English

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ALLEN CAREER INSTITUTE KOTA (RAJASTHAN) path to success

CLASSROOM CONTACT PROGRAMME

(Academic Session : 2023-2024)

Test Pattern

NEET (UG)

MAJOR

24-04-2024

PRE-MEDICAL : ENTHUSIAST, LEADER & ACHIEVER COURSE PHASE - ALL PHASE

Test Booklet Code

L13

This Booklet contains **24** pages.

Do not open this Test Booklet until you are asked to do so.

Important Instructions :

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on ORIGINAL Copy carefully with **blue/black** ball point pen only.
2. The test is of **3 hours 20 minutes** duration and the Test Booklet contains **200** multiple-choice questions (four options with a single correct answer) from **Physics, Chemistry and Biology (Botany and Zoology). 50** questions in each subject are divided into **two Sections (A and B)** as per details given below :
   (a) **Section A** shall consist of **35 (Thirty-five)** Questions in each subject (Question Nos - 1 to 35, 51 to 85, 101 to 135 and 151 to 185). All questions are compulsory.
   (b) **Section B** shall consist of **15 (Fifteen)** questions in each subject (Question Nos - 36 to 50, 86 to 100, 136 to 150 and 186 to 200). In Section B, a candidate needs to **attempt any 10 (Ten)** questions out of **15 (Fifteen)** in each subject.
   Candidates are advised to read all 15 questions in each subject of Section B before they start attempting the question paper. In the event of a candidate attempting more than ten questions, **the first ten questions answered by the candidate shall be evaluated.**
3. Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, **one mark** will be deducted from the total scores. **The maximum marks are 720**.
4. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses on Answer Sheet.
5. Rough work is to be done in the space provided for this purpose in the Test Booklet only.
6. On completion of the test, the candidate **must hand over the Answer Sheet (ORIGINAL and OFFICE Copy) to the Invigilator** before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.
7. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
8. Use of white fluid for correction is **NOT** permissible on the Answer Sheet.
9. Each candidate must show on-demand his/her Allen ID Card to the Invigilator.
10. No candidate, without special permission of the Invigilator, would leave his/her seat.
11. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign (with time) the Attendance Sheet **twice. Cases, where a candidate has not signed the Attendance Sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case.**
12. Use of Electronic/Manual Calculator is prohibited.
13. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Room/Hall. All cases of unfair means will be dealt with as per the Rules and Regulations of this examination.
14. **No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.**
15. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.
16. Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes duration, whether such candidate (having a physical limitation to write) uses the facility of scribe or not.

Name of the Candidate (in Capitals) : _____

Form Number : in figures _____

: in words _____

Centre of Examination (in Capitals) : _____

Candidate's Signature : _____ **Invigilator's Signature :** _____

Your Target is to secure Good Rank in Pre-Medical 2024

Topic : FULL SYLLABUS.

SECTION-A (BOTANY)

1. Which cross will not produce homozygous and heterozygous progenies in equal proportion ?

(1) Tt × tt (2) Tt × Tt

(3) TT × Tt (4) TT × tt

2. Which of the following come under *Panthera* genus ?

(1) Lion (2) Dog

(3) Jackal (4) Domestic Cat

3. Which of following statement is **incorrect about** blue-green algae ?

(1) They are unicellular, colonial or filamentous.

(2) They have chlorophyll-b, similar to higher plants.

(3) They can be found in fresh water or marine water.

(4) Flagellated stages are absent

4. In fungi sexual cycle involves the three steps.
(I) Fusion of two nuclei.
(II) Meiosis in zygote.
(III) Fusion of protoplasm.
Select the correct sequence :-

(1) (I) ⟶ (II) ⟶ (III) (2) (II) ⟶ (I) ⟶ (III)

(3) (III) ⟶ (I) ⟶ (II) (4) (III) ⟶ (II) ⟶ (I)

5. Potato spindle tuber disease is caused by :

(1) Bacteria (2) Viroids

(3) Virus (4) *Mycoplasma*

6. In heterosporous pteridophytes the development of the zygote into young embryos takes place with in the female gametophyte. This event is a precursor of the :-

(1) Seed habit (2) Fruit habit

(3) Vascular habit (4) Tissue habit

7. Match the column :-

Column-I		Column-II	
A	*Cycas*	i	Heterosporous fern
B	*Pinus*	ii	Homosporous fern
C	*Salvinia*	iii	Pinnate leaves
D	*Adiantum*	iv	Needle like leaves

(1) A ⟶ iv; B ⟶ iii; C ⟶ ii; D ⟶ i

(2) A ⟶ iv; B ⟶ iii; C ⟶ i; D ⟶ ii

(3) A ⟶ iii; B ⟶ iv; C ⟶ i; D ⟶ ii

(4) A ⟶ iii; B ⟶ iv; C ⟶ ii; D ⟶ i

8. Select the correct match of petal aestivation from given below -

(1) Valvate - Chinarose

(2) Twisted - Mustard

(3) Imbricate - *Cassia*

(4) Vexillary - *Calotropis*

9. Select incorrect statement :-

(1) Parthenocarpic fruits are developed from unfertilized ovary.

(2) In maize, seed coat is fused with fruit wall.

(3) The outer covering of endosperm separates the embryo by a proteinaceous layer, called aleurone layer, in maize

(4) Wheat & Maize are dicotyledonous plants.

10. How does the number of xylem bundles in monocot roots compare to dicot roots?

(1) Monocot roots have 2-4 xylem bundles

(2) Monocot roots have more than 6 xylem bundles

(3) Both have the same number of xylem bundles

(4) Monocot roots lack xylem bundles

11. Collenchymatous hypodermis is characteristic feature of :-

(1) Monocot stem

(2) Dicot root

(3) Dicot stem

(4) Both monocot and dicot stem

12. Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A) : When the microspore divide, two unequal size cells, the large vegetative cell and small generative cell are formed.
Reason (R) : Asymmetric spindle is formed in dividing microspore cell.
In the light of the above statements, choose the correct answer from the options given below:
(1) (A) is correct but (R) is not correct
(2) (A) is not correct but (R) is correct
(3) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(4) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

13. Select the incorrect option with reference to post fertilization events :-
(1) Central cell develops into the endosperm
(2) Ovary develops into fruit
(3) Integuments develops into epicarp
(4) Zygote develops into embryo

14. *Viola* (common pansy), *Oxalis* and *Commelina* produces
(1) chasmogamous flowers only
(2) cleistogamous flowers only
(3) both chasmogamous and cleistogamous flowers
(4) Either chasmogamous flowers or cleistogamous flowers

15. Two statements are given below -
Statement-I : For plants light is rarely a limiting factor in nature.
Statement-II : At optimum light intensity, both C_3 & C_4 plants show increase in the rate of photosynthesis at high CO_2 conditions.
(1) Both statement are correct
(2) Both statements are incorrect.
(3) Statement-I is correct, statement-II incorrect.
(4) Statement-II is correct, statement-I incorrect.

16. The stroma lamellae membranes lacks _____
(1) PSI and PSII
(2) PSI and NADP reductase enzyme
(3) Cytochromes and PSI
(4) PSII and NADP reductase enzyme.

17. What is the efficiency of energy production in the absence of oxygen during the fermentation process?
(1) 2 moles of ATP per glucose
(2) 36 moles of ATP per glucose
(3) 38 moles of ATP per glucose
(4) 40 moles of ATP per glucose

18. The splitting of fructose 1,6 bi-phosphate result in :-
(1) Two PGAL molecule
(2) One PGAL and one dihydroxy acetone phosphate (DHAP)
(3) One PGA and one PGAL
(4) Two pyruvate

19. What can the reason behind seed dormancy ?
(1) Impermeable and hard seed coat.
(2) Presence of chemical inhibition.
(3) Presence of immature embryo.
(4) All of the above.

20. Abscisic acid treatment is used for :-
(1) Leaf expansion
(2) Stomatal closure
(3) Stem elongation
(4) Breaking dormancy in seeds

21. Growth in plant can be measured by :-
(1) Fresh weight
(2) Surface Area of leaf
(3) Cell number
(4) All of the above

22. A species whose distribution is restricted to a small geographical area because of the presence of a competitively superior species is found to expand its distributional range dramatically when competing species is experimentally removed is called.

