



N-ACST-2022

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

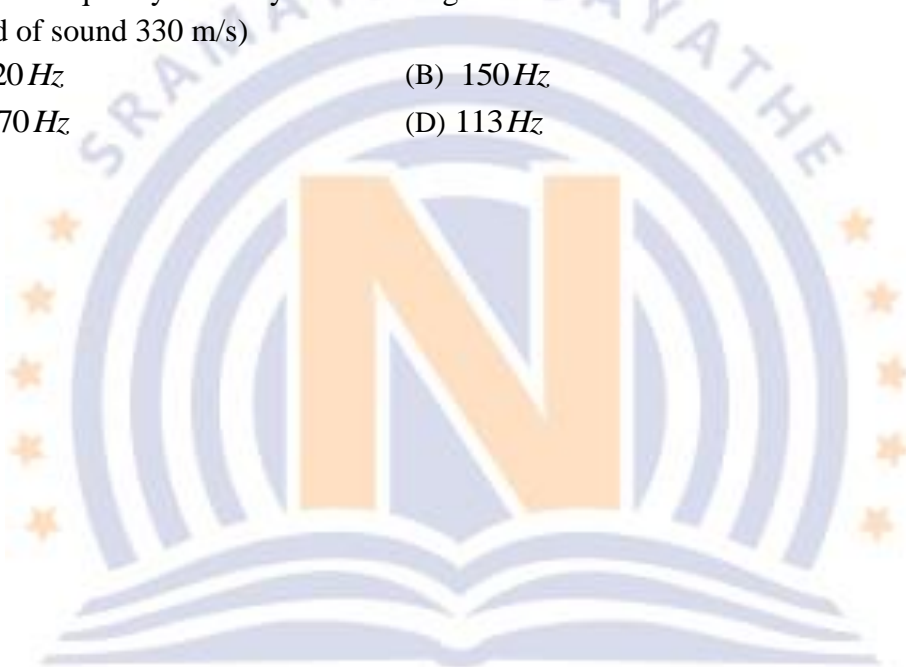
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Signature of Invigilator

PHYSICS

1. The ratio of the radii of gyration of a circular disc about a tangential axis in the plane of the disc and of a circular ring of the same radius about a tangential axis in the plane of the ring is
(A) $\sqrt{5} : \sqrt{6}$ (B) $1 : \sqrt{2}$ (C) $2 : 3$ (D) $2 : 1$
2. In the process $PV = \text{constant}$, pressure (P) versus density (ρ), graphs of an ideal gas is
(A) a straight line parallel to P-axis (B) a straight line parallel to ρ -axis
(C) a straight line passing through origin (D) a parabola
3. To maintain a rotor at a uniform angular speed of 100 s^{-1} , an engine needs to transmit a torque of 90 N-m . The power of engine must be
(A) 9 kW (B) 90 kW (C) 9 MW (D) 90 MW
4. What would be the length of the day, if earth were to shrink suddenly to $1/64^{\text{th}}$ of its original volume?
(A) 24 h (B) 12 h (C) 6h (D) 1.5 h
5. Two SHMs are represented by $y = a \sin(\omega t)$ and $y = a \cos(\omega t)$. The phase difference between the two is
(A) $\frac{\pi}{2}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{6}$ (D) $\frac{3\pi}{6}$
6. When a particle oscillates simple harmonically, its kinetic energy varies periodically. If frequency of the particle is 50 Hz , then frequency of the kinetic energy is
(A) 50 Hz (B) 25 Hz (C) 100 Hz (D) 12.5 Hz
7. The degree of freedom for diatomic gas will be
(A) 3 (B) 4 (C) 5 (D) 6
8. The diameter of a brass wire is 0.6 mm and Y is $9 \times 10^{11} \text{ Nm}^{-2}$. The force which will increase its length by 0.25 m is about : (Given original length $l = 3.14 \text{ m}$)
(A) 100 N (B) $2 \times 10^4 \text{ N}$ (C) 25 N (D) None of these
9. A projectile can have the same range R for two angles of projection. If t_1 and t_2 be the times of flight in the two cases then the initial velocity of projectile is
(A) $\frac{1}{4} g t_1 t_2$ (B) $\frac{1}{2} g t_1 t_2$ (C) $\frac{1}{2} g (t_1 + t_2)^2$ (D) $\frac{1}{2} g (t_1^2 + t_2^2)^{1/2}$

