Brilliant STUDY CENTRE

REPEATERS NEET/JEE 2026

SCREENING CUM SCHOLARSHIP TEST

Sample Qn. Paper

PHYSICS + CHEMISTRY + BIOLOGY + MATHEMATICS

Name of the Candidate :	
Signature of Candidate :	
Phone Number/Mobile Number:	
Student ID:	
Roll Number :	

INSTRUCTIONS

1. OMR Answer scripts are processed by electronic means. The following instructions are to be strictly followed to avoid invalidation of answer scripts
2. If the OMR sheet given is found defective, get it replaced by a new one
3. Please fill in the items such as name, user id, signature, centre etc. of the candidate in the columns given above.
4. The Test ID is printed on the top left corner of this page. Enter it correctly in the OMR sheet
5. Write the student ID in digits besides darkening the bubbles for the "Student ID"
6. Make sure that the "Student ID" is bubbled correctly and completely; no correction is permitted. If any error occurred while filling "Student ID" get a new OMR answer sheet
7. Do not write or make any mark on the Answer Sheet except at the spaces specially-provided for.
8. Each correct answer will be awarded **FOUR** marks. ONE mark will be deducted for each incorrect answer. More than one answer marked against a question will be deemed as an incorrect response and will be negatively marked. No nagative mark for unattended questions.
9. All the rough work is to be done in the blank space provided in the question paper.
10. ***WARNING:*** *Any malpractice or any attempt of malpractice, in the Examination, will* ***DISQUALIFY THE CANDIDATE.***
11. **Return the Answer sheet to the invigilator at the end of the examination.**
12. The scanner will read only the correct method of marking shown below. Other methods of marking will consider as wrong
13. Question paper booklet consists of four parts. Part I-Physics (30 qns.), Part II-Chemistry (30 qns.), Part III-Biology (30 qns.) and Part IV - Mathematics (30 qns.).
14. Those who seek admission to the **NEET** batches have to write the test based on physics, chemistry and biology topics. The test will be of **$1^1/_2$** hrs duration.
15. Those who seek admission to the **JEE** batches have to write the test based on physics, chemistry and mathematics topics. The test will be of **$1^1/_2$** hrs duration.
16. Those who seek admission to the **either NEET / JEE** batches have to write the test based on physics, chemistry, biology and mathematics topics. The test will be of **2.00** hrs duration. Their names will be included in the ranklists of NEET and JEE batches based on their respective marks.

Correct Method of Marking	Wrong Methods of Marking							
	Tick Mark	X Mark	Dot Mark	Scratch Mark	Partial Mark	Line Mark	Outside Mark	Multiple Mark
● ○ ○ ○	○	○	◉	▨	◑	⊖	⬬	● ●

IMMEDIATELY AFTER OPENING THIS QUESTION BOOKLET, THE CANDIDATE SHOULD VERIFY WHETHER THE QUESTION BOOKLET ISSUED CONTAINS ALL THE 120 QUESTIONS IN SERIAL ORDER. IF NOT, REQUEST FOR REPLACEMENT

PART-I (PHYSICS)

1. Two balls carrying charges +7 mC and –5 mC attract each other with a force F. If a charge –2 mC is added to both, the force between them will be

   1) F 2) F/2 3) 2F 4) Zero

2. An electric dipole consists of two opposite charges each of magnitude 1.0×10^{-6} C separated by a distance of 2 cm. The dipole is placed in an external field of 1.0×10^5 newton per coulomb. The maximum torque on the dipole is :

   1) 0.2×10^{-3} Nm 2) 1.0×10^{-3} Nm 3) 2×10^{-3} Nm 4) 4×10^{-3} Nm

3. The electric resistance of a certain wire of material is R. If its length and radius are both doubled, then :

   1) the resistance will be doubled and the specific resistance will be halved

   2) the resistance will be halved and the specific resistance will remain unchanged

   3) the resistance will be doubled and the specific resistance will remain unchanged

   4) the resistance will be halved and the specific resistance will be doubled

4. Kirchhoff's first law at a junction is based on the law of conservation of :

   1) energy 2) momentum 3) angular momentum 4) charge

5. The strength of the magnetic field around an infinite current carrying conductor is:

   1) same every where

   2) directly proportional to distance

   3) inversely proportional to distance

   4) inversely proportional to the square of the distance

SPACE FOR ROUGH WORK

6. A current flows in a conductor from east to west. The direction of the magnetic field at a point above the conductor is :

1) towards east 2) towards west 3) towards north 4) towards south

7. The magnetic moment of an electron orbiting in a circular orbit of radius r with a speed v is equal to

1) evr/2 2) evr 3) er/2v 4) none of these

8. The susceptibility of a paramagnetic material is K at 27^0C. At what temperature will it be $K/2$?

1) 600^0C 2) 287^0C 3) 34^0C 4) 327^0C

9. A transformer is based on the principle of

1) Mutual induction 2) Self induction 3) Ampere's law 4) Eddy current

10. Two identical coaxial circular loops carry a current I each, circulating in the same direction. If the loops approach each other, will you observe that:

1) the current in each increases

2) the current in each decreases

3) the current in each remains the same

4) the current in one increases whereas the other decreases

11. Lenz's law of electromagnetic induction corresponds to the

1) Law of conservation of charge

2) Law of conservation of energy

3) Law of conservation of momentum

4) Law of conservation of angular momentum

SPACE FOR ROUGH WORK

12. Which of the following electromagnetic radiations has the smallest wavelength?

1) microwaves 2) ultraviolet 3) X-rays 4) Gamma rays

13. Which of the following has zero average value in a plane e.m. wave

1) Electric field 2) Magnetic field 3) Electric energy 4) Both 1 and 2

14. Light travels in two media A and B with speeds 1.8×10^8m/s and 2.4×10^8 m/s respectively. Then the critical angle between them is

1) $\sin^{-1}\left(\frac{2}{3}\right)$ 2) $\tan^{-1}\left(\frac{3}{4}\right)$ 3) $\tan^{-1}\left(\frac{2}{3}\right)$ 4) $\sin^{-1}\left(\frac{3}{4}\right)$

