



N-ACST-2022

CLASS – XI: - (Mental Ability, Physics, Chemistry & Mathematics)
(Class X Moving to XI - PCM)

(SET-1)

N-ACST (12-06-2022)

Time Duration: 1 Hour

Maximum marks: 140

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

INSTRUCTIONS:

1. This question paper contains **35** questions: **Mental Ability (Q. No. 1 to Q. No. 7), Mathematics (Q. No. 8 to Q. No. 17), Physics (Q. No. 18 to Q. No. 26), and Chemistry (Q. No. 27 to Q. No. 35).**
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

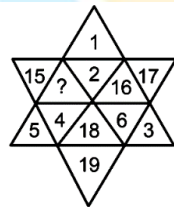
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Signature of Candidate

I have verified all the information filled in by the Candidate

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Signature of Invigilator

MENTAL ABILITY (MAT)

1. The question consists of two words each that have a certain relationship with each other. Select the pair that has the same relationship as the original pair of word
Sale : Purchase
(A) Give : Receive (B) Shop : Market (C) Cash : Credit (D) Profit : Loss
2. The question, in a certain code language '+' means ' \times ', '-' means '+', ' \times ' means ' \div ' and ' \div ' means '-', then answer the following question
 $16 + 4 \div 2 - 21 \times 7 \div 21$
(A) 33 (B) 44 (C) 48 (D) 39
3. In a family, there is one head of the family, his wife, three sons and their wives. Every son has two sons and one daughter. The number of male members are there in the family is:
(A) 4 (B) 10 (C) 8 (D) 12
4. If the word PINK is coded as RGPI, the word BLUE will be coded as:
(A) DJCW (B) DWJC (C) DJWC (D) DCJW
5. From the following the odd one out is:
(A) 22 (B) 4444 (C) 333 (D) 5555
6. From the given alternative the correct option to replace (?) in the given figure is:



- (A) 13 (B) 14 (C) 20 (D) 21
7. Rohan is taller than Aman but shorter than Siya. Kamal is taller than Pooja but shorter than Aman. Deepak is taller than Kamal but shorter than Siya. Then the tallest among them is:
(A) Rohan (B) Siya (C) Aman (D) Deepak

Space for Rough Work

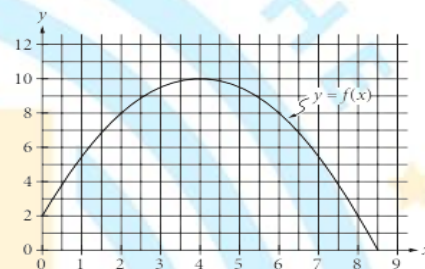
MATHEMATICS

8. The function f is defined $f(x) = (x+3)(x+1)$. The graph of f in the xy -plane is a parabola. Which of the following intervals contains the x -coordinate of the vertex of the graph of f ?

(A) $-4 < x < -3$ (B) $-3 < x < 1$
(C) $1 < x < 3$ (D) $3 < x < 4$

9. The graph of the function f , defined by $f(x) = -\frac{1}{2}(x-4)^2 + 10$, is shown in the xy -plane above. If the function g (not shown) is defined by $g(x) = -x + 10$, one possible value of 'a' such that $f(a) = g(a)$ is:

(A) 8 (B) 6
(C) 7 (D) 9



10. If $x-a$ is a factor of $x^3 - 3x^2a + 2a^2x + b$ then the value of b is
(A) 0 (B) 2
(C) 1 (D) 3
11. If $f(x) = x^6 - 10x^5 - 10x^4 - 10x^3 - 10x^2 - 10x + 10$, the value of $f(11)$ is
(A) 1 (B) 10
(C) 11 (D) 21
12. The value of $\sin^2 5^\circ + \sin^2 10^\circ + \sin^2 15^\circ + \dots + \sin^2 90^\circ$ is
(A) 8 (B) $9\frac{1}{2}$
(C) 9 (D) 10

13. If V be the volume and S the surface are of a cuboids of dimension a , b and c then $\frac{1}{V}$ is equal to

(A) $\frac{S}{2}(a+b+c)$ (B) $\frac{2}{S}\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$
(C) $\frac{2S}{a+b+c}$ (D) $2S(a+b+c)$

Space for Rough Work

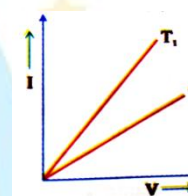
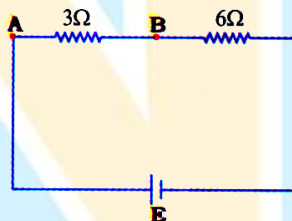
14. If the roots of $(b-c)x^2 + (c-a)x + (a-b) = 0$ are real and equal then which of the following is true?
 (A) $2b = a + c$ (B) $2a = b + c$
 (C) $2c = a + b$ (D) $2b = a - c$
15. If $x_1, x_2, x_3, \dots, x_n$ are in A.P., then the value of $\frac{1}{x_1 x_2} + \frac{1}{x_2 x_3} + \frac{1}{x_3 x_4} + \dots + \frac{1}{x_{n-1} x_n}$ is
 (A) $\frac{n-1}{x_1 x_n}$ (B) $\frac{n-1}{x_2 x_{n-1}}$
 (C) $\frac{n}{x_1 x_n}$ (D) $\frac{n+1}{x_1 x_n}$
16. If a, b, c be the first, the second and the last term of an A.P.; then the sum of this A.P. is
 (A) $\frac{(a-c)(b+c-2a)}{2(b-a)}$ (B) $\frac{(a+c)(b+c-2a)}{2(b-a)}$
 (C) $\frac{(a+c)(b+c+2a)}{2(b-a)}$
 (D) Cannot be determined unless some more information is given about the A.P.
17. The value of $\sin 12^\circ \cos 78^\circ + \cos 12^\circ \sin 78^\circ$ is
 (A) 0 (B) 1
 (C) -1 (D) None of these

