



N-ACST-2022

CLASS – XII-PASS: - (Physics, Chemistry, Botany & Zoology)
(Class XII Moving to XII-PASS-PCB)

{SET-1}

N-ACST (12-06-2022)

Time Duration: 1 Hour

Maximum marks: 180

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

INSTRUCTIONS:

1. This question paper contains 45 questions: Physics (Q. No. 1 to Q. No. 12), Chemistry (Q. No. 13 to Q. No. 25), Botany (Q. No. 26 to Q. No. 35), Zoology (Q. No. 36 to Q. No. 45).
2. There will be individual qualifying cut-offs for all sections.
3. **For Each correct answer 4 marks will be awarded. No Negative Marking.**
4. Use OMR-Sheet for answering
5. Use HB Pencil / Pen to darken the circles.
6. If you wish to change your answer, erase the already darkened circle completely and then darken the appropriate circle.
7. Use of a calculator and mobile phone is strictly prohibited during the exam.

TO BE FILLED IN CAPITAL LETTERS

NAME OF THE STUDENT : _____

FATHER'S NAME : _____

CONTACT NUMBER: _____ **SCHOOL NAME :** _____

ROLL NO. : _____ **TEST CENTRE :** _____

I have read all the instructions and shall abide by them

.....
Signature of Candidate

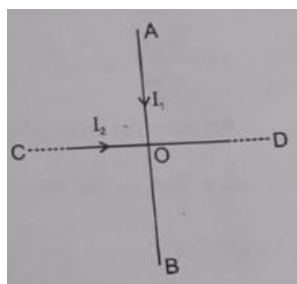
I have verified all the information filled in by the Candidate

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Signature of Invigilator

PHYSICS

- In a single slit diffraction of light of wavelength λ by a slit of width e , the size of the central maximum on a screen at a distance b is
 (A) $2b\lambda + e$ (B) $\frac{2b\lambda}{e}$ (C) $\frac{2b\lambda}{e} + e$ (D) $\frac{2b\lambda}{e} - e$
- A concave mirror gives an image three times as large as the object placed at a distance of 20 cm from it. For the image to be real, the focal length should be
 (A) 10 cm (B) 15 cm (C) 20 cm (D) 30 cm
- Two thin wire rings, each having a radius R are placed at a distance d apart with their axes coinciding. The charges on the two rings are $+q$ and $-q$. The potential difference between the centers of the two rings is
 A) Zero
 B) $\frac{q}{4\pi\epsilon_0} \left[\frac{1}{R} - \frac{1}{\sqrt{R^2 - d^2}} \right]$
 C) $\frac{qR}{4\pi\epsilon_0 d^2}$
 D) $\frac{q}{2\pi\epsilon_0} \left[\frac{1}{R} - \frac{1}{\sqrt{R^2 + d^2}} \right]$
- A point object is placed at a distance of 10 cm and its real image is formed at a distance of 20 cm from a concave mirror. If the object is moved by 0.1 cm towards the mirror, the image will shift by about
 (A) 0.4 cm away from the mirror (B) 0.4 cm towards the mirror
 (C) 0.8 cm away from the mirror (D) 0.8 cm towards the mirror
- Two conductors have the same resistance at 0°C but their temperature coefficients of resistance are α_1 and α_2 . The respective temperature coefficients of their series and parallel combinations are nearly
 A) $\frac{\alpha_1 + \alpha_2}{2}, \alpha_1 + \alpha_2$ B) $\alpha_1 + \alpha_2, \frac{\alpha_1 + \alpha_2}{2}$ C) $\alpha_1 + \alpha_2, \frac{\alpha_1 \alpha_2}{\alpha_1 + \alpha_2}$ D) $\frac{\alpha_1 + \alpha_2}{2}, \frac{\alpha_1 + \alpha_2}{2}$
- Two identical conducting wires AOB and COD are placed at right angles to each other. The wire AOB carries an electric current I_1 and COD carries a current I_2 . The magnetic field on a point lying at a distance d and O, in a direction perpendicular to the plane of the wires AOB and COD, will be given by

