Code Number: **A**

Aakash
Medical | IIT-JEE | Foundations

Corp. Office: Aakash Educational Services Limited, 3rd Floor, Incuspaze Campus- 2, Plot No. 13, Sector- 18, Udyog Vihar, Gurugram, Haryana - 122015

Time: 3 hrs. **Mock Test Paper for Class-XII** **Max. Marks: 75**

MATHEMATICS

Paper - II(A)

Roll No. | | | | | | | | | | | |

GENERAL INSTRUCTIONS

Read the following instructions carefully and follow them:

1. The Question paper consists of section **A, B,** and **C**
2. Answer all the questions of **Section A**. Answer ANY **FIVE** questions out of **seven** in **Section B** and answer ANY **FIVE** questions out of **seven** "in **Section C**.
3. In **Section A**, questions from Sl. Nos. **1** to **10** are of '**very short answer type**'. Each question carries **TWO** marks. Every answer may be limited to **5** lines. Answer all the questions at one place in the same order.
4. In **Section B**, questions from Sl. Nos. **11** to **17** are of '**short answer type**'. Each question carries **Four** marks. Every answer may be limited to **20** lines. Answer any **FIVE** questions out of **7** questions.
5. In **Section C**, questions from Sl. Nos. **18** to **24** are of '**long answer type**'. Each question carries **Seven** marks. Every answer may be limited to **60** lines. Answer any **FIVE** questions out of **7** questions.
6. Draw labelled diagrams, wherever necessary for questions in **Sections B** and **C**.

SECTION - A

I. Answer ALL questions. **10 x 2 = 20**

1. Find the multiplicative inverse of 7 + 24i.
2. Write $z = -\sqrt{7} + i\sqrt{21}$ in the polar form.
3. If $x = \text{cis}\theta$, then find value of $\left(x^6 + \frac{1}{x^6}\right)$
4. Form quadratic equation whose roots are $7 \pm 2\sqrt{5}$.
5. If $-1, 2, \alpha$ are the roots of $2x^3 + x^2 - 7x - 6 = 0$ then find 'α'.
6. If ${}^nP_r$ = 5040, ${}^nC_r$ =210 then find n and 'r'.
7. Find the number of diagonals of a polygon with 12 sides.
8. Find the number of terms int eh expansion of $(2x + 3y + z)^7$.
9. The coefficient of variation of two distributions are 60 and 70 and their standard deviations are 21 and 16 respectively. Find their arithmetic means.
10. A poison variable satisfies P (x = 1) = P(x = 2). Find P(x = 5).

SECTION - B

II. Answer ANY FIVE questions. **5 x 4 = 20**

11. Show that the four points in the Arg and plane represented by the complex numbers 2 + i, 4 + i, 2 + 5i, 3i are the vertices of a square.
12. If 'x' is real, show that the value of the expression $\frac{x^2 + 34x - 71}{x^2 + 2x - 7}$ do not lie between 5 and 9.
13. Find the sum of all 4-digit numbers that can be formed using digits 1, 3, 5, 7, 9.
14. Prove that, $\frac{{}^{4n}C_{2n}}{{}^{2n}C_n} = \frac{1.3.5....(4n-1)}{[1.3.5....(2n-1)]^2}$.
15. Resolve $\frac{x+4}{(x^2-4)(x+1)}$ into partial fractions.
16. The probability for a contractor to get a road contract is $\frac{2}{3}$ and to get a building contract $\frac{5}{9}$ is. The probability to get atleast one contract $\frac{4}{5}$ is Find the probably that he gets both the contracts.
17. Suppose A and B are independent events with P(A) = 0.6, P(B) = 0.7 compute

    (i) $P(A \cap B)$ (ii) $P(A \cup B)$ (iii) $P(B/A)$ (iv) $P(\overline{A} \cap \overline{B}) = P(A^C \cap B^C)$

SECTION - C

III. Answer ANY FIVE questions. **5 x 7 = 35**

18. If α,β are the roots of the equation $x^2 - 2x + 4 = 0$ then show that $\alpha^n + \beta^n = 2^{n+1}\cos\left(\frac{n\pi}{3}\right)$.

19. Solve the equation $4x^3 - 24x^2 + 23x + 18 = 0$ the roots being in A.P.

20. If the coefficient of r^{th}, $(r+1)^{th}$ and $(r+2)^{th}$ terms in the expansion of $(1+x)^n$ are in the A.P then show that $n^2 - (4r+1)n + 4r^2 - 2 = 0$.

21. If $x = \frac{1}{5} + \frac{1.3}{5.10} + \frac{1.3.5}{5.10.15} + ...\alpha$ then find $3x^2 + 6x = 2$.

22. Find the mean deviation about the mean for the given data using step deviation method.

Marks obtained	0-10	10-20	20-30	30-40	40-50
No. of students	5	8	15	16	6

23. Three boxes B_1, B_2 and B_3 contains balls with different colours as shown below

Box	**White**	**Black**	**Red**
B_1	2	1	2
B_2	3	2	4
B_3	4	3	2

A die is thrown, B_1 is chosen if either 1 or 2 turns up. B_2, is chosen if 3 (or) 4 turns up and B_3 is chosen if 5 (or) 6 turns up. Having choosen a box in this way, a ball is choosen at random from this box. If the ball drawn is found to be red, find the probability that it is from box B_2

24. A random variable X has the following probability distribution.

$X = x_i$	0	1	2	3	4	5	6	7
$P(X = x_i)$	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2 + K$

Find (i) K (ii) the mean and (iii) $P(0 < x < 5)$

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