

A.P. Intermediate Board Mathematics IIA Model Paper

(Extracted from <https://bieap.apcfss.in>)

Mathematics Paper - II(A)

Time : 3 Hours

Max. Marks : 75

SECTION A

I. **Very Short Answer Type Questions :** **10 × 2 = 20**

(i) Answer **ALL** questions.

(ii) Each question carries **TWO** marks.

1. Find the multiplicative inverse of $7 + 24i$.
2. If $(\sqrt{3} + i)^{100} = 2^{99}(a + ib)$, show that $a^2 + b^2 = 4$.
3. Find the cube roots of 8.
4. Find the quadratic equation whose roots are $-3 \pm 5i$.
5. If 1, 1, α are the roots of $x^3 - 6x^2 + 9x - 4 = 0$, then find α .
6. If $(n + 1) P_5 : nP_6 = 2 : 7$, find 'n'.
7. Find the number of permutations that can be made by using all the digits of the word MATHEMATICS.
8. Find the number of diagonals of a polygon with 12 sides.
9. Find the variance for the discrete data given below :
6, 7, 10, 12, 13, 4, 8, 12
10. A Poisson variable satisfies $P(x = 1) = P(x = 2)$. Find $P(x = 5)$.

SECTION B

II. **Short Answer Type Questions :** **5 × 4 = 20**

(i) Answer **ANY FIVE** questions.

(ii) Each question carries **FOUR** marks.

- 11.** Show that the four points in the Argand plane represented by the complex numbers $2 + i$, $4 + 3i$, $2 + 5i$, $3i$ are the vertices of a square.
- 12.** Prove that $\frac{1}{3x+1} + \frac{1}{x+1} - \frac{1}{(3x+1)(x+1)}$ does not lie between 1 and 4, if x is real.
- 13.** If the 6 letters of the word EAMCET are permuted in all possible ways and the words thus formed are arranged in the dictionary order, then find the rank of the word EAMCET.
- 14.** Find the number of ways of selecting a cricket team of 11 players from 7 batsmen and 6 bowlers such that there will be at least 5 bowlers in the team.
- 15.** Resolve : $\frac{x^2-x+1}{(x+1)(x-1)^2}$ into partial fractions.
- 16.** Find the probability of drawing an Ace or a Spade from a well shuffled pack of 52 playing cards.
- 17.** Suppose A and B are independent events with $P(A) = 0.6$, $P(B) = 0.7$. Then compute
 (i) $P(A \cap B)$ (ii) $P(A \cup B)$ (iii) $P(B/A)$ (iv) $P(A^C \cap B^C)$.

SECTION C

III. Long Answer Type Questions :

5 × 7 = 35

(i) Answer **ANY FIVE** questions.

(ii) Each question carries **SEVEN** marks.

18. If 'n' is an integer then show that :

$$(1 + i)^n + (1 - i)^n = 2^{n+1} \cos \frac{n\pi}{2}.$$

19. Show that one value of $\left[\frac{1 + \sin \frac{\pi}{8} + i \cos \frac{\pi}{8}}{1 + \sin \frac{\pi}{8} - i \cos \frac{\pi}{8}} \right]^{\frac{8}{3}}$ is -1 .

20. Solve $x^4 + 4x^3 - 2x^2 - 12x + 9 = 0$, given that it has two pairs of equal roots.

21. Solve the equation $x^4 + 2x^3 - 5x^2 + 6x + 2 = 0$, given that $1 + i$ is one of its roots.

22. Find the mean deviation from the mean for the following data, using the step deviation method :

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of Students	6	5	8	15	7	6	3

23. State and prove Addition theorem on probability.

24. A random variable x has the following probability distribution :

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

Find (i) k (ii) The mean and (iii) $P(0 < X < 5)$.