Space for rough work



A) $\frac{\mu_0}{2\pi} \left(\frac{I_1 + I_2}{d} \right)^{1/2}$ B) $\frac{\mu_0}{2\pi d} (I_1^2 + I_2^2)^{1/2}$ C) $\frac{\mu_0}{2\pi d} (I_1 + I_2)$ D) $\frac{\mu_0}{2\pi d} (I_1^2 + I_2^2)$

7. In a uniform magnetic field of induction B , a wire in the form of semicircle of radius r rotates about the diameter of the circle with angular frequency ω . If the total resistance of the circuit is R , the mean power generated per period of rotation is

A) $\frac{B\pi^2\omega}{2R}$ B) $\frac{(B\pi r^2\omega)^2}{8R}$ C) $\frac{(B\pi r\omega)^2}{2R}$ D) $\frac{(B\pi r\omega^2)^2}{8R}$

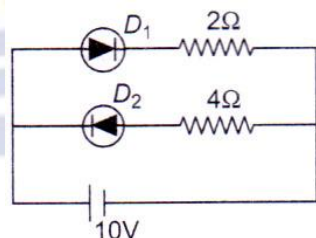
8. A metal conductor of length 1 m rotates vertically about one of its ends at angular velocity 5 radians per second. If the horizontal component of earth's magnetic field is $0.2 \times 10^{-4} \text{ T}$, then the emf developed between the two ends of the conductor is

A) $5\mu\text{V}$ B) $50\mu\text{V}$ C) 5mV D) 50mV

9. If the binding energy of the electron in a hydrogen atom is 13.6 eV , the energy required to remove the electron from the first excited state of Li^{++} is

(A) 122.4 eV (B) 30.6 eV (C) 13.6 eV (D) 3.4 eV

10. Find current passing through 2Ω and 4Ω resistance respectively, in the circuit shown in figure.



(A) $5\text{A}, 0\text{A}$ (B) $2.5\text{A}, 2.5\text{A}$ (C) $0\text{A}, 5\text{A}$ (D) $5\text{A}, 5\text{A}$

Space for rough work

11. The image formed by an objective of a compound microscope is
 (A) virtual and diminished (B) real and diminished
 (C) real and enlarged (D) virtual and enlarged
12. In a common base amplifier, the phase difference between the input signal voltage and output voltage is
 (A) $\frac{\pi}{2}$ (B) 0 (C) π (D) $\frac{\pi}{4}$

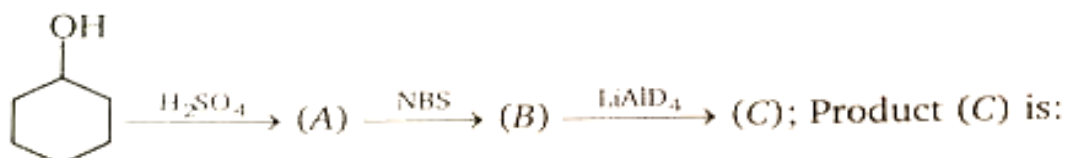
CHEMISTRY

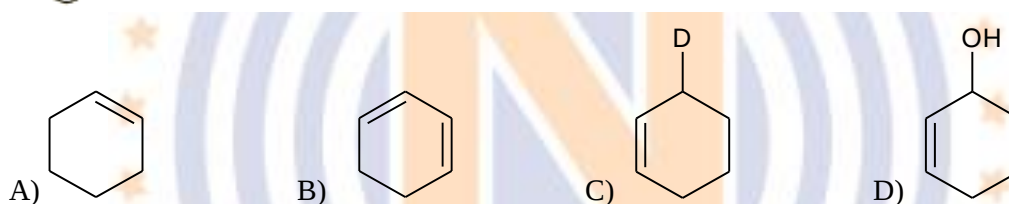
13. Which of the following salt has the same value of Van't Hoff factor as that of $K_3[Fe(CN)_6]$
 A) Na_2SO_4 B) $Al_2(SO_4)_3$ C) $Al(NO_3)_3$ D) Fe_3O_4
14. Hypochlorite disproportionates to give :
 (A) Cl^- and ClO_4^- (B) ClO_4^- and ClO_3^- (C) ClO_3^- and Cl^- (D) ClO_2^- and Cl^-
15. The number of space lattices possible for the crystallographic dimensions $\alpha \neq \beta \neq \gamma$
 A) 1 B) 2 C) 3 D) 4
16. Which is not correct reaction?
 (A) $XeF_6 + NaF \rightarrow [XeF_5]^+ 2F^- Na^+$ (B) $XeF_6 + PF_5 \rightarrow [XeF_5^+][PF_6^-]$
 (C) $XeF_6 + SbF_5 \rightarrow [XeF_5^+][SbF_6^-]$ (D) $XeF_2 + PF_5 \rightarrow [XeF^+][PF_6^-]$
17. Which of the following has highest lattice energy?
 (A) RbF (B) CsF (C) KF (D) NaF
18. Which of the following is D-Glyceraldehyde?
 A) $\begin{array}{c} CH_2OH \\ | \\ H-C-OH \\ | \\ CH \end{array}$ B) $\begin{array}{c} CHO \\ | \\ H-C-OH \\ | \\ CH_2OH \end{array}$ C) $\begin{array}{c} CHO \\ | \\ H-C-OH \\ | \\ CH_3 \end{array}$ D) $\begin{array}{c} CHO \\ | \\ HO-C-H \\ | \\ CH_3 \end{array}$