15. When a ray of light enters a medium of refractive index n, it is observed that the angle of refraction is half of the angle of incidence. The angle of incidence is

1) $2\cos^{-1}\left(\frac{n}{2}\right)$ 2) $\cos^{-1}\left(\frac{n}{2}\right)$ 3) $2\cos^{-1}(n)$ 4) $2\sin^{-1}\left(\frac{n}{2}\right)$

16. The wave length of light in two liquids x and y is 3500 A^o and 7000 A^o respectively, then the critical angle of x relative to y will be

1) 60° 2) 45° 3) 30° 4) 15°

17. When two coherent monochromatic beams of intensity I and 9I interfere, the possible maximum and minimum intensities of the resulting beam are

1) 9 I and I 2) 9 I and 4 I 3) 16 I and 4 I 4) 16 I and I

SPACE FOR ROUGH WORK

18. The refractive index of a medium is $\sqrt{3}$. If an unpolarised beam of light is incident on it at the polarizing angle of the medium, the angle of refraction is

1) 60° 2) 30° 3) 45° 4) 90°

19. According to Einstein's photoelectric equation, the graph of the stopping potential of the photoelectron emitted from the metal versus the frequency of the incident radiation gives a straight line graph, whose slope

1) depends on the nature of the metal

2) is same for all metals and independent of intensity of the incident radiation

3) depends on the nature of the metal and also on intensity of incident radiation

4) depends on the intensity of the incident radiation.

20. If the frequency of the incident light is doubled, the kinetic energy of the emitted electron is

1) more than doubled 2) reduced to half 3) zero 4) unchanged

21. If the given particles are moving with same velocity, then the maximum de Broglie wavelength is for

1) proton 2) α – particle 3) neutron 4) β – particle

22. In Bohr's model, the atomic radius of the first orbit is r_0, then the radius of the 5th orbit is

1) $\frac{r_0}{25}$ 2) $25r_0$ 3) $\frac{r_0}{5}$ 4) $5r_0$

23. Hydrogen atoms are excited from ground state of the principal quantum number 4. Then the number of spectral lines observed will be

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

SPACE FOR ROUGH WORK

24. The mass defect for the nucleus of helium is 0.0303 a.m.u. What is the binding energy per nucleon for helium in MeV?

1) 28 2) 7 3) 4 4) 1

25. The ratio of radii of nuclei $_{13}Al^{27}$ and $_{52}X^{A}$ is 3:5. The number of neutrons in the nuclei of X will be

1) 52 2) 73 3) 125 4) 13

26. At resonance, the value of power factor for an LCR series circuit is

1) 0 2) 1 3) 0.5 4) ∞

27. A p-type semiconductor is obtained by doping silicon with

1) germanium 2) gallium 3) bismuth 4) phosphorus

28. In forward bias, the width of potential barrier in a p-n junction diode

1) increases 2) decreases

3) remain constant 4) first increase then decrease

29. In a compound microscope, the intermediate image is

1) virtual, erect and magnified

2) real, erect and magnified

3) real, inverted and magnified

4) virtual, erect and magnified

SPACE FOR ROUGH WORK

30. A telescope has focal length of objective and eye piece as 200cm and 5cm respectively. What is the magnification of telescope ?

1) 40 2) 80 3) 50 4) 0.01

PART-II (CHEMISTRY)

31. Which of the following xenon compounds has the same number of lone pairs as in I_3^- ?

1) XeO_4 2) XeF_4 3) XeF_2 4) XeO_3

32. In which of the following compounds manganese has oxidation number equal to that of iodine in KIO_4?

1) Potassium manganate 2) Potassium permanganate

3) Dimanganese decacarbonyl 4) Manganese chloride

33. Among the the following transition metal ions, the one where all metal ions have $3d^2$ electronic configuration is

1) $Ti^{3+}, V^{2+}, Cr^{3+}, Mn^{4+}$ 2) $Ti^{+}, V^{4+}, Cr^{6+}, Mn^{7+}$

3) $Ti^{2+}, V^{3+}, Cr^{2+}, Mn^{3+}$ 4) $Ti^{2+}, V^{3+}, Cr^{4+}, Mn^{5+}$

34. Bond angles of NH_3, PH_3, AsH_3 and SbH_3 is in the order

1) $PH_3 > AsH_3 > SbH_3 > NH_3$ 2) $SbH_3 > AsH_3 > PH_3 > NH_3$

3) $SbH_3 > AsH_3 > NH_3 > PH_3$ 4) $NH_3 > PH_3 > AsH_3 > SbH_3$

35. All the group 16 hydrides except X posses reducing property. X refers to

1) H_2O 2) H_2S 3) H_2Se 4) H_2Te

SPACE FOR ROUGH WORK

36. Which of the following oxides of group 16 has the highest boiling point?

1) H_2O 2) H_2S 3) H_2Se 4) H_2Te

37. Two bulbs A and B contain 16g O_2 and 16g O_3, respectively. Which of the following statements are true?

I) Both bulbs contain same number of atoms

II) Both bulbs contain different number of atoms

III) Both bulbs contain same number of molecules

IV) Bulb A contain $N_A/2$ molecules while bulb B contains $N_A/3$ molecules (N_A = Avogadro's number)

1) I and III only 2) II and IV only 3) II and III only 4) I and IV only

38. In which of the following compounds manganese has the highest oxidation state?

1) $KMnO_4$ 2) MnO_2 3) K_2MnO_4 4) Mn_2O_3

39. Given the standard electrode potentials, $K^+ / K = -2.93$ V, $Ag^+ / Ag = 0.80$ V, $Hg^{2+} / Hg = 0.79$ V, $Mg^{2+} / Mg = -2.37$ V, $Cr^{3+} / Cr = -0.74$ V. Arrange these metals in increasing order of their reducing power

1) Hg < Cr < Ag < Mg < K 2) Hg < K < Mg < Cr < Ag

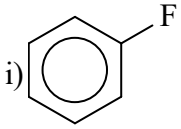
3) Ag < K < Mg < Hg < Cr 4) Ag < Hg < Cr < Mg < K

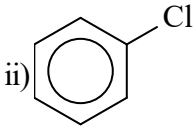
40. The rate constant of a reaction is 3.00×10^3 L mol^{-1} sec^{-1}. The order of this reaction will be

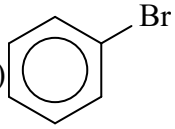
1) Zero 2) First 3) Second 4) Third

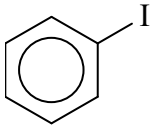
SPACE FOR ROUGH WORK

41. How many of the following are prepared by Sand Meyer's reaction?

i) 

ii) 

iii) 

iv) 

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

42. Given below are two statements labelled as Assertion (A) and Reason (R)

Assertion (A) : $CH_2 = CH - CH_2 - X$ is an example of allylic halide.