(1) Interference competition

(2) Competitive exclusion

(3) Competitive release

(4) Resource partitioning

23. Given below are two statements :

Statement I : Majority of the parasites harm the host, they may reduce the survival, growth and reproduction of the host and reduce its population density.

Statement II : Female anopheles mosquito is not considered as parasite

In the light of above statements. Choose the most appropriate answer from the option 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.

24. Leech on cattle is an example of .....

(1) Ectoparasite (2) Endoparasite

(3) Predation (4) Competition

25. **Assertion (A) :** N.P.P. is gross primary productivity minus respiration loss.

Reason (R) : Secondary productivity is productivity of heterotrophs.

(1) Both A and R are correct but R is not the correct explanation of A.

(2) A is correct but R is not correct

(3) A is not correct but R is correct

(4) Both A and R are correct and R is the correct explanation of A.

26. The unit of productivity is _____

(1) $gm^{-2}\ yr^{-1}$ (2) $gm^{2}\ yr^{-1}$

(3) $Kcal\ m^{-3}\ yr^{-1}$ (4) $Kcal\ gm^{-3}\ yr^{-1}$

27. In global plant biodiversity, _____ are the taxonomic group which are most species diverse.

(1) Fungi (2) Angiosperms

(3) Algae (4) Gymnosperms

28. In which respect RNA synthesized on DNA template in nucleus differ from template :

(1) in segment transcribed from exon

(2) in segment transcribed from intron

(3) in presence of Uracil

(4) in presence of Thymine

29. The same amino acid sequence of a polypeptide chain can be represented by more than one type of nucleotide sequence in mRNA. It explains which property of genetic code ?

(1) Universal nature

(2) Degeneracy

(3) Un-ambiguous

(4) Comma-less or continuous

30. During the formation of bread it becomes porous due to release of CO_2 by the action of:-

(1) Yeast (2) Bacteria

(3) Virus (4) Protozoans

31. Baculoviruses used as biological control agents belong to :

(1) Genus *Glomus*

(2) Genus *Nucleopolyhedrovirus*

(3) Genus *Escherichia*

(4) Genus *Bacillus*

32. **Assertion :** The possibility of a female becoming a haemophilic is extremely rare.

Reason : Mother of haemophilic female has to be at least carrier and the father should be haemophilic.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

33. Match List-I with List-II.

	List-I		List-II
(A)	F_1 hybrid resembles to both of the parents	(I)	Complete dominance
(B)	F_1 hybrid resembles to either of the two parents	(II)	Incomplete dominance
(C)	F_1 hybrid is intermediate of the two parents	(III)	Co-dominance

Choose the correct answer from the options given below :-

(1) (A)-(I), (B)-(III), (C)-(II)

(2) (A)-(III), (B)-(I), (C)-(II)

(3) (A)-(II), (B)-(III), (C)-(I)

(4) (A)-(III), (B)-(II), (C)-(I)

34. Phenylketonuria is not

(1) Autosomal dominant disease.

(2) Autosomal recessive disease.

(3) Inborn error of metabolism.

(4) Disease in which phenylalanine converted into phenyl pyruvic acid and other derivative.

35. Biofertilisers play an important role in increasing the soil fertility. They are :

(1) Chemicals which improve soil quality.

(2) Organisms that reduce organic matter in paddy fields.

(3) Organisms that enrich the nutrient quality of the soil.

(4) Microbes used to produce antibiotics only.

SECTION-B (BOTANY)

36. Two non allelic genes located on single chromosome can show :-

(1) Dominant-recessive relation

(2) Segregation

(3) Independent assortment

(4) Linkage

37. Plant families like convolvulaceae and solanaceae are included in the -

(1) Different order and same class

(2) Same order and different classes

(3) Same order as well as same class

(4) Different orders and classes

38. The main plant body in pteridophytes is :-

(1) Undifferentiated sporophyte

(2) Differentiated sporophyte

(3) Undifferentiated gametophyte

(4) Differentiated gametophyte

39. The type of placentation in members of family poaceae is :-

(1) 

(2) 

(3) 

(4) 

40. A leaf is said to be simple, when it's lamina is :

(1) With incisions only

(2) Without incisions only

(3) With or without incisions but do not incised, upto mid rib

(4) Incised upto mid rib

41. Which of the following is absent in most of monocot stem ?

(1) Sieve tube

(2) Companion cell

(3) Phloem parenchyma

(4) Tracheids

42. **Statement - I :-** Xylem and Phloem are the complex permanent tissues in plants.
Statement - II :- The complex tissues are made up of more than one type of cells.

(1) Both statements I & II are correct
(2) Both statements I & II are incorrect.
(3) Statement I is correct and Statement II is incorrect.
(4) Statement - I is incorrect and Statement - II is correct.

43. The pollen tube releases the two male gametes into _____ .

(1) The cytoplasm of the style and stigma cells
(2) The cytoplasm of the egg
(3) The cytoplasm of the synergid
(4) The cytoplasm of the embryo sac

44. Fill in the blanks -
According to Blackmann, If a chemical process is affected by more than one factor, then its rate is determined by factor which is nearest to its rate is determined by factor which is nearest to its _____ value.

(1) Maximum (2) Minimum
(3) Critical (4) Average

45. What is found in the stroma of higher plants chloroplast ?

(1) Light-independent reaction enzymes
(2) Light-dependent reaction enzymes
(3) 80s Ribosomes
(4) Chlorophyll

46. Which of the following statement is incorrect ?

(1) The cells of meristems have the capacity to divide are self perpetrate.
(2) The increases growth per unit time is termed as growth rate.
(3) The simplest expression of geometric growth is exemplified by a root elongating at a constant rate.
(4) Every plant organism has an optimum temperature range best suited for its growth.

47. (1) The fast dwindling Amazon forest is estimated to produce, through photosynthesis __A__ % of total oxygen in earths surface.
(2) The National forest policy (1988) of India has recommended __B__ % forest cover for the plains and __C__ % for the hills.

(1) (A) - 20%, (B) - 33%, (C) - 67%
(2) (A) - 20%, (B) - 67%, (C) - 33%
(3) (A) - 30%, (B) - 33%, (C) - 67%
(4) (A) - 30%, (B) - 67%, (C) - 33%

48. Match the following :

	Country		No. of species of Birds
(i)	Columbia	(a)	1400
(ii)	New York	(b)	1200
(iii)	Green land	(c)	56
(iv)	India	(d)	105

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

49. **Assertion :** In mRNA introns are removed and exons are joined in a defined order.
Reason : Primary transcript contain both exons and introns and are nonfunctional.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
(3) Assertion is True but the Reason is False.
(4) Both Assertion & Reason are False.

50. Which of the following is not a feature of double helix model of DNA ?
(A) Two chains have parallel polarity.
(B) Distance between two strands are uniform.
(C) There are roughly 10 base pair in each turn of DNA.
(D) Adenine forms two hydrogen bond with guanine from opposite strand

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

Topic : FULL SYLLABUS.

SECTION-A (ZOOLOGY)

51. Gills are also excretory organ in which phylum :-

(1) Phylum Annelida

(2) Phylum Mollusca

(3) Phylum Arthropoda

(4) Phylum platyhelminthese

52. In which animal notocord is extends from head to tail:-

(1) Saccoglossus (2) Ascidia

(3) Branchiostoma (4) Balanoglossus

53. Water vascular system found in all except -

(1) *Asterias* (2) *Pinctada*

(3) *Cucumaria* (4) *Ophiura*

54. Select the correct statement for phylum arthropoda-

(1) Largest phylum which include only insects

(2) They are Triploblastic, unsegmented and coelomate.

(3) Sensory organs like antennae, simple eyes, compound eyes, are present.

(4) They always show indirect development.

55. Which of the following cell junction is found in epithelial tissue and help to stop substances from leaking across tissue?