Space for rough work

19. Select the rate law that corresponds to the data shown for the reaction $A + B \rightarrow C$
- | Exp | [A] | [B] | [C] |
|-----|-------|-------|------|
| 1 | 0.012 | 0.035 | 0.10 |
| 2 | 0.024 | 0.070 | 0.80 |
| 3 | 0.024 | 0.035 | 0.10 |
| 4 | 0.012 | 0.070 | 0.80 |
- (A) Rate = $k[B]^3$ (B) Rate = $k[B]^4$ (C) Rate = $k[A]^1[B]^3$ (D) Rate = $k[A]^2[B]^2$

20. In the froth floatation process for the purification of ores, the ore particles floats because
- (A) They are light
 (B) their surface is not easily wetted by water
 (C) they bear electrostatic charge
 (D) they are insoluble

21. 



22. The true statement acids of phosphorus H_3PO_2 , H_3PO_3 and H_3PO_4 is
- (A) The order of their acidity is $H_3PO_4 > H_3PO_3 > H_3PO_2$
 (B) All of them are reducing in nature
 (C) All of them are tribasic acids
 (D) The geometry of phosphorus is tetrahedral in all the three

23. $C_6H_5-CH_3 \xrightarrow[H_3O^+]{1)CrO_2Cl_2/CS_2} A \xrightarrow{OH^-} B$
- The conversion of A to B is called as
- (A) Cannizaro reaction (B) Aldol Condensation
 (C) Clemmenson reduction (D) Etard reaction

Space for rough work

24. Choose the correct relationship for α -D-glucose (A) and β - D-glucose (B)–
(A) A and B are anomers
(B) A is an aldose and B is ketose.
(C) A is a pyranose sugar and B is a furanose sugar
(D) None of these
25. The acidic group in glycine is–
(A) – COOH (B) –COO[–] (C) –NH₂ (D) NH₃[⊕]

BOTANY

26. Pyramid of numbers is
(A) always upright (B) always inverted
(C) either upright or inverted (D) neither upright nor inverted
27. A and B chains of Insulin contain respectively:
(A) 21 and 30 amino acids (B) 30 and 21 amino acids
(C) 30 and 40 amino acids (D) 50 and 59 amino acids
28. Which of the following steps in transcription is catalysed by RNA polymerase?
(A) Initiation (B) Elongation
(C) Termination (D) All of the above
29. Who is known as the “Father of Genetics”?
(A) Morgan (B) Mendel (C) Watson (D) Bateson
30. Sonalika and Kalyan Sona are varieties of
(A) Wheat (B) Rice (C) Millet (D) Tobacco
31. Functional megaspore in a flowering plant develops into
(A) Endosperm (B) Ovule (C) Embryo-sac (D) Embryo
32. In agarose gel electrophoresis, DNA molecules are separated on the basis of their
(A) charge only (B) size only
(C) charge to size ratio (D) both charge and size
33. According to Allen’s Rule, the mammals from colder climates have
(A) shorter ears and longer limbs (B) longer ears and shorter limbs
(C) longer ears and longer limbs (D) shorter ears and shorter limbs
34. The alternate form of a gene is
(A) Alternate type (B) Recessive character
(C) Dominant character (D) Allele

