297 **III**

Total No. of Questions – 15 **Regd. No.**

Total No. of Printed Pages – 2

MATHEMATICS (BRIDGE COURSE) for Bi.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 $\frac{5x+6}{(2+x)(1-x)}$ into partial fractions.

2. Show that $\frac{2}{3!}+\frac{4}{5!}+\frac{6}{7!}+\ldots=\frac{1}{e}$.

3. Find the equation of the circle passing through (2, 3) and concentric with the circle $x^2+y^2+8x+12y+15=0$.

4. If the length of the tangent from (5, 4) to the circle $x^2+y^2+2ky=0$ is 1, then find k.

5. Find the mean deviation about the median for the data 13, 17, 16, 11, 13, 10, 16, 11, 18, 12, 17.

6. Find the variance for the discrete data 6, 7, 10, 12, 13, 4, 8, 12.

7. Evaluate $\int \sqrt{1-\cos 2x}\,dx$.

8. Evaluate $\int_2^3 \frac{2x}{1+x^2}\,dx$.

9. Find the order and degree of the differential equation $\frac{d^2y}{dx^2}+2\frac{dy}{dx}+y=\log\left(\frac{dy}{dx}\right)$.

10. Solve the differential equation $\frac{dy}{dx}=\frac{1+y^2}{1+x^2}$.

SECTION – B

$3 \times 15 = 45$

II. Long answer type questions :

(i) Answer any **three** questions.

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

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

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

12. (a) Find the equation of the circle passing through the points (1, 2), (3, – 4), (5, –6).

(b) Find the co-ordinates of the vertex and focus, the equations of the directrix and axes of the parabola $y^2 - x + 4y + 5 = 0$.

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

x_i	10	30	50	70	90
f_i	4	24	28	16	8

(b) Find the mean deviation about the median for the following continuous distribution :

Marks obtained	0–10	10–20	20–30	30–40	40–50	50–60
No. of boys	6	8	14	16	4	2

14. (a) Evaluate $\int \frac{2x+5}{\sqrt{x^2-2x+10}}\,dx$.

(b) Evaluate $\int \frac{dx}{5+4\cos 2x}$.

15. (a) Evaluate $\int_{\frac{\pi}{6}}^{\pi/3} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}\,dx$.

(b) Evaluate $\int_0^{\pi/4} \log(1+\tan x)\,dx$.