

Total No. of Questions—15

Total No. of Printed Pages—3

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Part III

MATHEMATICS

(Bridge Course) (For B.P.C. Candidates)

Paper II

(English Version)

Time : 3 Hours

Max. Marks : 75

Note :— This question paper consists of TWO Sections A and B.**SECTION-A**

10×3=30

I. Short answer type questions :

- (i) Answer ALL the questions.
(ii) Each question carries THREE marks.

1. Resolve $\frac{5x+1}{(x+2)(x-1)}$ into partial fractions.

2. Show that :

$$\frac{1 \cdot 2}{1!} + \frac{2 \cdot 3}{2!} + \frac{3 \cdot 4}{3!} + \dots = 3e.$$

3. Find the equation of the circle passing through the origin and having the centre at $(-4, -3)$.

4. Find the equation of the tangent to $x^2 + y^2 - 4x - 6y + 11 = 0$ at $(3, 4)$.

5. Find the mean deviation about the median for the data :

4, 6, 9, 3, 10, 13, 2.

6. Find the variance of the following data :

5, 12, 3, 18, 6, 8, 2, 10.

7. Evaluate :

$$\int \frac{e^{\tan^{-1} x}}{1+x^2} dx.$$

8. Evaluate :

$$\int_0^{\pi} \sqrt{2+2\cos\theta} d\theta.$$

9. Form the differential equation corresponding to $y = A \cos 3x + B \sin 3x$, where A and B are parameters.

10. Find the general solution of $\frac{dy}{dx} = e^{y-x}$.

SECTION-B

3×15=45

- II. Long answer type questions :

- (i) Attempt ANY THREE questions.
(ii) Each question carries FIFTEEN marks.

11. (a) Resolve $\frac{x^2-3}{(x+2)(x^2+1)}$ into partial fractions.

- (b) Resolve $\frac{x^3}{(x-1)(x+2)}$ into partial fractions.

12. (a) Find the equation of the circle whose centre lies on the X-axis and passing through (-2, 3) and (4, 5).
(b) Show that the equation of common tangents to the circle $x^2 + y^2 = 2a^2$ and parabola $y^2 = 8ax$ are $y = \pm(x + 2a)$.

13. (a) Find the mean deviation about the mean for the following data :

Marks Obtained	No. of Students
0—10	5
10—20	8
20—30	15
30—40	16
40—50	6

- (b) Find the variance and standard deviation of the following frequency distribution :

x_i	f_i
6	2
10	4
14	7
18	12
24	8
28	4
30	3

14. (a) Evaluate :

$$\int (6x + 5) \sqrt{6 - 2x^2 + x} \, dx.$$

- (b) Evaluate :

$$\int \frac{dx}{5 + 4 \cos 2x}.$$

15. (a) Evaluate :

$$\int_0^{\pi} \frac{x \sin x}{1 + \sin x} \, dx.$$

- (b) Evaluate :

$$\int_0^1 \frac{\log(1+x)}{1+x^2} \, dx.$$