

Total No. of Questions – 15

Regd.

Total No. of Printed Pages – 2

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**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

3 × 10 = 30

I. Short answer type questions :

- (i) Answer **all** the questions.  
(ii) Each question carries **three** marks.

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

2. Show that  $1 + \frac{2^2}{2!} + \frac{3^2}{3!} + \dots = 2e$ .

3. If the circle  $x^2 + y^2 - 4x + 6y + a = 0$  has radius 4, then find 'a'.

4. Find the equation of the tangent to  $x^2 + y^2 - 6x + 4y - 12 = 0$  at  $(-1, 1)$ .

5. Find the mean deviation about the mean for the following discrete data :  
6, 7, 10, 12, 13, 4, 12, 16.

6. Find the variance and standard deviation of the following data :  
5, 12, 3, 18, 6, 8, 2, 10.

7. Evaluate  $\int \sin^2 x \, dx$  on R.

8. Evaluate  $\int_0^a \frac{1}{a^2 + x^2} \, dx$ .

9. Find the order and degree of the differential equation  $\left[ \frac{d^2y}{dx^2} + \left( \frac{dy}{dx} \right)^3 \right]^{6/5} = 6y$ .

10. Find the general solution of  $\sqrt{1-x^2} \, dy + \sqrt{1-y^2} \, dx = 0$ .

## SECTION - B

3 × 15 = 45

II. Long answer type questions :

- (i) Answer any **three** questions.  
 (ii) **Each** question carries **fifteen** marks.

11. (a) Resolve  $\frac{3x-18}{x^3(x+3)}$  into partial fractions.

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

12. (a) Find the equation of the circle passing through the points (1, 1), (2, -1) and (3, 2).

(b) Find the co-ordinates of the vertex & focus, the equation of the directrix and axis of the parabola  $y^2 + 4x + 4y - 3 = 0$ .

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

$x_i$	2	5	7	8	10	35
$f_i$	6	8	10	6	8	2

(b) Calculate the variance and standard deviation of the following continuous frequency distribution :

<b>Class interval</b>	30-40	40-50	50-60	60-70	70-80	80-90	90-100
<b>Frequency</b>	3	7	12	15	8	3	2

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

(b) Evaluate  $\int x \tan^{-1} x dx$ .

15. (a) Evaluate  $\int_0^{\pi/2} \frac{dx}{4+5 \cos x}$ .

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