Space for rough work

35. Discontinuous synthesis of DNA occurs in one strand, because
 (A) DNA molecule being synthesised is very long
 (B) DNA dependent DNA polymerase catalyses polymerisation only in one direction ($5' \rightarrow 3'$)
 (C) it is a more efficient process
 (D) DNA ligase has a role to play in the process

ZOOLOGY

36. Polyblend, a fine powder of recycled modified plastic, has proved to be a good material for
 (A) Making plastic sacks (B) Making tubes and pipes
 (C) Use as a fertiliser (D) Construction of roads
37. Match the following diseases (column I) with their causative agent (column II) and select the correct option.

Column I

Column II

- (1) Typhoid
 (2) Common cold
 (3) Pneumonia
 (4) Filariasis

- (i) *Wuchereria*
 (ii) *Salmonella*
 (iii) Rhino viruses
 (iv) *Haemophilus*

	(1)	(2)	(3)	(4)
(A)	(iii)	(iv)	(i)	(ii)
(B)	(iv)	(ii)	(iii)	(i)
(C)	(iv)	(iii)	(ii)	(i)
(D)	(ii)	(iii)	(iv)	(i)

38. In which of the following techniques, the embryos are transferred to assist those females who cannot conceive?
 (A) ZIFT and IUT (B) GIFT and ZIFT
 (C) ICSI and ZIFT (D) GIFT and ICSI
39. The analogous structures are a result of
 (A) Shared ancestry (B) Stabilising selection
 (C) Divergent evolution (D) Convergent evolution

Space for rough work

40. Match the hominids with their correct brain size.

- | | |
|----------------------------------|------------------|
| (1) <i>Homo habilis</i> | (i) 900 cc |
| (2) <i>Homo neanderthalensis</i> | (ii) 1350 cc |
| (3) <i>Homo erectus</i> | (iii) 650-800 cc |
| (4) <i>Homo sapiens</i> | (iv) 1400cc |

Select the correct option.

	(1)	(2)	(3)	(4)
(A)	(iv)	(iii)	(i)	(ii)
(B)	(iii)	(i)	(iv)	(ii)
(C)	(iii)	(ii)	(i)	(iv)
(D)	(iii)	(iv)	(i)	(ii)

41. Interspecific hybridisation is the mating of

- (A) Animals within same breed without having common ancestors
- (B) Two different related species
- (C) Superior males and females of different breeds
- (D) More closely related individuals within same breed for 4-6 generations

42. A patient brought to a hospital with myocardial infarction is normally immediately given

- (A) Penicillin
- (B) Streptokinase
- (C) Cyclosporin-A
- (D) Statins

43. Which of the following is the most important cause of animals and plants being driven to extinction?

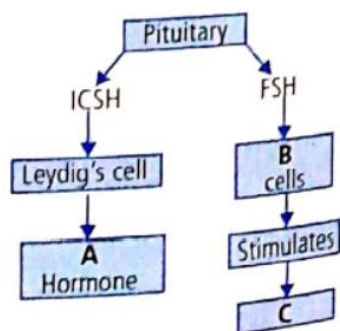
- (A) Co-extinctions
- (B) Over-exploitation
- (C) Habitat loss and fragmentation
- (D) Alien species invasion

44. Which of the following hormone levels will cause release of ovum (ovulation) from the Graafian follicle?

- (A) High concentration of Estrogen
- (B) High concentration of Progesterone
- (C) Low concentration of LH
- (D) Low concentration of FSH

Space for rough work

45. Given below is an incomplete flow chart showing influence of hormones on spermatogenesis. Observe the flow chart carefully and choose the option that correctly fills the blank A, B and C.



- | | | |
|------------------|---------------|-----------------|
| (A) Androgens | Spermatogonia | Spermatogenesis |
| (B) Testosterone | Follicular | Spermiogenesis |
| (C) Testosterone | Sertoli | Spermiation |
| (D) Androgens | Sertoli | Spermiogenesis |

Space for rough work