(1) Tight junction (2) Gap junction

(3) Adhering junction (4) Both (1) and (2)

56. Which structure is present in male cockroach while absent in female cockroach.

(1) Anal cerci (2) Anal style

(3) Spermatheca (4) Both 2 and 3

57. Blood vessel carrying least CO_2 is :-

(1) Vena cava (2) Hepatic vein

(3) Pulmonary vein (4) Pulmonary artery

58. Read the following statements and select the incorrect option.

(1) Purkinje fibres found only in ventricle wall

(2) Pulmonary artery drains deoxygenated blood from the right atrium

(3) Lymph is colourless fluid

(4) Kidney shaped nucleus occurs in monocyte

59. Inspiration can occur if the intra-pulmonary pressure is :

(1) Less than the atmospheric pressure

(2) More than the atmospheric pressure

(3) Equal to the atmospheric pressure

(4) Positive pressure in the lungs with respect to atmospheric pressure.

60. Minimum reabsorbtion occurs in :-

(1) PCT

(2) DCT

(3) Ascending limb of Henle's loop

(4) Desending limb of Henle's loop

61. The chemical causing the transmission of nerve impulse across synapses is ?

(1) Acetylcholine (2) Cholinesterase

(3) Choline (4) Acetic acid

62. Which of the following gland degenerate in old individuals ?

(1) Thymus (2) Pituitary

(3) Adrenal (4) Thyroid

63. Which of the following endocrine gland is paired ?

(1) Hypothalamus

(2) Pineal gland

(3) Adrenal gland

(4) Pituitary gland

64. Match the column I with column II and choose the correct option given below ?

Column-I		Column-II	
(A)	Secretin	(1)	Stimulate the secretion from gastric glands
(B)	Gastrin	(2)	Stimulate the secretion of water & bicarbonates in pancreatic Juice
(C)	CCK	(3)	Inhibit gastric secretion & motility
(D)	GIP	(4)	stimulate the secretion of pancreatic enzyme

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

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

65. What is sarcomere ?

(1) Part between two H zone
(2) Part between two A band
(3) Part between two Z line
(4) Part between two I band

66. Glans penis is covered by :-

(1) Loose fold of skin-fore skin
(2) Very tight fold of cartilage-prepuce
(3) Elastic cartilage
(4) Areolar membrane

67. Sertoli cells are found in :-

(1) Ovaries and secrete progesterone
(2) Adrenal cortex and secrete adrenaline
(3) Seminiferous tubules and provide nutrition to germ cells.
(4) Pancreas and secrete cholecystokinin.

68. **Assertion :** Oxytocin helps in parturition.
Reason : Process of delivery of the foetus is called parturition.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
(3) Assertion is True but the Reason is False.
(4) Both Assertion & Reason are False.

69. Which is not a suitable method for population control?

(1) Oral pills (2) I.U.C.D
(3) Condoms (4) M.T.P

70. An example of innate immunity is :-

(1) T-lymphocyte
(2) B-lymphocyte
(3) Neutrophils
(4) Memory cell

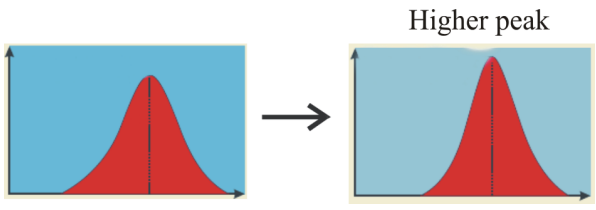
71. Which of the following cells are not included in cellular barrier of innate immunity ?

(1) Macrophages (2) N.K. cells
(3) Neutrophils (4) Helper T-cells

72. **Statement-I :** Active immunity is slow and takes time to give its full effective response
Statement-II : The yellowish fluid colostrum secreted by mother during the initial days of lactation has abundant IgG antibodies

(1) Statement-I and II both are correct
(2) Statement-I and II both are incorrect
(3) Only Statement-I is correct
(4) Only Statement-II is correct

73. The given figure represents which type of natural selection :-



(1) Disruptive selection
(2) Stabilising selection
(3) Directional selection
(4) Artificial selection

74. **Statement-I** : In Hardy-Weinberg principle, allelic frequencies in a population are stable and is constant from generation to generation.
Statement-II : In Hardy-Weinberg principle the gene pool remains constant.

(1) Both Statement-I and II are incorrect.

(2) Statement-I is correct but statement-II is incorrect.

(3) Statement-I is incorrect and Statement-II is correct.

(4) Both Statement-I and Statement-II are correct.

75. Which of the following is **not** a membrane-bound cell organelle ?

(1) ER

(2) Mitochondria

(3) Ribosome

(4) Golgi complex

76. Which cell organelle divide the intracellular space in two distinct compartments luminal and extra luminal ?

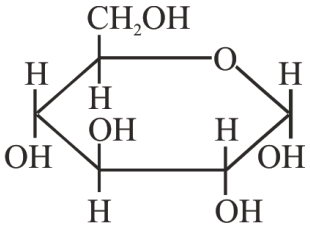
(1) ER

(2) Golgi body

(3) Lysosome

(4) Plasma membrane

77. Identify the given structure and their nature :-



	Structure	Nature
(1)	Glucose	Reducing
(2)	Glucose	Non reducing
(3)	Maltose	Reducing
(4)	Fructose	Reducing

78. The optimum temperature for polymerisation in PCR is ____ while the enzyme responsible for the mentioned step can tolerate temperatures upto ____. Select the correct option according to the blanks :-

(1) 95°C, 60°C (2) 94°C, 95°C

(3) 72°C, 95°C (4) 95°C, 72°C

79. Which kind of therapy was given in 1990 to a four year old girl with ADA deficiency:

(1) Immuno therapy

(2) Radiation therapy

(3) Gene therapy

(4) Chemo therapy

80.

(a) (b)

(a) and (b) are :-

(1) (a) Roots of a typical control plants.
(b) Transgenic plants root 5 days after deliberate infection of nematode but protected through novel mechanism.

(2) (a) Transgenic plants root 5 days after deliberate infection of nematode but protected through novel mechanism.
(b) Roots of a typical control plants.

(3) (a) Host plant-generated dsRNA triggers protection against nematode infestation.
(b) Roots of a typical control plants.

(4) (a) Roots of a typical control plants.
(b) Host plant-generated dsRNA triggers protection against nematode infestation.

81. Water vascular system helps in :

(1) Locomotion

(2) Respiration

(3) (1) and (2) both

(4) Only Respiration

82. Choose the correct statement regarding cilia :-

(1) Mainly present in the inner surface of hollow organs

(2) Present in inner lining of stomach

(3) Present in inner lining of Alveoli

(4) Cilia helps in the flaggelar movement of sperm

83. Match the following columns :-

Type of neuron		Source	
(a)	Multipolar	(i)	Embryonic stage
(b)	Bipolar	(ii)	Cerebral cortex
(c)	Unipolar	(iii)	Retina of eye

(1) a-i, b-iii, c-ii

(2) a-iii, b-ii, c-i

(3) a-ii, b-i, c-iii

(4) a-ii, b-iii, c-i

84. Which one is not regulated by thyroid gland ?

(1) RBC formation

(2) Fat metabolism

(3) Calcium balance

(4) Increase in inflammatory actions

85. How many of the following are secondary sex organs in males ?

Uterus, Epididymis, Vas deferens, Prostate, Fallopian tube, Seminal vesicle, Penis, Vagina, Testes, Bulbourethral glands

(1) Five (2) Six (3) Seven (4) Four

SECTION-B (ZOOLOGY)

86. **Assertion:** In human Spermatogenesis begins at puberty but oogenesis is intiated during the embryonic development stage.

Reason: oogenesis is markedly different from spermatogenesis.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

87. Read the following statement carefully and answer the question given below :

(A) Cyclic changes occurs in endometrium during menstrual cycle.

(B) External thin membrane of uterus is perimetrium.

(C) Strong uterine contraction occur in myometrium at the time of parturition.

(D) The uterus opens into narrow cervix through vagina.

How many of the above statements are correct ?

(1) A and B

(2) A, B and C

(3) A, B and D

(4) B and D

88. **Statement-I :-** AIDS is a congenital disease.

Statement-II :- HIV is a retro-virus.

(1) Both statement-I and statement-II are correct.

(2) Statement-I is correct but statement-II is not correct.

(3) Both statement-I and statement-II are not correct.