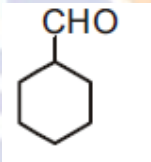
Space for rough work

10. The densities of two materials X and Y are in the ratio 1 : 3. Their specific heats are in the ratio 3 : 1. If we take same volumes of the two substances, the ratio of their thermal capacities will be
(A) 1 : 1 (B) 1 : 3 (C) 1 : 6 (D) 1 : 9
11. The percentage error in radius of sphere is 3%, find the percentage error in its volume.
(A) 6% (B) 9% (C) 12% (D) 1%
12. A whistling engine moves towards a hill with speed 20 m/s produces a sound of 100 Hz. Find the frequency heard by driver of engine after reflection from hill.
(speed of sound 330 m/s)
(A) 120 Hz (B) 150 Hz
(C) 170 Hz (D) 113 Hz



Space for rough work

CHEMISTRY

13. 10 mole of SO_2 and 4 mole of O_2 are taken in 1 litre container to form SO_3 . If degree of dissociation of SO_2 is 40%, then equilibrium constant is
 (A) $\frac{1}{5}$ (B) 5 (C) $\frac{9}{2}$ (D) $\frac{2}{9}$
14. The value of 'n' in the reaction :
 $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + n\text{Fe}^{2+} \longrightarrow 2\text{Cr}^{3+} + n\text{Fe}^{3+} + 7\text{H}_2\text{O}$ will be
 (A) 2 (B) 3 (C) 6 (D) 7
15. The bond angles of NH_3 , NH_4^+ and NH_2^- are in the order
 (A) $\text{NH}_2^- > \text{NH}_3 > \text{NH}_4^+$ (B) $\text{NH}_4^+ > \text{NH}_3 > \text{NH}_2^-$
 (C) $\text{NH}_3 > \text{NH}_2^- > \text{NH}_4^+$ (D) $\text{NH}_3 > \text{NH}_4^+ > \text{NH}_2^-$
16. Among the following reaction, which reaction cannot be used for preparation of hydrogen?
 (A) $\text{Zn} + \text{H}_2\text{SO}_4$ (B) $\text{Al} + \text{NaOH}$ (C) $\text{Cu} + \text{HCl}$ (D) $\text{Fe} + \text{H}_2\text{O}(\text{g})$
17. Which has maximum number of atoms?
 (A) 24g of C(12) (B) 56g of Fe (56)
 (C) 27g of Al (27) (D) 108 g of Ag (108)
18. IUPAC name of given compound is

 (A) Benzaldehyde (B) Cyclohexanal
 (C) Cyclohexane carbaldehyde (D) Cyclohexyl aldehyde
19. Rutherford model of atom could not explain
 (A) stability of the atom (B) line spectra of the atoms
 (C) distribution of electrons in an atom
 (D) all of three above.

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20. Among the following grouping which represents the collection of isoelectronic species?
(A) $\text{NO}^+, \text{C}_2^{2-}, \text{O}_2^-, \text{CO}$ (B) $\text{N}_2, \text{C}_2^{2-}, \text{CO}, \text{NO}$
(C) $\text{CO}, \text{NO}^+, \text{CN}^-, \text{C}_2^{2-}$ (D) $\text{NO}, \text{CN}^-, \text{N}_2, \text{O}_2^-$
21. The value of $\Delta H - \Delta U$ for combustion of ethane is
(A) 2.5 RT (B) -2.5 RT (C) -0.5 RT (D) 0.5 RT
22. Electronic configuration of niobium (Nb=41) is
(A) $[\text{Kr}]4d^4 5s^1$ (B) $[\text{Kr}]4d^5$ (C) $[\text{Kr}]4d^3 5s^2$ (D) $[\text{Kr}]5s^2 5p^3$
23. Boric acid is
(A) Tribasic, aprotic, lewis acid (B) Tribasic, protic, lewis acid
(C) Monobasic, protic, lewis acid (D) Monobasic, aprotic, lewis acid
24. 10 mole of acetic acid is mixed with 5 mole of NaOH. pOH of solution is (pK_a of $\text{CH}_3\text{COOH} = 5$)
(A) 4.5 (B) 5 (C) 9 (D) 2.5
25. The shape of an orbital is decided by
(A) Radial wave function (B) Angular Wave Function
(C) Magnetic quantum number (D) Spin quantum number

