297

B.C.

Total No. of Questions—**15**

Total No. of Printed Pages—**3** **Regd. No.** | | | | | | | | | | |

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 :

$$\frac{1\cdot2}{1!}+\frac{2\cdot3}{2!}+\frac{3\cdot4}{3!}+\ldots\ldots\ldots=3e.$$

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 :

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