(4) Statement-I is not correct but statement-II is correct.

89. How many pair is/are **correctly** matched ?

(a) Malaria – Female anopheles

(b) Diphtheria – Mycobacterium diphtheriae

(c) Plague – Yersinia pestis

(d) Pneumonia – Rhino virus

(1) a & b (2) b & c

(3) b & d (4) a & c

90. Gap between meiosis I & meiosis II is known as :-

(1) Interphase

(2) Interkinesis

(3) Diakinesis

(4) Telophase

91. Study the names of different cell organelles / structures given below -

Lysosome, Mitchondria, Golgi body, ER, Ribosome, Thylakoid

How many from the above are bound by single membrane ?

(1) 2 (2) 3

(3) 4 (4) 5

92. Which one of the following bond is formed between carboxyl group of one amino acid and amine group of other amino acid in protein ?

(1) Peptide bond

(2) Hydrogen bond

(3) Vanderwall bond

(4) Hydrophobic interaction

93. In gel electrophoresis, differential mobility of DNA depends upon

(1) Helical nature of DNA

(2) Double stranded nature of DNA

(3) Charge and size of DNA

(4) Hydrogen bonding between bases

94. DNA probe is used for :-

(1) Detection of pathogenic bacteria

(2) Medical genetics to find particular gene

(3) DNA finger printing

(4) All the above

95. Which of the following is not the function of connective tissue ?

(1) To connect structure

(2) Transportation of substances

(3) Supporting

(4) Covering

96. In male frog vasa efferentia enters the kidney and open into ?

(1) Ureter (2) Bidder's canal

(3) Cloaca (4) Urinogenital tract

97. 'Bundle of His' is related to which one of the following organs in humans ?

(1) Pancreas (2) Brain

(3) Heart (4) Kidney

98. Thymosin stimulate differentiation of :

(1) Milk (2) Erythrocyte

(3) T-lymphocytes (4) Melanocytes

99. Which of the following is used as method of gene transfer in plant cells ?

(1) Biolistic (2) Microinjection

(3) Ti Plasmid (4) Both (1) & (3)

100. Lubrication during copulation is provided by :-

(1) Epididymis

(2) Sperms

(3) Bulbourethral glands

(4) Prostate

Topic : FULL SYLLABUS.

SECTION-A (CHEMISTRY)

101. 'Xe' forms different type of compounds. The $\frac{n_1}{n_2}$ ratio of XeO_{n_1}, F_{n_2} is 1.
Then which of the following option is incorrect ?

(1) It is an polar compound.

(2) It is an planar compound.

(3) It contain one lone pair at central atom.

(4) It has folded square shape.

102. How many of the following species having bond order ≥ 2.
$O_2^+, Li_2^+, B_2^-, N_2^-, Be_2, O_2^-, H_2^-, C_2$

(1) 5 (2) 3 (3) 2 (4) 1

103. Choose incorrect order of bond angle ?

(1) $NO_2^+ > NO_3^- > NO_2^-$

(2) $BF_3 < BCl_3 < BBr_3$

(3) $NF_3 < NH_3 < NCl_3$

(4) $NH_2^- < NH_3 < NH_4^+$

104. Which of the following species contain super single pair ?

(1) C_2H_6 (2) C_2H_4 (3) CCl_4 (4) CH_4

105. Hybridisation of XeO_6^{4-} is similar with -

(1) ICl_4^- (2) CO_3^{2-} (3) I_3^+ (4) XeF_5^-

106. The bond order of SO_4^{2-} is similar with ?

(1) O_2^+ (2) O_2^{2-}

(3) O_2^- (4) None of these

107. Which statement is incorrect about *Phosphonic* acid?

(1) Two acidic hydrogen

(2) sp^3 – hybridized Phosphorus atom

(3) Two $p\pi - d\pi$ bonds

(4) act as reducing agent

108. **Assertion :** In d-block elements, generally second ionisation enthalpy increases along in 3d series.
Reason : In d-block elements the effective nuclear charge increases because one d-electron doesn't shield another electron from the influence of nuclear charge due to d-orbitals differ in direction.

(1) Assertion and Reason are true and Reason is correct explanation of Assertion.

(2) Assertion and Reason are true but Reason is not correct explanation of Assertion.

(3) Assertion is true but Reason is false.

(4) Assertion is false but Reason is true.

109. Which of the following statement is not correct for d-block elements ?

(1) Elements which give the greatest number of oxidation states occur in or near the middle of series.

(2) Low oxidation states are found when a complex compound has ligands capable of π-acceptor character in addition to the σ-bonding.

(3) Mn^{+3} is oxidising agent whereas Co^{+3} is reducing agent.

(4) The dichromate ion consist of two tetrahedral sharing one corner with Cr-O-Cr bond angle of 126°.

110. Which group-V reagent is generally used for group analysis.

(1) $NH_4OH + NH_4Cl$

(2) $H_2S + NH_4OH$

(3) $(NH_4)_4CO_3 + NH_4OH$

(4) NaOH on boiling

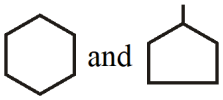
111. Which of the following sulphides has maximum solubility product ?

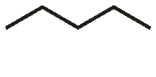
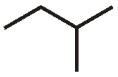
(1) HgS (2) PbS (3) CuS (4) MnS

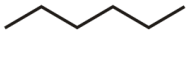
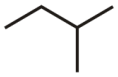
112. $CH_3-(CH_2)_2-COOK \xrightarrow{\text{Electrolysis}} X \xrightarrow[HCl]{\text{Anhy.}AlCl_3} A + B$

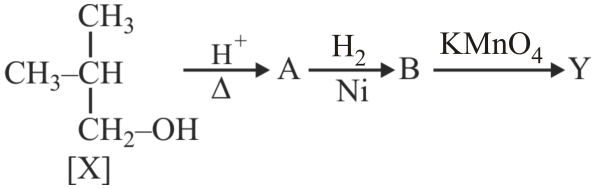
A & B may be :-

(1) $CH_3-\underset{\underset{CH_3}{|}}{CH}(CH_2)_2-CH_3$ and $CH_3-CH_2-\underset{\underset{CH_3}{|}}{CH}-CH_2-CH_3$

(2)  and

(3)  and 

(4)  and 

113. 

X & Y are :-

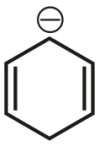
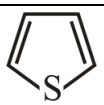
(1) Functional group isomer

(2) Position isomers

(3) Metamers

(4) Chain isomers

114. Match the column :-

(a)		(p)	Heterocyclic aromatic
(b)		(q)	Homocylic aromatic
(c)		(r)	Anti aromatic
(d)		(s)	Non Aromatic

(1) a ⟶ q, b ⟶ r, c ⟶ s, d ⟶ p

(2) a ⟶ r, b ⟶ q, c ⟶ p, d ⟶ s

(3) a ⟶ r, b ⟶ q, c ⟶ s, d ⟶ p

(4) a ⟶ s, b ⟶ p, c ⟶ q, d ⟶ r

115. Which of the following is most stable carbocation.

(1) $(CH_3)_3C\overset{\oplus}{C}H_2$

(2) $(CH_3)_3\overset{\oplus}{C}$

(3) $CH_3-CH_2-\overset{\oplus}{C}H_2$

(4) $CH_3-\overset{\oplus}{C}H-CH_2-CH_3$

116. $\underset{(I)}{CH_2=CH-\overset{O}{\overset{\|}{C}}-H}$, $\underset{(II)}{\overset{\oplus}{C}H_2-CH=\overset{O^{\ominus}}{\overset{|}{C}}-H}$

$\underset{(III)}{\overset{\ominus}{C}H_2-CH=\overset{O^{\oplus}}{\overset{|}{C}}-H}$

Correct order of stability of resonating structure is :-

(1) I > II > III

(2) III > I > II

(3) III > II > I

(4) I = II = III

117. Fractions of crude oil are separated from each other by :-

(1) Fractional distillation

(2) Simple distillation

(3) Steam distillation

(4) Distillation at low pressure

118. $CH_3-CH=CH-CN$ in given compound hybridisation state of each carbon from left to right is :-

