoacids of Phosphorus)		List-II (Preparation)
a.	H_3PO_2	(i)	$P_2O_3 + H_2O$
b.	$H_4P_2O_6$	(ii)	Red P_4 + alkali
c.	H_3PO_4	(iii)	White P_4 + alkali
d.	H_3PO_3	(iv)	$P_4O_{10} + H_2O$

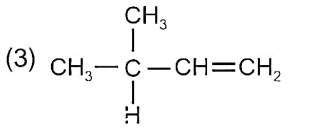
(1) a(i), b(iii), c(iv), d(ii) (2) a(iii), b(ii), c(iv), d(i)
(3) a(i), b(iv), c(ii), d(iii) (4) a(ii), b(iii), c(i), d(iv)

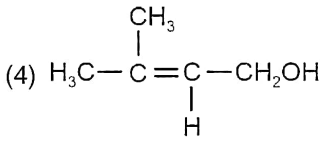
188. The product 'A' in the following reaction is



(1) 

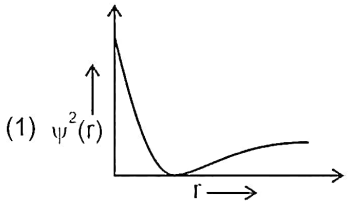
(2) 

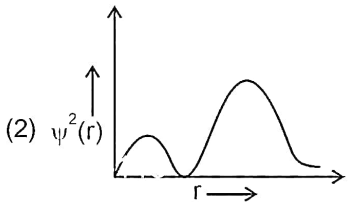
(3) 

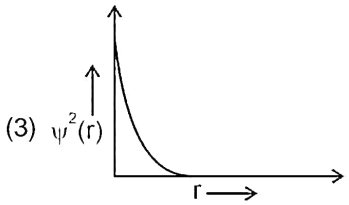
(4) 

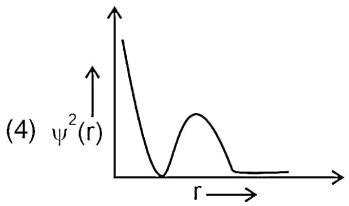
Space for Rough Work

189. The probability density curve for 2*s* electron is

(1) 

(2) 

(3) 

(4) 

190. The correct order for the increasing oxidising power of the given species is

(1) $MnO_4^- < VO_2^+ < Cr_2O_7^{2-}$

(2) $VO_2^+ < Cr_2O_7^{2-} < MnO_4^-$

(3) $VO_2^+ < MnO_4^- < Cr_2O_7^{2-}$

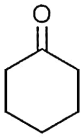
(4) $MnO_4^- < Cr_2O_7^{2-} < VO_2^+$

191. Amount of charge needed for the reduction of 0.8 mole of permanganate ions to Mn^{2+} ions will be

(1) 2 F (2) 5 F

(3) 4 F (4) 3 F

192. An organic compound 'A', C_3H_4 on reacting with dil. H_2SO_4 and $HgSO_4$ gives a compound 'B', which can also be obtained from reaction of acetonitrile with CH_3MgBr followed by hydrolysis. Compound B on reaction with ethylene glycol in presence of dry hydrogen chloride gives ethylene glycol ketal. Identify compound B.

(1) $CH_3 - C \equiv CH$ (2) 

(3) $CH_3 - \overset{\overset{O}{\|}}{C} - CH_3$ (4) $CH_3 - CH = CH_2$

193. Consider the following reaction

$2H_2(g) + CO(g) \rightleftharpoons CH_3OH(g)$, $\Delta H = -92.2$ kJ

Among the following, which condition(s) is/are favouring the formation of methanol:

a. Decreasing temperature

b. Addition of He gas at constant volume

c. Decreasing pressure

Choose the correct option.

(1) (a) only (2) (a) and (b) only

(3) (b) and (c) only (4) (a), (b) and (c)

194. Two moles of an ideal gas at 1 bar pressure and 300 K temperature is compressed isothermally by applying an external pressure of 5 bar. The work done on the gas is

(1) 26.5 kJ (2) 19.9 kJ

(3) 10.4 kJ (4) 15.6 kJ

195. Which of the following is the correct order of increasing field strength of ligands to form coordination compounds?

(1) $edta^{4-} < NCS^{\ominus} < OH^- < C_2O_4^{2-} < en$

(2) $OH^- < C_2O_4^{2-} < NCS^{\ominus} < edta^{4-} < en$

(3) $C_2O_4^{2-} < OH^- < NCS^{\ominus} < en < edta^{4-}$

(4) $OH^- < C_2O_4^{2-} < NCS^{\ominus} < en < edta^{4-}$

196. Consider the following statements

a. Ethyne on passing through red hot iron tube at 873 K gives benzene as product.

b. Propyne on reaction with water in presence of mercuric sulphate at 333 K gives propanone as major product.

c. Ethyne is more acidic than ethene.

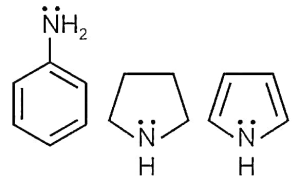
The correct statements are

(1) (a) and (b) only (2) (b) and (c) only

(3) (a) and (c) only (4) (a), (b) and (c)

Space for Rough Work

197. Correct order of basic strength of the given compounds is



(i) (ii) (iii)

(1) (i) > (ii) > (iii) (2) (iii) > (ii) > (i)

(3) (i) > (iii) > (ii) (4) (ii) > (i) > (iii)

198. Basic amino acid among the following is

(1) Isoleucine (2) Alanine

(3) Lysine (4) Glycine

199. The solubility product of PbS at 298 K is 8×10^{-28}. The solubility of PbS in 10^{-3} M solution of Na_2S at 298 K will be

(1) 8×10^{-25} mol L^{-1}

(2) 4×10^{-14} mol L^{-1}

(3) 6×10^{-15} mol L^{-1}

(4) 8×10^{-20} mol L^{-1}

200. The rate constant for a first order reaction is 2.303×10^{-2} s^{-1}. The time required to reduce 1 g of reactant to 0.1 g is

(1) 50 s (2) 500 s

(3) 100 s (4) 20 s

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