Reason (R) : These are compounds in which the halogen atom is bonded to an sp^2 hybridised carbon atom.

Select the most appropriate answer from the options given below:

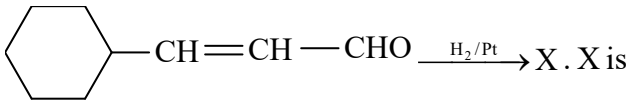
1) Both (A) and (R) are true and (R) is the correct explanation of (A)

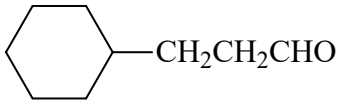
2) Both (A) and (R) are true and (R) is not the correct explanation of (A)

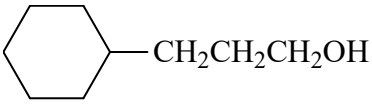
3) (A) is true but (R) is false

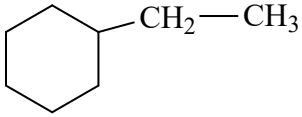
4) (A) is false but (R) is true

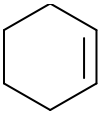
SPACE FOR ROUGH WORK

43.  X . X is

1) 

2) 

3) 

4) 

44. Match the column-I with column-II and select the correct option

Column – I	Column – II
A) $RCOCH_3 \xrightarrow[HCl]{Zn-Hg} RCH_2CH_3$	i) Wolff – Kishner reduction
B) $2C_6H_5CHO \xrightarrow{NaOH} C_5H_5COONa + C_6H_5CH_2OH$	ii) Clemmensen reduction
C) $C_6H_6 + CH_3COCl \xrightarrow[AlCl_3]{Anhy.} C_6H_5COCH_3$	iii) Friedel – Crafts reaction
D) $C_6H_{10}O \xrightarrow[KOH/ethylene\ glucol,\ \Delta]{i)\ NH_2\ NH_2} C_6H_{12} + N_2$	iv) Cannizzaro reaction

1) A → ii; B → iv; C → iii; D → i

2) A → i; B → iii; C → ii; D → iv

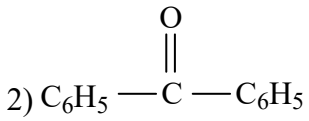
3) A → iii; B → iI; C → i; D → iv

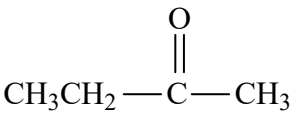
4) A → iv; B → i; C → ii; D → iii

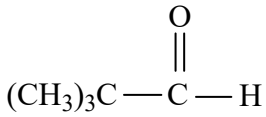
SPACE FOR ROUGH WORK

45. Which of the following gives aldol condensation reaction?

1) C_6H_5OH

2) 

3) 

4) 

46. Which of the following pairs contain disaccharides?

1) Glucose and fructose
2) Glucose and galactose
3) Glucose and sucrose
4) Lactose and maltose

47. Keratin, a fibrous protein is present in

1) hair
2) wool
3) silk
4) all of these

48. Given below are two statements labelled as Assertion (A) and Reason (R).

Assertion (A) : D-(+)-glucose is dextrorotatory

Reason (R) : D-compounds are always dextrorotatory and L-compounds are always laevorotatory.

Select the most appropriate answer from the options given below

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

SPACE FOR ROUGH WORK

49. Arrange the following cobalt complexes in the increasing order of crystal field splitting energy (Δ_0) value.
Complexes : A = $[CoF_6]^{3-}$, B = $[Co(H_2O)_6]^{3+}$, C = $[Co(NH_3)_6]^{3+}$ and D = $[Co(en)_3]^{3+}$. Choose the correct option

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

50. The pair having the same magnetic moment is [At.No. Cr = 24, Mn = 25, Fe = 26, Co = 27]

1) $[Cr(H_2O)_6]^{2+}$ and $[CoCl_4]^{2-}$

2) $[Cr(H_2O)_6]^{2+}$ and $[Fe(H_2O)_6]^{2+}$

3) $[Mn(H_2O)_6]^{2+}$ and $[Mn(CN)_6]^{3-}$

4) $[CoCl_4]^{2-}$ and $[Fe(H_2O)_6]^{2+}$

51. Assertion : Cis-trans isomerism is a type of geometrical isomerism

Reason : Tetrahedral complexes show geometrical isomerism.

1) If both Assertion and Reason are true and Reason is the correct explanation of Assertion

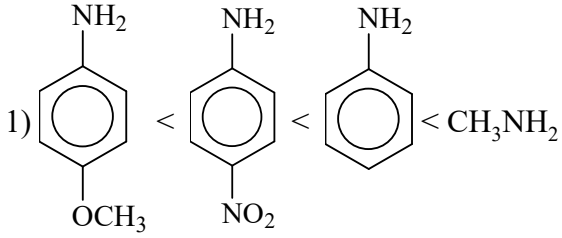
2) If both Assertion and Reason are true and Reason is not the correct explanation of Assertion

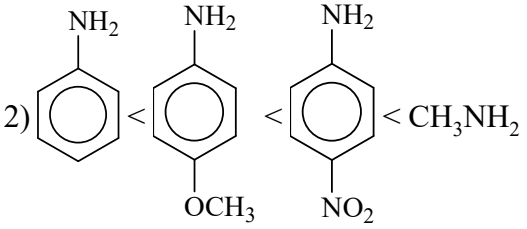
3) If Assertion is true but Reason is false