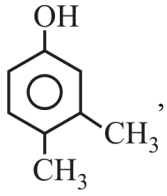
(1) sp^3, sp^2, sp^2, sp^3

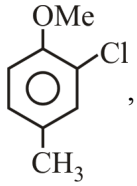
(2) sp^3, sp^2, sp^2, sp^2

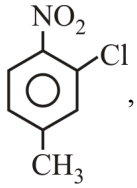
(3) sp^3, sp^2, sp^2, sp

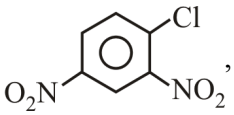
(4) sp^2, sp^2, sp^2, sp^2

119. Which is not correctly matched :-

(1)  , 3,4-dimethyl phenol

(2)  , 2-chloro-4-methyl anisole

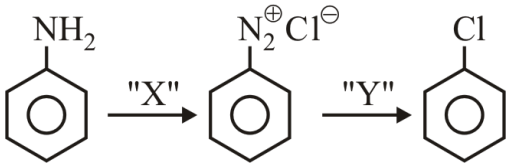
(3)  , 2-chloro-4-methyl-1-nitrobenzene

(4)  ,2-chloro-1,5-dinitrobenzene

120. The red colour product in lassaigne's extract is due to formation of :-

(1) $[Fe(SCN)_2]^{-1}$ (2) $[Fe(CNS)]^{2+}$

(3) $Fe(CN)_3$ (4) $[Fe(SCN)]^{2+}$

121. 

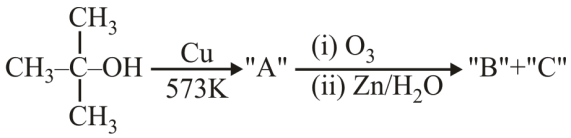
'X' & "Y" respectively will be ?

(1) $NaNO_2 + HCl$ (273–278 K), Cu_2Cl_2 / HCl

(2) $NaNO_3 + HCl$ (273–278 K), KCl

(3) $NaNO_2 + HCl$ (373–378 K), Cu_2Cl_2

(4) $NaNO_3 + HCl$ (373–278 K), KCl

122. 

"A", "B" & "C" are respectively. While B give silver mirror test.

(1) Isobutene, Acetyldehyde and acetone

(2) Isopropene, Formaldehyde and Acetone

(3) Isobutene, Formaldehyde and Acetone

(4) Isopropene, Formaldehyde and Acetaldehyde

123. Match column-I with column-II :-

	Column-I (Reagent)		Column-II (Reaction)
(i)	dil. NaOH	(a)	Swarts reaction
(ii)	Conc. NaOH	(b)	Aldol reaction
(iii)	$CHCl_3$ + aq. NaOH	(c)	Cannizzaro reaction
(iv)	SbF_3	(d)	Reimer-Tiemann reaction

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

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

124. Consider the following reaction and select incorrect statement :

$CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(g)$

(1) One mole of $CH_4(g)$ reacts with two moles of $O_2(g)$ to give one mole of $CO_2(g)$ and two moles of $H_2O(g)$

(2) One molecule of $CH_4(g)$ reacts with 2 molecules of $O_2(g)$ to give one molecule of $CO_2(g)$ and 2 molecules of $H_2O(g)$

(3) At STP 22.4 L of $CH_4(g)$ reacts with 44.8 L of $O_2(g)$ to give 22.4 L of $CO_2(g)$ and 44.8 L of $H_2O(g)$

(4) 1g of $CH_4(g)$ reacts with 2g of $O_2(g)$ to give 1 g of $CO_2(g)$ and 2g of $H_2O(g)$

125. **Assertion (A) :-** A reddish colour appears on adding two drops of 0.002 M potassium thiocynate solution to 1 mL of 0.2 M Iron (III) nitrate solution.

Reason (R) :- Fe^{+3} ion and SCN^- ion react together and form a complex ion $[Fe(SCN)]^{+2}$ of deep red colour.

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

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

(3) (A) is correct but (R) is incorrect

(4) (A) is incorrect but (R) is correct

126. For preparing the buffer solution of the required pH of 9.5, the acid which must be selected is :

(1) HCOOH ($pK_a = 3.7$)

(2) C_6H_5COOH ($pK_a = 4.22$)

(3) C_6H_5OH ($pK_a = 9.9$)

(4) HClO ($pK_a = 7.5$)

127. On combustion of 0.4 g CH_4, 0.25 kcal of heat is liberated. Then heat of combustion of CH_4 is -

(1) −20 kcal/mol (2) −10 kcal/mol

(3) −2.5 kcal/mol (4) −5 kcal/mol

128. First law of thermodynamics tells us about -

(1) The relationship between the heat absorbed and the work performed on or by the system

(2) The direction of chemical reactions

(3) The rate of chemical reactions

(4) Extent of chemical reactions

129. Match List-I with List-II :

	List-I		List-II
(P)	Number of subshells in a shell	(A)	$2(2\ell + 1)$
(Q)	Maximum number of electrons in a subshell	(B)	$n - \ell - 1$
(R)	Number of Radial Nodes	(C)	n
(S)	Number of spectral lines for transition from energy level "n" to ground state	(D)	$\frac{n(n-1)}{2}$

(1) P ⟶ A; Q ⟶ B; R ⟶ C; S ⟶ D

(2) P ⟶ C; Q ⟶ A; R ⟶ B; S ⟶ D

(3) P ⟶ C; Q ⟶ B; R ⟶ A; S ⟶ D

(4) P ⟶ D; Q ⟶ B; R ⟶ A; S ⟶ C

130. Oxidation state of all the carbon atoms present in carbon suboxide (C_3O_2) separately is :

(1) 0, +1, +2 (2) +1, +2, +3

(3) +2, 0, +2 (4) +2, 0, −2

131. **Assertion (A) :-** Aquatic species are more comfortable in cold water rather than in warm water.

Reason (R) :- Solubility of gases in liquid decreases with decrease in temperature.

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

(2) (A) is correct but (R) is not correct

(3) (A) is incorrect but (R) is correct

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

132. Consider the following statements and select the correct option :-

(A) Order of reaction is applicable to elementary as well as complex reactions.

(B) The probability that more than three molecules can collide with proper orientation and react simultaneously is very small.

(C) The decomposition of gaseous ammonia on a hot platinum surface is a first order reaction at high pressure.

(D) In a mixture of potassium permanganate and oxalic acid, potassium permanganate gets decolorised faster at a higher temperature than that at a lower temperature.

(1) A and C only

(2) A, B and D only

(3) B and C only

(4) All the above statements are correct

133. Which one of the following solutions will have highest osmotic pressure ?

(Assume that all the salts are 100 % dissociated)

(1) 0.1 M Na_2SO_4

(2) 0.1 M Na_3PO_4

(3) 0.1 M $Al_2(SO_4)_3$

(4) 0.1 M $CaCl_2$

134. Consider the following statements and select the correct option :-

Statement-I :- Lyophobic sols needs stabilising agents for their preservation.

Statement-II :- Lyophilic sols are readily precipitated (or coagulated) on the addition of small amount of electrolytes.

(1) Both statement-I and statement-II are correct

(2) Both statement-I and Statement-II are incorrect

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

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

135. 2g of benzoic acid (C_6H_5COOH) dissolved in 25 g of benzene shows a depression in freezing point equal to 1.62 K. Molal depression constant for benzene is 4.9 K kg mol^{-1}. What is % association of acid if it forms dimer in solution ?

(1) 69.2 (2) 79.2 (3) 89.2 (4) 99.2

SECTION-B (CHEMISTRY)

136. **Assertion :** MgF_2 is more stable than NaF.

Reason : Lattice energy of MgF_2 is greater than NaF.

(1) Assertion and Reason both are correct and Reason is correct explanation of Assertion.

(2) Assertion and Reason both are correct and Reason is not correct explanation of Assertion.

(3) Assertion is correct but Reason is incorrect.

(4) Assertion is incorrect but Reason is correct.