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BOTANY

26. Auxin can be bioassayed by
(A) Lettuce hypocotyls elongation (B) Avena coleoptiles curvature
(C) Hydroponics (D) Potometer
27. Which of the following criteria does not pertain to facilitated transport ?
(A) High selectivity
(B) Transport saturation
(C) Uphill transport
(D) Requirement of special membrane proteins
28. First botanist to give binomial nomenclature was
(A) Linnaeus (B) Aristotle (C) Mendel (D) Hutchinson
29. During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by
(A) Cytochrome (B) Leghaemoglobin (C) Xanthophyll (D) Carotene
30. The process which makes major difference between C_3 and C_4 plants is
(A) Glycolysis (B) Calvin cycle (C) Photorespiration (D) Respiration
31. Heterocyst is found in
(A) Nostoc
(B) Chrysophytes
(C) Slime moulds
(D) Dinoflagellates
32. Keel is characteristics of the flower of
(A) Gulmohur (B) Cassia (C) Bean (D) Calotropis
33. Oxidative phosphorylation is
(A) Formation of ATP by transfer of phosphate group from a substrate to ADP
(B) Oxidation of phosphate group in ATP
(C) Addition of phosphate group to ATP

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- (D) Formation of ATP by energy released from electrons removed during substrate oxidation
34. Zygotic meiosis is characteristics of
(A) *Fucus* (B) *Funaria* (C) *Chlamydomonas* (D) *Marchantia*
35. Plants having little or no secondary growth are
(A) Conifers (B) Dicluous angiosperms
(C) Grasses (D) Cycads



Space for rough work

ZOOLOGY

36. Read the following statements A and B and choose the correct option.
 Statement A : The inner ear contains a complex structure, called vestibular apparatus located below the cochlea.
 Statement B : Each semicircular canal lies in a different plane making different angles with each other.
 (A) Both statements A and B are correct
 (B) Both statements A and B are incorrect
 (C) Only statement A is correct
 (D) Only statement B is correct
37. Select the incorrect match among the hormones with their functions given below.
 (A) Gastrin – Stimulates secretion of HCl
 (B) Secretin – Stimulates secretion of enzymes in intestinal juice
 (C) GIP – Inhibits gastric motility
 (D) CCK – Acts on gall bladder to release bile
38. The important site for the formation of glycoproteins and glycolipids in a eukaryotic cell is
 (A) Smooth endoplasmic reticulum
 (B) Mitochondria
 (C) Peroxisomes
 (D) Golgi bodies
39. Match the stages of meiosis in column I with their characteristic features in column II
- | Column I | Column II |
|-----------------|--|
| (1) Pachytene | (i) Pairing of homologous chromosomes |
| (2) Metaphase I | (ii) Terminalisation of chiasmata |
| (3) Diakinesis | (iii) Crossing-over takes place |
| (4) Zygotene | (iv) Chromosomes align at equatorial plate |
- Select the correct option:
- | | (1) | (2) | (3) | (4) |
|-----|-------|------|-------|------|
| (A) | (iii) | (iv) | (ii) | (i) |
| (B) | (iv) | (ii) | (iii) | (i) |
| (C) | (iii) | (i) | (ii) | (iv) |
| (D) | (ii) | (i) | (iii) | (iv) |
40. Gastric juice of infants contain
 (A) Pepsinogen, lipase, pro-renin
 (B) Amylase, rennin, pepsinogen
 (C) Maltase, pepsinogen, renin

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- (D) Pro-rennin, pepsinogen, lipase
41. During forceful expiration, alveoli do not collapse because a certain amount of air is still left in alveoli, known as
- (A) Vital capacity
 - (B) Expiratory reserve volume
 - (C) Residual volume
 - (D) Expiratory capacity
42. What would be the heart rate of a person, if the cardiac output is 5 L, blood volume in the ventricles at the end of diastole is 130 mL and at the end of ventricular systole is 80 mL ?
- (A) 50 beats per minute
 - (B) 100 beats per minute
 - (C) 75 beats per minute
 - (D) 110 beats per minute
43. Select the correct statement with respect to bones and joints in human beings.
- (A) The vertebral column has 10 thoracic vertebrae
 - (B) The joint between adjacent vertebrae is a fibrous joint.
 - (C) A decreased level of oestrogen causes osteoporosis in older females
 - (D) Accumulation of uric acid crystals in joints causes muscular dystrophy
44. Which one of the following group of animals reproduce only by sexual means?
- (A) Annelida
 - (B) Ctenophora
 - (C) Porifera
 - (D) Cnidaria
45. In male cockroaches, sperms are stored in which part of the reproductive system?
- (A) Phallic gland
 - (B) Seminal vesicles
 - (C) Mushroom glands
 - (D) Testis

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