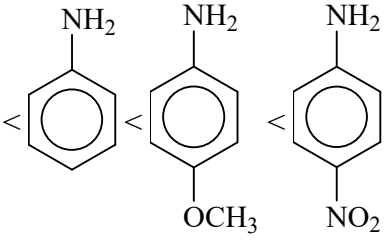
4) If both assertion and reason are false

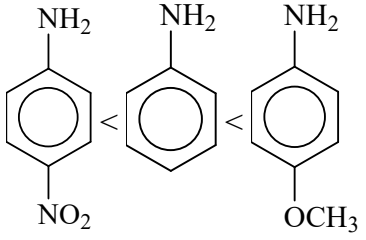
SPACE FOR ROUGH WORK

52. Select the correct order of increasing basicity for the following amines.

1)  $< CH_3NH_2$

2)  $< CH_3NH_2$

3) $CH_3NH_2 <$ 

4)  $< CH_3NH_2$

53. Assertion : If standard reduction potential for the reaction $Ag^+ + e^- \rightarrow Ag$ is 0.80 volt, then for the reaction $2Ag^+ + 2e^- \rightarrow 2Ag$, it will be 1.60 volt.

Reason : If concentration of Ag^+ ions is doubled, the electrode potential becomes half.

1) If both Assertion and Reason are true and Reason is the correct explanation of Assertion

2) If both Assertion and Reason are true and Reason is not the correct explanation of Assertion

3) If Assertion is true but Reason is false

4) If both assertion and reason are false

SPACE FOR ROUGH WORK

54. Statement-I : A metal having more negative electrode potential than iron is used to cover the surface of iron to prevent rusting

Statement-II : Zinc has a more negative electrode potential than iron

1) Both statement-I and statement-II are true

2) Both statement-I and statement-II are false

3) Statement-I is true but statement-II is false

4) Staetment-II is true but statement-I is false

55. When during electrolysis of a solution of $AgNO_3$, 9650 coulombs of charge is passed through the electroplating bath, the mass of silver deposited on the cathode will be (Atomic mass of Ag = 108 $gmol^{-1}$)

1) 1.08 g

2) 10.8 g

3) 21.6 g

4) 108 g

56. Amines behave as

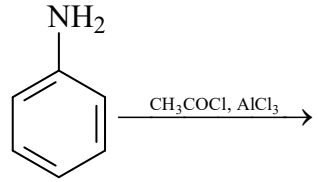
1) Aprotic acids

2) Neutral compounds

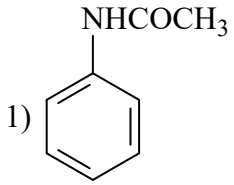
3) Lewis acids

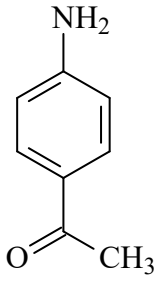
4) Lewis bases

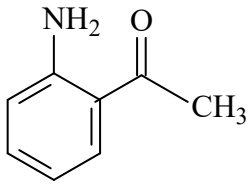
SPACE FOR ROUGH WORK

57. 

? What product will be obtained?

1) 

2) 

3) 

4) None of these

58. A solution containing 0.2563 g of naphthalene (molecular mass = 128) in 50g of carbon tetrachloride yields a boiling point elevation of 0.201°C while a solution of 0.621g of an unknown solute in the same mass of the solvent gives a boiling point elevation of 0.647°C. The molecular mass of unknown solute is

1) 85.45 g 2) 100.23 g 3) 91.25 g 4) 96.44 g

59. A binary liquid solution is prepared by mixing n-heptane and ethanol. Which one of the following statements is correct regarding the behaviour of the solution?

1) The solution formed is an ideal solution

2) The solution is non-ideal, showing positive deviation from Raoult's law

3) The solution is non-ideal, showing negative deviation from Raoult's law

4) n-heptane shows positive deviation while ethanol shows negative deviation from Raoult's law

SPACE FOR ROUGH WORK

60. Which one of the following equations is correct for the reaction, $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$?

1) $\frac{3d[H_2]}{dt} = \frac{2d[N_2]}{dt}$

2) $\frac{2d[N_2]}{dt} = \frac{1}{3}\frac{d[H_2]}{dt}$

3) $\frac{2d[NH_3]}{dt} = \frac{-3d[H_2]}{dt}$

4) $\frac{3d[NH_3]}{dt} = \frac{-2d[H_2]}{dt}$

PART-III (BIOLOGY)

61. Double fertilization in angiosperm means

1) Fusion of two egg cells with two male gametes

2) Fusion of egg cell twice with male gametes

3) Fusion of one male gamete with the egg cell and the other male gamete with the synergid

4) Fusion of one male gamete with the egg cell and the other male gamete with secondary nucleus

62. Sporopollenin, a chemical found in .....

1) Intine of pollen grain 2) Exine of pollen grain 3) Endothecium 4) Middle layers

63. A multicarpellary, apocarpous gynoecium is present in

1) Michelia 2) Hibiscus 3) Papaver 4) Both 2 and 3

64. The method in which recombinant DNA is directly injected into the nucleus of an animal cell

1) Biolistics 2) Gene gun method 3) Microinjection 4) Heat shock

SPACE FOR ROUGH WORK

65. Cloning vector pBR322 posses restriction sites for

1) EcoRI 2) Cla I 3) Pvu I 4) All of the above

66. Bacteria protect themselves from viral attack by producing

1) Exonuclease 2) Endonuclease 3) DNA ligase 4) Gyrase

67. Read the following statements and selectr the correct option.

Statement-I : C peptide is not present in the mature insulin

Statement-II : Eli Lilly an American company prepared two DNA corresponding to A and B chains.