137. Lattice energy (LE) affect on :-

(1) Stability of ionic compound

(2) Melting point of ionic compound

(3) Boiling point of ionic compound

(4) All of the above

138. The incorrect order of stability ?

(1) $Ga^{+3} < In^{3+} < Tl^{3+}$ (2) $Tl^{+} > Tl^{+3}$

(3) $Ga^{+} < In^{+} < Tl^{+}$ (4) $Ga^{+3} > Ga^{+}$

139. Match the column-I with column-II :

Column-I IUPAC Name of complex		Column-II Formula of complex	
(a)	Tetra carbonyl nickel [0]	(P)	$[Co(H_2NCH_2CH_2NH_2)_3]_2(SO_4)_3$
(b)	Tetra ammine aqua chlorido cobalt (III) chloride	(Q)	$[Co(NH_3)_5(CO_3)]Cl$
(c)	Tris (ethane-1, 2-diammine) cobalt (III) Sulphate	(R)	$[Co(NH_3)_4(H_2O)Cl]Cl_2$
(d)	Penta ammine carbonato cobalt (III) chloride	(S)	$[Ni(CO)_4]$

(1) a ⟶ Q, b ⟶ R, c ⟶ P, d ⟶ S

(2) a ⟶ S, b ⟶ P, c ⟶ R, d ⟶ Q

(3) a ⟶ P, b ⟶ R, c ⟶ S, d ⟶ Q

(4) a ⟶ S, b ⟶ R, c ⟶ P, d ⟶ Q

140. Out of the following co-ordination entities.

The number of co-ordination entities which are chiral ?

$[CrCl_2(OX)_2]^{-3}$, $[Co(en)_3]Cl_3$,

$[Co(NH_3)_3(NO_2)_3]$, $[Zn(gly)\ (NH_3)_2]^{+}$,

$[Pd\ BrCl(NO_2)(NH_3)]^{\ominus}$

$[Ir(acac)_2(H_2O)(NH_3)]^{+}$,

$[CrCl_3(SCN)(H_2O)_2]^{\ominus}$, $[Pt(Br)_2(NO_2)_2\ en]$

(1) 5 (2) 6 (3) 4 (4) 3

141. **Assertion (A) :-** Sodium ethoxide is a stronger base than sodium hydroxide.

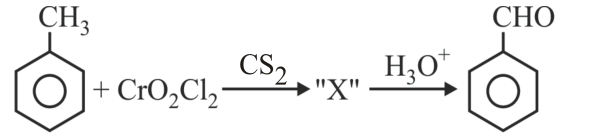
Reason (R) :- On reaction of water with ethoxide ion it is better proton acceptor than hydroxide ion.

(1) Both **Assertion** and **Reason** are true but **Reason** is NOT the correct explanation of **Assertion**.

(2) Both **Assertion** and **Reason** are true and **Reason** is the correct explanation of **Assertion**.

(3) **Assertion** is true but **Reason** is false.

(4) **Assertion** is false but **Reason** is true.

142. 

Toluene — Chromium complex — Benzaldehyde

'X' is:-

(1) 

(2) 

(3) 

(4) 

143. Total no. of structural isomers possible from formula C_3H_9N :-

(1) 3 (2) 4 (3) 5 (4) 6

144. Choose correct decreasing order of pK_a of ortho, meta and para nitro phenol.

(1) o > m > p > phenol

(2) p > m > o > phenol

(3) phenol > m > o > p

(4) phenol > m > p > o

145. Which of the following is not essential amino acid ?

(1) Glycine (2) Valine

(3) Leucine (4) Histidine

146. According to James Maxwell, when electrically charged particle moves under acceleration -

(1) Only electrical field is produced

(2) Only magnetic field is produced

(3) Alternating electrical and magnetic fields are produced

(4) Neither electrical nor magnetic field is produced

147. In acidic medium, MnO_4^{2-} shows disproportionation reaction but MnO_4^- doesn't show, because -

(1) Mn having maximum oxidation number in MnO_4^{2-}

(2) Mn having maximum oxidation number in MnO_4^-

(3) Disproportionation reaction are exothermic in nature

(4) Disproportionation reaction are endothermic in nature

148. Consider the following statements and select the correct option :

Statement-I :- If the standard electrode potential of an electrode is negative then its reduced form is more stable compared to hydrogen gas.

Statement-II :- If the standard electrode potential of an electrode is greater than zero then hydrogen gas is more stable than the reduced form of the species.

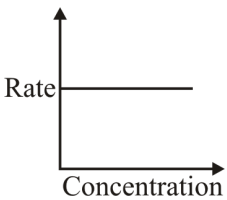
(1) Both statement-I and statement-II are correct

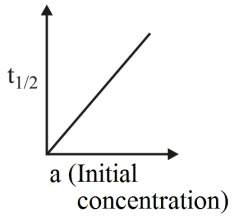
(2) Both statement-I and Statement-II are incorrect

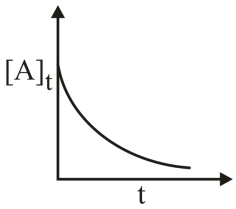
(3) Statement-I is incorrect and statement-II is correct

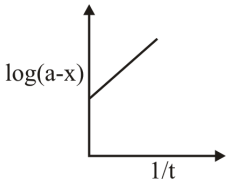
(4) Statement-I is correct and statement-II is incorrect

149. Which of the following graphs represents a 1^{st} order reaction :

(1) 

(2) 

(3) 

(4) 

150. For a reaction $A(s) + 2B^+(aq.) \longrightarrow A^{+2}(aq.) + 2B(s)$ K_c has been found to be 10^6. Then $E°_{cell}$ is :

(1) 0.36 V (2) 0.18 V

(3) 0.708 V (4) 0.0098 V

Topic : FULL SYLLABUS.

SECTION-A (PHYSICS)

151. **Statement-I :** Melting point of ice decreases on increasing pressure.
Statement-II : Ice contracts on melting.

(1) Statement I is incorrect and statement II is correct

(2) Both statement I and statement II are correct

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

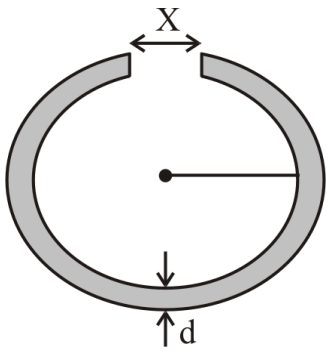
(4) Both statement I and statement II are incorrect

152. The radiant energy from sun incident normally at the surface of earth is 20 kcal/m^2–min. What would have been the radiant energy incident normally on the earth if the sun had a temperature twice of the present one ?

(1) 40 kcal/m^2-min (2) 80 kcal/m^2-min

(3) 160 kcal/m^2-min (4) 320 kcal/m^2-min

153. A cylindrical metal rod of length L_0 is shaped into a ring with a small gap as shown. On heating the system-



(1) x decreases, r and d increase

(2) x and r increase, d decreases

(3) x, r and d all increase

(4) Data unfufficient to arrive at a conclusion

154. A box contains N molecules of a gas. If the number of molecules is doubled, then the pressure will (at constant temp.)

(1) Decrease (2) Be same

(3) Be doubled (4) Be tripled

155. For ideal gas which statement is not true :-

(1) It obeys Boyle's law

(2) It follows PV = RT

(3) Internal energy depends on temperature only

(4) It follows Vander-wall equation

156. Two waves are represented by: $y_1 = 4 \sin 404\ \pi t$ and $y_2 = 3 \sin 400\ \pi t$. Then :

(1) beat frequency is 4 Hz and the ratio of maximum to minimum intensity is 49 : 1

(2) beat frequency is 2 Hz and the ratio of maximum to minimum intensity is 49 : 1

(3) beat frequency is 2 Hz and the ratio of maximum to minimum intensity is 1 : 49

(4) beat frequency is 4 Hz and the ratio of maximum to minimum intensity is 1: 49

157. The K.E. and P.E of a particle executing SHM with amplitude A will be equal when its displacement is :-

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

158. The average acceleration in one time period in a simple harmonic motion is :-

(1) $A\omega^2$ (2) $A\omega^2/2$

(3) $A\omega^2/\sqrt{2}$ (4) Zero

159. In a series resonant LCR circuit, the voltage across R is 100 volts and R = 1 kΩ with C = 2 μF. The resonant frequency ω is 200 rad/s. At resonance the voltage across L is :

(1) 250 V (2) 4×10^{-3} V

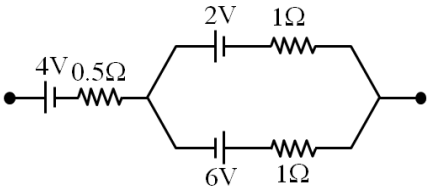
(3) 2.5×10^{-2} V (4) 40 V

160. A current of 1.6 A is flowing through a wire having cross-sectional area 1 mm^2. If density of free electrons in the material of the wire is 10^{29} per m^3, the drift velocity of electrons will be :-

(1) 10^{-4} m/s (2) 10^{-3} m/s

(3) 10^{-2} m/s (4) 0.1 m/s

161. Find the net emf of the three batteries shown in fig.



(1) 1 volt (2) 2 volt

(3) 3 volt (4) 6 volt

162. An air capacitor C connected to a battery of e.m.f. V acquires a charge q and energy E. The capacitor C is disconnected from the battery and a dielectric slab is placed between the plates. Which of the following statements is correct?