PHYSICS

18. The current and voltage graph for a given metallic conductor wire at two different temperatures is shown in the figure. It is concluded that _____
 (A) $T_1 > T_2$ (B) $T_1 < T_2$ (C) $T_1 = T_2$ (D) $T_1 = 2T_2$
19. Light travels from air into a glass of refractive index 1.5. The time taken by the light to travel through a piece of glass of 50 cm thickness is:
 (A) 2.25 s (B) 2.25×10^{-7} s (C) 2.5×10^{-8} s (D) 2.5×10^{-9} s
20. If 'x' is the length of a conductor, 'y' is the area of the cross-section of a conductor, and 'ρ' is resistivity then the resistance of a conductor is equal to
 (A) $\frac{y}{\rho x}$ (B) $\frac{y\rho}{x}$ (C) $\frac{\rho x}{y}$ (D) $\frac{\rho x^2}{y}$

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21. The direction of the line of the magnetic field of a bar magnet is
 (A) From South Pole to North Pole (B) From north pole to the South Pole
 (C) Across the bar magnet
 (D) From the South Pole to the North Pole inside the magnet and from the north pole to the South Pole outside the magnet.
22. A convex mirror of focal length f forms an image that is $1/n$ times the object. The distance of the object from the mirror is
 (A) $(n-1)f$ (B) $\left(\frac{n-1}{n}\right)f$ (C) $\left(\frac{n+1}{n}\right)f$ (D) $(n+1)f$
23. The magnifying power of an optical instrument is expressed in _____
 (A) Meter (B) meter^{-1} (C) dioptre (D) It has no unit
24. Image is formed for the short-sighted person at _____
 (A) Retina (B) Before retina
 (C) Behind the retina (D) Image is not formed at all
25. The source of the sun's energy is
 (A) Chemical reaction (B) Nuclear fission (C) Nuclear fusion (D) None of these
26. If $V_A - V_B = 9V$ then value of E is
 (A) 12V (B) 18V
 (C) 27 V (D) 30 V



CHEMISTRY

27. Which one is not correct for a homologous series?
 (A) All members have same general formula (B) All members have same chemical properties
 (C) All members have same physical properties (D) All members have same functional group
28. Elements belonging to the same group have similar properties because:
 (A) They have a similar electronic configuration of the outermost shell.
 (B) Their atomic numbers go on increasing as we move down the group.
 (C) All of them are metallic elements.

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- (D) None of the above.
29. The reaction $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$ is an example of _____.
(A) Combination reaction (B) Double displacement reaction
(C) Decomposition reaction (D) Displacement reaction
30. The Haber's process of ammonia synthesis, in which nitrogen and hydrogen gas react to give ammonia is an example of _____.
(A) Endothermic reaction (B) Reversible reaction
(C) Exothermic reaction (D) Both (B) and (C)
31. 'X' is a substance which is soluble in water and its aqueous solution turns red litmus blue and produces H_2 on reaction with zinc. It is prepared by electrolysis of NaCl (aq.) then the X is:
(A) HNO_3 (B) NaClO_3 (C) NaOH (D) NH_4OH
32. Which of the following represent the correct order of decreasing reactivity?
(A) $\text{Mg} > \text{Al} > \text{Zn} > \text{Fe}$ (B) $\text{Mg} > \text{Zn} > \text{Al} > \text{Fe}$
(C) $\text{Al} > \text{Zn} > \text{Fe} > \text{Mg}$ (D) $\text{Mg} > \text{Fe} > \text{Zn} > \text{Al}$
33. The IUPAC name of the compound $\text{Cl}-\overset{\text{Br}}{\underset{\text{F}}{\text{C}}}-\text{CHO}$ is
(A) 2-Bromo, 2-chloro-2-fluoroethanal (B) 1-Bromo-1-chloro-2-fluoroethanol
(C) 2-fluoro-2-chloro-2-bromoethanol (D) 2-fluoro-2-chloro-1-bromorthanol
34. Which of the following is monobasic acid?
(A) H_3PO_3 (B) H_2SO_3 (C) HCN (D) $(\text{COOH})_2$
35. The conjugate acid of NH_2^- is:
(A) NH_3 (B) NH_2OH (C) NH_4^+ (D) N_2H_4



THE NARAYANA GROUP

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