1) Both statements are correct

2) Both statements are incorrect

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

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

68. GEAC stands for

1) Genetic Engineering Association of Chennai

2) Gentic Engineering Approval Committee

3) Gene Encoding Area of CDNA

4) Gene Encoding Agricultural crops

SPACE FOR ROUGH WORK

69. Sigmoid growth curve is represented by

1) $\frac{dN}{dt} = rN$

2) $\frac{dN}{dt} = rN\left(\frac{K - N}{K}\right)$

3) $N_t = N_0 + B + I - D - E$

4) $\frac{dN}{dt} = 1 - N/K$

70. Match the following

Column – I	Column – II
a) Mutualism	i) $-,-$ interaction
b) Competition	ii) $+,+$ interaction
c) Parasitism	iii) $+,-$ interaction
d) Commensalism	iv) $+,0$ interaction

1) $a \rightarrow ii; b \rightarrow i; c \rightarrow iii; d \rightarrow iv$

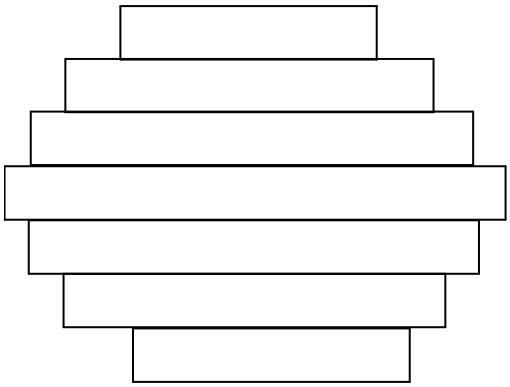
2) $a \rightarrow ii; b \rightarrow i; c \rightarrow iv; d \rightarrow iii$

3) $a \rightarrow i; b \rightarrow iv; c \rightarrow ii; d \rightarrow iii$

4) $a \rightarrow ii; b \rightarrow iii; c \rightarrow i; d \rightarrow iv$

SPACE FOR ROUGH WORK

71. What type of human population is represented by the following pyramid?



1) Expanding population
2) Vanishing population
3) Stable population
4) Declining population

72. Some strains of ..... produce proteins that kill certain insects such a lepidopterans, ... and dipterans

1) Streptococcus bacillus, Coleopterans
2) Basillus thuringiensis, Coleopterans
3) Basillus thuringiensis, Pseudopterans
4) Agrobacterium tumefaciens, Hemipterans

73. When a single tree is considered as an ecosystem, the pyramid of number is

1) Upright
2) Inverted
3) Linear
4) both 1 and 2

74. Each tropic level has a certain mass of living material at a particular time is called

1) Standing state
2) Standing crop
3) Stratification
4) Productivity

SPACE FOR ROUGH WORK

75. Read the following statements and choose the correct option

Statement-I : Plants capture only 2-10 percent of the PAR

Statement-II : Producers in an aquatic ecosystem are various species like zooplankton and algae

1) Both statements are correct

2) Both statements are incorrect

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

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

76. Which of the following is the correct matching of the events occurring during menstrual cycle?

1) Menstruation - Break down of myometrium if the ovum is not fertilized

2) Ovulation - LH and FSH attain peak level and sharp fall in the secretion of progesterone

3) Proliferative phase : Rapid regeneration of myometrium and maturation of Graafian follicle

4) Development of corpus luteum - Secretory phase and increased secretion of progesterone

77. Fore limbs of cat, lizard used in walking, fore limbs of whale used in swimming and forelimbs of bats used in flying are an example of

1) Analogous organs 2) Adaptive radiation 3) Homologous organs 4) Convergent evolution

78. Rejection of transplanted organ is prevented by regular use of

1) Cyclosporin 2) Statin 3) Streptokinase 4) Lipase

SPACE FOR ROUGH WORK

79. Which of the following approaches does not give the defined action of contraceptive?

1) Vasectomy : prevents spermatogenesis

2) Barrier method : Prevent fertilization

3) Intra uterine devices : Increases phagocytosis of sperm, suppress sperm motility and fertilizing capacity of sperm

4) Hormonal contraceptives : Prevent ovulation and fertilization

80. A woman has an x-linked condition on one of her x chromosomes. This chromosomes can be inherited by

1) Only daughters 2) only grand children

3) Only sons 4) Both sons and daughters

81. If there is complete linkage in F_2 generation of Morgan's experiment

1) Parental types and recombinants appear in equal ratio

2) Recombinants are less than parental types

3 Recombinant are more than parental types

4) There will be only parental types

82. During translation in eukayrotes the anticodon to be aligned with the initiation codon is

1) $5' - UAC - 3'$ 2) $3' - UAC - 5'$ 3) $5' - UCA - 3'$ 4) $3' - CAU - 5'$

83. Removal of introns and joining the exons in a defined order after transcription is called

1) Capping 2) Tailing 3) Splicing 4) Transformation

SPACE FOR ROUGH WORK

84. Which one of the following are analogous structures?

1) Wings of bat and wings of butterfly

2) Limbs o humans and cats

3) Thorns of Bougainvillea and tendrils of cucurbita

4) Flippers of Dolphin and legs of horse

85. Select an exsitu conservation method from the following

1) Sacred groves 2) Safari parks 3) National parks 4) Wild life sancturies

86. *Monascus pupureus* is a yeast used commercially in the production of

1) citric acid 2) blood cholesterol lowering statins

3) ethanol 4) streptokinase for removing clots from the blood vessels

87. Match column-I with column-II and select the correct options using the codes given below

Column-I	**Column-II**
a) Citric acid	p) Trichoderma
b) Cyclosporin A	q) Clostridium
c) Statins	r) Aspergillus
d) Butyric acid	s) Monascus

1) $a \rightarrow p; b \rightarrow s; c \rightarrow q; d \rightarrow r$ 2) $a \rightarrow r; b \rightarrow s; c \rightarrow p; d \rightarrow q$

3) $a \rightarrow r; b \rightarrow p; c \rightarrow q; d \rightarrow s$ 4) $a \rightarrow r; b \rightarrow p; c \rightarrow s; d \rightarrow q$

SPACE FOR ROUGH WORK

88. Which of the following is incorrect regarding vasectomy?

1) No sperms occurs in seminal fluid
2) No sperm occurs in epididymis
3) Vasa deferentia is cut and tied
4) Irreversible sterility

89. Correct sequence of hormone secretion from beginning of menstruation during menstrual cycle

1) FSH, progesterone, estrogen
2) Estrogen, FSH, progesterone
3) FSH, estrogen, progesterone
4) Estrogen, progesterone, FSH