(1) V and q decreases but C and E increases

(2) V remains unchanged, but q, E and C increases

(3) q remains unchanged, C increases, V and E decreases

(4) q and C increases but V and E decreases

163. If the potential in the region of space near the point (–2, 4, 6)m is $V=80x^2 + 60y^2$ volt. Then components of electric field at that point are :-

(1) $E_x = 0, E_y = 50$ v/m, $E_z = 100$ v/m

(2) $E_x = 320$ v/m, $E_y = -480$ v/m, $E_z = 0$

(3) $E_x = 100$ v/m, $E_y = -240$ v/m, $E_z = 0$

(4) $E_x = 160$ v/m, $E_y = 140$ v/m, $E_z = 0$

164. A closely wound solenoid of 50 cm length has 5 layers of windings of 200 turns each. Radius of the solenoid is 2 cm. When a current of 3.14 A flows in solenoid then magnetic field inside the solenoid near the centre is nearly-

(1) 4 mT (2) 1 mT (3) 2 mT (4) 8 mT

165. An electron moving in a circular orbital of radius 'r' makes n rotation per two second. The magnetic field produced at the centre has magnitude ?

(1) zero (2) $\frac{\mu_0 ne}{2r}$ (3) $\frac{\mu_0 ne}{4r}$ (4) $\frac{\mu_0 ne}{4\pi r}$

166. Relation between μ_r and χ will be :

(1) $\mu_r = 1 + \chi$ (2) $\chi = \mu_r + 1$

(3) $\frac{\mu_0}{\mu}$ (4) $\mu_0\chi$

167. A physical quantity X is related to four measurable quantities a, b, c and d as follows.

$$X = a^2b^3c^{5/2}d^{-2}$$

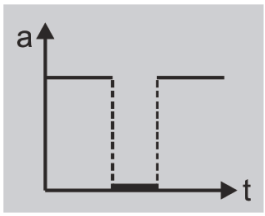
The percentage errors in the measurement of a, b, c and d are 1%, 2%, 2% and 4% respectively. The percentage error in quantity X :

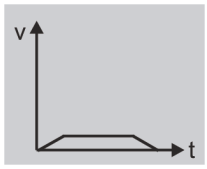
(1) 15% (2) 17% (3) 21% (4) 23%

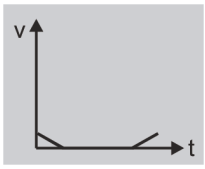
168. A car moving with a speed of 40 km per hour can be stopped by applying brakes after at least 2 metre if the same car is moving with a speed of 80 km per hour what is the minimum stopping distance :

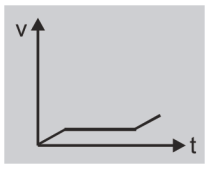
(1) 2 m (2) 4 m (3) 6 m (4) 8 m

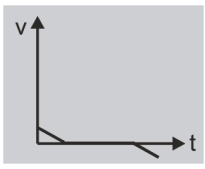
169. Acceleration-time graph of a body is shown. The corresponding velocity-time graph is :



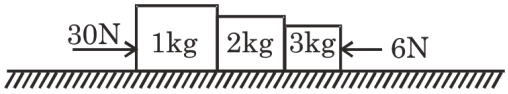
(1) 

(2) 

(3) 

(4) 

170. Find normal contact force between 1 kg and 2kg :-



(1) 20 N (2) 26 N (3) 14 N (4) 24 N

171. A weight lifter lifts a weight 300 kg. from ground to a height of 2 m. in 3 sec. Average power developed by him :

(1) 2210 watt (2) 8820 watt

(3) zero watt (4) 1960 watt

172. **Assertion (A) :** Two blocks of masses m_1 & m_2 are at rest. They are now moving towards each other under a mutual internal force. The velocity of centre of mass is zero.
Reason (R) : If no external force acts on the system, then velocity of centre of mass remains unchanged but can never be zero.

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

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

(3) (A) is true but (R) is false.

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

173. The number of molecules in one litre of gas at temperature 27°C and pressure of 10^6 dyne cm^{-2} is

(1) 2.4×10^{21} (2) 2.4×10^{20}

(3) 3.2×10^{21} (4) 2.4×10^{22}

174. When a solid sphere rolls without slipping down on an inclined plane making an angle θ with the horizontal, the acceleration of its centre of mass is 'a'. If the same sphere slides without friction, its acceleration will be :

(1) $\frac{7}{2}a$ (2) $\frac{5}{7}a$ (3) $\frac{7}{5}a$ (4) $\frac{5}{2}a$

175. Two equal masses of 1.0 kg are placed at two corners of an equilateral triangle of side $\sqrt{3}$ meter. Third mass of 2.0 kg is at centroid. Find net force on mass at centroid. (G is universal gravitation constant) :-

(1) $2\sqrt{2}G$ (2) $2G$ (3) $2\sqrt{3}G$ (4) None

176. Two glass plates are separated by water. If surface tension of water is 75 dyne per cm and area of each plate wetted by water is 8 cm^2 and the distance between the plates is 0.12 mm, then the force applied to separate the two plates is :

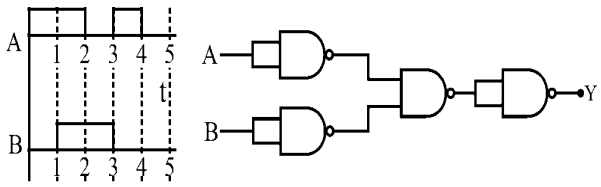
(1) 10^2 dyne (2) 10^4 dyne

(3) 10^5 dyne (4) 10^6 dyne

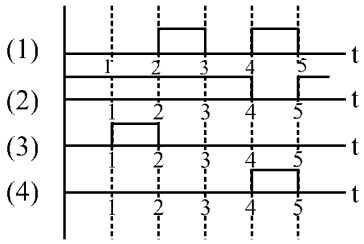
177. A metallic block weighs 15 N in air. It weighs 12 N when immersed in water and 13 N when immersed in another liquid. What is the specific gravity of the liquid ?

(1) 1/3 (2) 2/3 (3) 12/13 (4) 13/15

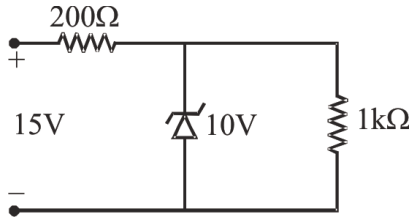
178. Input A and B are given to the shown combination of logic gates :



Then, output Y is :-



179. A zener diode having breakdown voltage equal to 10V, is used in a voltage regulator circuit shown in figure. The current flowing through the diode is :

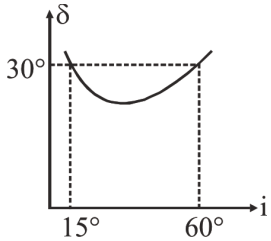


(1) 10 mA (2) 5 mA (3) 15 mA (4) 20 mA

180. In an interference pattern, at a point, we observe the 16^{th} order maximum for λ_1=7200Å . What order of maximum will be visible at the same point if the source is replaced by light of wavelength λ_2=4800Å.

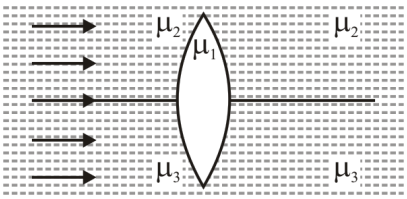
(1) 12 (2) 24 (3) 6 (4) 30

181. Figure shows graph of deviation δ versus angle of incidence for a light ray striking a prism. Angle of prism is :-



(1) 30° (2) 45° (3) 60° (4) 75°

182. A double convex lens, made of a material of refractive index μ_1, is placed inside two liquids of refractive indices μ_2 and μ_3 as shown $\mu_2 > \mu_1 > \mu_3$. A wide, parallel beam of light is incident on the lens from the left. The lens will give rise to :-



(1) a single convergent beam

(2) two different convergent beams

(3) two different divergent beams

(4) a convergent and a divergent beam

183. A hydrogen atom (ionisation energy 13.6 eV) makes a transition from third excited state to first excited state. The energy of the photon emitted in the process is

(1) 1.89 eV (2) 1275 eV

(3) 12.09 eV (4) 2.55 eV

184. Match the columns :

	Column-I		Column-II
i.	Photoelectric current is directly proportional to	p.	Frequency of light
ii.	Maximum kinetic energy of photoelectron increases linearly with increase in	q.	Intensity of light of a given frequency
iii.	Photoelectric current becomes zero in experiment	r.	Threshold frequency
iv.	Certain minimum frequency of light below which no photo electron emission takes place	s.	Stopping potential

Now, select the correct option from the codes given below :

(1) i-r, ii-p, iii-s, iv-q (2) i-p, ii-q, iii-r, iv-s

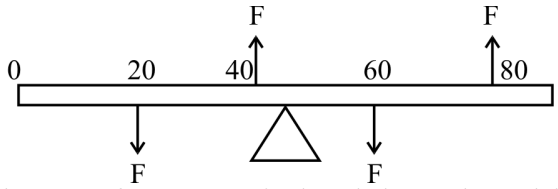
(3) i-q, ii-p, iii-s, iv-r (4) i-p, ii-r, iii-p, iv-q

185. The minimum intensity of light to be detected by human eye is 10^{-10} W/m^2. For vision the number of photons of wavelength 5.6×10^{-7} m entering (per second) the eye, with pupil area 10^{-6} m^2 will be nearly :-

(1) 100 (2) 280 (3) 350 (4) 400

SECTION-B (PHYSICS)

186. A rod of length 1 m is pivoted at centre and four parallel forces of same magnitude are acting on rod, at distances of 20 cm, 40 cm, 60 cm and 80 cm from one end of the rod as shown in figure.



The extra force F required to balance the rod in equilibrium should be :

(1) F at 10 cm from left end in upward direction

(2) F at 10 cm from right end in upward direction

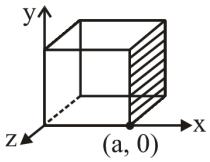
(3) F at 30 cm from left end in upward direction

(4) F at 30 cm from right end in upward direction

187. The equation of transverse wave propagating in string in given by y = 0.02 sin (x + 30 t) m. Where x & y are in meter and t in sec. If linear mass density of string is 1.3×10^{-4} kg/m then the tension in the string is :-

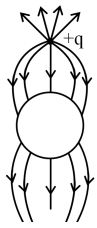
(1) 0.12 N (2) 1.2 N (3) 12 N (4) 10 N

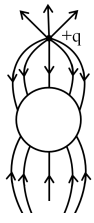
188. If $\vec{E} = \frac{E_0 x}{a}\hat{i}$ (N/C) then flux through the shaded area is :-



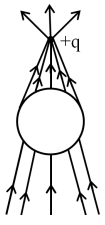
(1) E_0a^2 (2) Zero (3) E_0a^3 (4) $-E_0a^3$

189. A point positive charge is brought near an isolated conducting sphere. The electric field is best given by –

(1) 

(2) 

(3) 

(4) 

190. A long solenoid of radius 2 cm has 100 turns/cm and carries a current of 5A. A coil of radius 1 cm having 100 turns and a total resistance of 20 Ω is placed inside the solenoid coaxially. The coil is connected to a galvanometer. If the current in the solenoid is reversed in direction, find the charge flown through the galvanometer :-

(1) 2×10^{-4} C (2) 4×10^{-4} C

(3) 6×10^{-4} C (4) 8×10^{-4} C

191. A uniform magnetic field exists in the region given by $\vec{B} = 3\hat{i} + 4\hat{j} + 5\hat{k}$. A rod of length 5 m placed along y-axis is moved along x-axis with constant speed 1 ms^{-1}. Then induced e.m.f in the rod is :-

(1) Zero (2) 25 V (3) 5 V (4) 10 V

192. Out of the following options which one can not be used to produce a propagating electro-magnetic wave?

(a) A charge moving at constant velocity
(b) A stationary charge
(c) A charge less particle
(d) An accelerating charge

(1) (a,d) (2) (b,d) (3) (a,c,d) (4) (a,b,c)

193. Three point charges +2 μC, – 4 μC and + 2 μC are placed at points (x = 0, y = a, z = 0), (x = 0, y = 0, z = 0) and (x = a, y = 0, z = 0) respectively. The magnitude and direction of the electric dipole moment vector of this charge assembly is :- (given a = 1.41 cm)

(1) 4×10^{-8} C × m along $\left(\frac{a}{2}\hat{i} + \frac{a}{2}\hat{j}\right)$

(2) 2×10^{-8} C × m along $\left(\frac{a}{2}\hat{i} + \frac{a}{2}\hat{j}\right)$

(3) 4×10^{-8} C × m along + x direction

(4) 2×10^{-8} C × m along + y direction

194. A rocket of mass 1000 kg is ejecting gases with a speed of 500 m/s. What should be the rate of consumption of fuel to provide the rocket an upward acceleration of 5 m/s^2 ?

(1) 50 Kg/s (2) 100 Kg/s

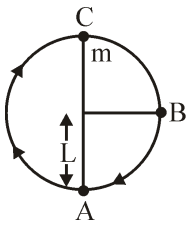
(3) 10 Kg/s (4) 30 Kg/s

195. A car moving with speed 20 m/s on a circular path of radius 200 m. Its speed is increasing at the rate of 2 m/s^2 then acceleration of car is :

(1) 9.8 m/s^2 (2) 1.8 m/s^2

(3) 2 m/s^2 (4) 2.8 m/s^2

196. A bob of mass m suspended by a light string of length L is whirled into a vertical circle as shown in figure. What will be the trajectory of the particle



(1) if the string is cut at B then straight line.
(2) if the string is cut at C then parabola.
(3) if the string is cut at A then parabola.
(4) All are correct

197. A particle of mass M is situated at the centre of a spherical shell of same mass and radius r. The gravitational potential at a point situated at $\frac{r}{4}$ distance from the centre, will be :-

(1) $-\frac{GM}{r}$ (2) $-\frac{3GM}{r}$ (3) $-\frac{4GM}{r}$ (4) $-\frac{5GM}{r}$

198. The first diffraction minima due to a single slit diffraction is at θ = 30°, for a light of wavelength 5000 Å. The width of the slit is :-

(1) 1×10^{-4}cm (2) 2.0×10^{-4} cm

(3) 2.5×10^{-4} cm (4) 5×10^{-4} cm

199. When Lithium (^{7}Li) is bombarded by a proton, two alpha particles (^{4}He) are produced. The masses of ^{7}Li, ^{1}H and ^{4}He are 7.016004 u, 1.007825 u and 4.002603 u respectively. The reaction energy is nearly:

(1) 17 eV (2) 17 keV

(3) 17 MeV (4) 170 MeV

200. The de-Broglie wavelength of a particle accelerated with 150 volt potential difference is 10^{-10} m. If it is accelerated by 600 volts potential difference its wavelength will be:

(1) 0.25 Å (2) 0.5 Å (3) 1.5 Å (4) 2 Å

SPACE FOR ROUGH WORK