90. Which one of the following statement is correct?

1) Malignant tumors may exhibit metastasis
2) Patients who have undergone surgery are given cannabinoids to relieve pain
3) Benign tumors shows the property of metastasis
4) Heroin accelerates body functions

PART-IV (MATHEMATICS)

91. The function $f : R \to \{x \in R : -1 < x < 1\}$ defined by $f(x) = \frac{x}{1+|x|}, x \in R$ is

1) one-one
2) onto
3) one-one and onto
4) none

SPACE FOR ROUGH WORK

92. Domain of definition of the function $f(x)=\frac{3}{4-x^2}+\log_{10}\left(x^3-x\right)$ is

1) (1,2) 2) $(-1,0)\cup(1,2)$ 3) $(1,2)\cup(2,\infty)$ 4) $(-1,0)\cup(1,2)\cup(2,\infty)$

93. The sum $\sum_{n=1}^{\infty}\tan^{-1}\left(\frac{1}{2^n+2^{1-n}}\right)=$

1) $\frac{\pi}{2}$ 2) $\frac{\pi}{4}$ 3) $\frac{\pi}{6}$ 4) $\frac{\pi}{3}$

94. $\tan\left(\frac{\pi}{4}+\frac{1}{2}\cos^{-1}x\right)+\tan\left(\frac{\pi}{4}-\frac{1}{2}\cos^{-1}x\right), x\neq 0$ is equal to :

1) x 2) 2x 3) $\frac{2}{x}$ 4) none of these

95. If $A=\begin{bmatrix}3 & 7\\ 1 & 2\end{bmatrix}$, then the value of the determinant $\left(A^{2024}-3A^{2023}\right)$ is equal to

1) 8 2) –8 3) 9 4) 7

96. $\begin{vmatrix}x^2+1 & x+1 & x-2\\ 2x^2+3x-1 & 3x & 3x-3\\ x^2+2x+3 & 2x-1 & 2x-1\end{vmatrix}=ax-12,$ then 'a' is equal to

1) 12 2) 24 3) –12 4) –24

SPACE FOR ROUGH WORK

97. Let A be a 3×3 matrix such that $\left|\text{adj}\left(\text{adj}\left(\text{adj}A\right)\right)\right| = 16^4$. Then $\left|A^{-1}\text{adj}A\right|$ is equal to

1) 4 2) 16 3) 64 4) 1

98. The ordered pair (a,b) for which the system of linear equations $3x-2y+z=b, 5x-8y+9z=3, 2x+y+az=-1$ has no solution, is

1) $\left(3,\frac{1}{3}\right)$ 2) $\left(-3,\frac{-1}{3}\right)$ 3) $\left(-3,\frac{1}{3}\right)$ 4) $\left(3,\frac{-1}{3}\right)$

99. If $x = 3\tan t, y = 3\sec t$ then $\frac{d^2y}{dx^2}$ at $t=\frac{\pi}{4}$:

1) $\frac{1}{6\sqrt{2}}$ 2) $6\sqrt{2}$ 3) $\frac{-1}{6\sqrt{2}}$ 4) $-6\sqrt{2}$

100. Let $f: R \to R$ be defined as

$$f(x)=\begin{cases}\frac{x^3}{\left(1-\cos 2x\right)^2}\log_e\left(\frac{1+2xe^{-2x}}{\left(1-xe^{-x}\right)^2}\right), & x\neq 0\\ \alpha, & x=0\end{cases}$$

If f is continuous at x = 0, then α is equal to

1) 1 2) 3 3) 0 4) 2

SPACE FOR ROUGH WORK

101. The interval in which $f(x) = 2x^3 - 15x^2 + 36x + 6$ is strictly decreasing

1) $(2,\ 3)$ 2) $(-\infty,\ 2)$ 3) $(3,\ 4)$ 4) $(-\infty,\ 3) \cup (4,\ \infty)$

102. Which of the following is a value of x at which f(x) has a critical point.

$$f(x) = x - \log x + \int_0^x \left(\frac{1}{t} - 2 - 2\cos 4t\right) dt$$

1) $\frac{\pi}{3}$ 2) $\frac{\pi}{6}$ 3) $\frac{\pi}{2}$ 4) 0

103. $\int \left(\sin^6 x + \cos^6 x + 3\sin^2 x.\cos^2 x\right) dx =$

1) $x + c$ 2) $\frac{3}{2}\sin 2x + C$ 3) $-\frac{3}{2}\cos 2x + C$ 4) $\frac{1}{3}\sin 3x - \cos 3x + C$

104. $\int_0^{\pi/2} \frac{2^{\sin x}}{2^{\sin x} + 2^{\cos x}} dx =$

1) 2 2) π 3) $\frac{\pi}{4}$ 4) 2π

105. The area bounded by $y = x^2 + 3$ and $y = 2x + 3$ is

1) $\frac{12}{7}$ 2) $\frac{4}{3}$ 3) $\frac{3}{4}$ 4) $\frac{8}{3}$

SPACE FOR ROUGH WORK

106. $\int \cos\left(2\tan^{-1}\sqrt{\frac{1-x}{1+x}}\right)dx$

1) $\frac{1}{8}\left(x^2-1\right)+C$ 2) $\frac{x^2}{4}+C$ 3) $\frac{x}{2}+C$ 4) $\frac{x^2}{2}+C$

107. $\int\left(\frac{\log x-1}{1+\left(\log x\right)^2}\right)^2 dx =$

1) $\frac{x}{(\log x)^2+1}+c$ 2) $\frac{xe^x}{1+x^2}+c$ 3) $\frac{x}{x^2+1}+c$ 4) $\frac{\log x}{(\log x)^2+1}+c$

108. $\int_1^3 |2x-1|dx$ is equal to

1) 12 2) 6 3) 15 4) 17

109. The area bounded by the lines $y-2x=2, y=4$ and the y axis is (in square units)

1) 1 2) 4 3) 0 4) 3

110. The area of the region bounded by $y^2=16-x^2, y=0, x=0$ in third quadrant is (in square units)

1) 8π 2) 6π 3) 2π 4) 4π

SPACE FOR ROUGH WORK

111. The solution of the differential equation $\left(kx - y^2\right)dy = \left(x^2 - ky\right)dx$ is

1) $x^3 + y^3 = 3kxy + C$

2) $x^3 - y^3 = 3kxy + C$

3) $x^3 - y^3 = 2kxy + C$

4) $x^3 + y^3 = 2kxy + C$

112. If $\frac{dy}{dx} = \frac{xy}{x^2 + y^2}, y(1) = 1$ then a value of x satisfying $y(x) = e$ is

1) $\frac{e}{\sqrt{2}}$

2) $\sqrt{2}\,e$

3) $\sqrt{3}\,e$

4) $\frac{1}{2}\sqrt{3}\,e$

113. If $y(x)$ is the solution of the differential equation $\frac{dy}{dx} + \left(\frac{2x+1}{x}\right)y = e^{-2x}, x > 0$ where $y(1) = \frac{1}{2}e^{-2}$ then

1) $y(\log_e 2) = \frac{\log_e 2}{4}$

2) $y(\log_e 2) = \log_e 4$

3) y(x) is decreasing in (0,1)

4) $y(x)$ is decreasing in $(\frac{1}{2}, 1)$

SPACE FOR ROUGH WORK

114. Let E amd F be two independent events. The probability that both E and F happen is $\frac{1}{12}$ and the probability that neither E nor F happens is $\frac{1}{2}$, then a value of $\frac{P(E)}{P(F)}$ is

1) $\frac{4}{3}$ 2) $\frac{3}{2}$ 3) $\frac{1}{3}$ 4) $\frac{5}{12}$

115. Two dice are rolled. If A is the event that sum of the numbers is 4 and B is the event the at least one of the dice shows a 3, then $P(A \mid B)$ is equal to

1) $\frac{3}{11}$ 2) $\frac{2}{11}$ 3) $\frac{1}{4}$ 4) $\frac{1}{6}$

116. If $\vec{a} = \hat{i} + 2\hat{k}, \vec{b} = \hat{i} + \hat{j} + \hat{k}, \vec{c} = 7\hat{i} - 3\hat{k} + 4\hat{k}$, $\vec{r} \times \vec{b} + \vec{b} \times \vec{c} = \vec{0}$ and $\vec{r}.\vec{a} = 0$ then $\vec{r}.\vec{c}$ is equal to

1) 34 2) 12 3) 36 4) 30

117. If $\bar{a} = 2i + j + 2k$ then $\left|i \times \left(\bar{a} \times i\right)\right|^2 + \left|j \times \left(\bar{a} \times j\right)\right|^2 + \left|k \times \left(\bar{a} \times k\right)\right|^2$ is

1) 6 2) 9 3) 16 4) 18

SPACE FOR ROUGH WORK

118. A line makes acute angles of α, β, γ with the coordinate axes such that $\cos\alpha\cos\beta = \cos\beta\cos\gamma = \frac{2}{9}$ and $\cos\gamma\cos\alpha = \frac{4}{9}$ then $\cos\alpha + \cos\beta + \cos\gamma =$

1) $\frac{25}{9}$ 2) $\frac{5}{9}$ 3) $\frac{16}{9}$ 4) $\frac{5}{3}$

119. If the lines $\frac{2x-1}{2} = \frac{3-y}{1} = \frac{z-1}{3}$ and $\frac{x+3}{2} = \frac{z+1}{p} = \frac{y+2}{5}$ are perpendicular to each other, then p is equal to

1) 1 2) –1 3) 10 4) $-\frac{7}{5}$

120. A line passes through a point A with position vector $3\hat{i} + \hat{j} - \hat{k}$ and is parallel to the vector $2\hat{i} - \hat{j} + 2\hat{k}$. If P is a point on this line such that AP = 15 units, then the position vector of the point P is /are

1) $13\hat{i} + 4\hat{j} - 9\hat{k}$ 2) $13\hat{i} - 4\hat{j} + 9\hat{k}$

3) $7\hat{i} - 6\hat{j} + 11\hat{k}$ 4) None of these

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

REPEATERS SCREENING TEST (SAMPLE)

P + C + B + M - ANSWER KEY

PHYSICS

1. 1 $F \propto q_1 q_2$

   I[st] case: $q_1 = +7\text{mC}$, $q_2 = -5\text{mC}$

   II[nd] case: $q_1 = +7\ \text{mC} - 2\text{mC} = +5\text{mC}$, $q_2 = -5\text{mC} - 2\text{mC} = -7\text{mC}$

2. 3 $\tau_{max} = PE = q\,(2l)\,E$

3. 2

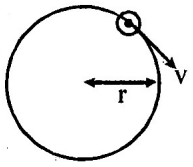
4. 4

5. 3 $B = \dfrac{\mu_0 i}{2\pi r}$

6. 3

7. 1 Magnetic moment $\mu = niA$
   Where n = number of turns of the current loop
   i = current; Since the orbiting electron behaves as current loop of current i;
   we can write

   $$i = \frac{e}{T} = \frac{e}{\frac{2\pi r}{v}} = \frac{ev}{2\pi r}$$

   A = area of the loop $= \pi r^2$

   $$\Rightarrow \mu = (1)\left(\frac{ev}{2\pi r}\right)(\pi r^2) \Rightarrow \mu = \frac{evr}{2}$$

8. 4 $x\alpha\dfrac{1}{T}$

9. 1

10. 2

11. 2

12. 4

13. 4

14. 4 $C = \sin^{-1}\left(\dfrac{v_1}{v_2}\right) = \sin^{-1}\left(\dfrac{1.8\times10^8}{2.4\times10^8}\right) = \sin^{-1}\left(\dfrac{3}{4}\right)$

15. 1 $$n=\frac{\sin(i)}{\sin\left(\frac{i}{2}\right)}=\frac{2\sin\left(\frac{i}{2}\right)\cos\left(\frac{i}{2}\right)}{\sin\left(\frac{i}{2}\right)};$$

$$n=2\cos\left(\frac{i}{2}\right);\quad i=2\cos^{-1}\left(\frac{n}{2}\right)$$

16. 3 $$\sin c=\frac{n_2}{n_1}=\frac{\lambda_1}{\lambda_2};\quad \sin c=\frac{3500}{7000}=\frac{1}{2}\quad \therefore c=30^{o}$$

17. 3

18. 2 30^0

$tanp = n = \sqrt{3}; p =$
60^0; *At the polarising angle reflected and refracted beams are mutually perpendicular*

19. 2 Slope = h/e. Here, h and e are constants. Therefore, the slope is same for all metals and independent of the intensity of incident radiation.

20. 1 We have

$$E_k = hf - hf_0$$

and $$(E_k)' = 2hf - hf_0$$

Therefore, $$\frac{(E_k)'+E_k}{E_k}=\frac{3hf-2hf_0}{hf-hf_0}=\frac{3f-2f_0}{f-f_0}$$

$$\frac{(E_k)'}{E_k}=\frac{3f-2f_0}{f-f_0}-1=\frac{3f-2f_0-f+f_0}{f-f_0}$$

$$\frac{(E_k)'}{E_k}=\frac{2f-f_0}{f-f_0}=\frac{2f-2f_0}{f-f_0}+\frac{f_0}{f-f_0}$$

$$\frac{(E_k)'}{E_k}=2+\left(\frac{f_0}{f-f_0}\right)E_k$$

Therefore, $$(E_k)'=2E_k+\left(\frac{f_0}{f-f_0}\right)E_k$$

21. 4 We have

$$\lambda=\frac{h}{mv}$$

$$m_\beta < m_p < m_n < m_\alpha \Rightarrow \lambda_\beta < \lambda_p < \lambda_n < \lambda_\alpha$$

22. 2 $r \propto n^2$

23. 2 No. of spectral lines $= \frac{n(n-1)}{2} = \frac{4(4-1)}{2} = 6$

24. 2 $B.E. = \Delta mc^2$ and B.E. per nucleons $= \frac{B.E.}{\text{mass no.}}$

25. 2 $r \propto A^{1/3} \Rightarrow \frac{r_1}{r_2} = \left(\frac{A_1}{A_2}\right)^{1/3}$

$\Rightarrow \frac{3}{5} = \left(\frac{27}{A}\right)^{1/3} \Rightarrow \frac{27}{125} = \frac{27}{A}$

A = 125

Number of nuclei in atom X = A–52 = 125–52 = 73

26. 2

27. 2 p-type is obtained by doping with trivalent impurity atoms

28. 2

29. 3 The intermediate image in a compound microscope is real, inverted and magnified.

30. 1 $M = \frac{f_o}{f_e} = \frac{200}{5} = 40$

CHEMISTRY

31. 3

32. 2

33. 4

34. 4

35. 1

36. 1

37. 4

38. 1 In $KMnO_4$ Mn is in +7 oxidation state

39. 4

40. 3

41. 3 Only chlorobenzene and bromobenzene are prepared by Sand Meyer's reaction

42. 3

43. 2

44. 1

45. 3 Carbonyl compounds containing α -hydrogen atom give aldol condensation

46. 4 Lactose and maltose are disaccharides

47. 4

48. 3 D and L have no relation with the optical rotation. Carbohydrate having D-configuration may be either dextrorotatory or laevorotatory e.g., D-(+)-glucose is dextrorotatory while D-(-)–fructose is laevorotatory.

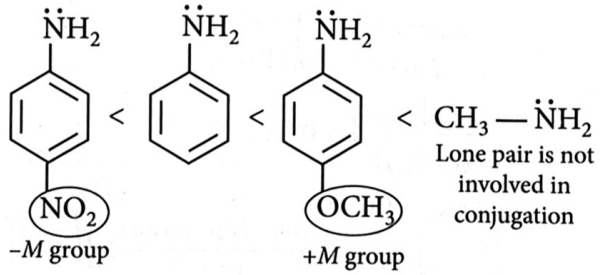
49. 3

50. 2

51. 3

52. 4

Aromatic amines like aniline are less basic than aliphatic amines because of the involvement of lone pair of electrons in resonance with the aromatic ring which now becomes less available for donation. In substituted aromatic amines, electron withdrawing groups decrease the basic character and electron releasing groups increase the basic character.



53. 4
54. 1
55. 2
56. 4 Amines have an unshared pair of electrons on nitrogen atom due to which they behave as Lewis bases
57. 4 Aniline itself does not undergo Friedel-Crafts reaction because amino group of aniline acts as a base and forms salt with Lewis acid, $AlCl_3$ etc, $C_6H_5\overset{\oplus}{N}H_2.AlCl_3^-$

58. 4

$$\text{We know that, } K_b = \frac{\Delta T_b \times W_1 \times MW_2}{1000 \times W_2}$$

$$\text{For } CCl_4;\ K_b = \frac{0.201 \times 50 \times 128}{1000 \times 0.2563} = 5.019$$

$$MW_2 = \frac{1000 \times K_b \times W_2}{\Delta T_b \times W_1} = \frac{1000 \times 5.019 \times 0.6216}{0.647 \times 50} = 96.44\ g$$

59. 2

The solution containing *n*-heptane and ethanol shows non-ideal behaviour with positive deviation from Raoult's law. This is because the ethanol molecules are held together by strong H-bonds, however the forces between *n*-heptane and ethanol are not very strong, as a result they easily vapourise showing higher vapour pressure than expected.

60. 4

BIOLOGY

61. 4
62. 2

63. 1
64. 3
65. 4
66. 2
67. 1
68. 2
69. 2
70. 1
71. 4
72. 2
73. 2
74. 2
75. 3
76. 4
77. 3
78. 1
79. 1
80. 4
81. 4
82. 2
83. 3
84. 1
85. 2
86. 2
87. 4
88. 2
89. 3
90. 1

MATHEMATICS

91. 3
92. 4
93. 2
94. 3
95. 4
96. 2
97. 1
98. 3
99. 1
100. 1
101. 1
102. 1
103. 1
104. 3
105. 2
106. 4
107. 1
108. 2

109. 1
110. 4
111. 1
112. 3
113. 4
114. 1
115. 2
116. 1
117. 4
118. 4
119. 1
120. 2

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK