



7. Identify the complementary function of  $(D^2 - 4DD' + 3D'^2)Z = 0$ . CO4- R
- (a)  $\phi_1(y + x) + \phi_2(y + 3x)$  (b)  $\phi_1(y + x) - \phi_2(y + 3x)$   
(c)  $\phi_2(y + 2x) + \phi_1(y + x)$  (d)  $\phi_1(y - x) - \phi_2(y + 3x)$
8. A solution that contains as many arbitrary constants as there are independent variables is called as CO4- R
- (a) singular integral (b) general integral (c) complete integral (d) particular integral
9. Identify the partial differential equation of  $3uxx + 4uxy + 3uy - 2ux = 0$ . CO5- R
- (a) Elliptic (b) Parabolic (a) Elliptic
10. The ends A & B of a rod of length 10cm have their temperature kept at  $20^\circ\text{C}$  and  $70^\circ\text{C}$ . Examine the steady state temperature distribution on the rod. CO5- R
- (a)  $5x + 20$  (b)  $7x + 10$  (c)  $2x + 20$  (d)  $7x - 10$

PART – B (3 x 8 = 24 Marks)

**(Answer any Three of the following Questions)**

11. Illustrate the Fourier Series of CO1-App (8)
- $$f(x) = \begin{cases} x, & 0 \leq x \leq \pi \\ 2\pi - x, & \pi \leq x \leq 2\pi \end{cases} \text{ and deduce}$$
- $$\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots + \infty = \frac{\pi^2}{8}.$$
12. Find the sine and cosine transform of  $e^{-ax}$ ,  $a > 0$ . Hence, Evaluate CO2 -App (8)
- $$\int_0^{\infty} \frac{x^2}{(x^2 + a^2)^2} dx \quad \text{and} \quad \int_0^{\infty} \frac{dx}{(x^2 + a^2)(x^2 + b^2)}.$$
13. Analyze inverse z transform of CO3- App (8)
- $$\frac{8z^2}{(2z-1)(4z-1)} \text{ using Convolution theorem.}$$
14. Analyze  $z = px + qy + p^2 - q^2$ . CO4-App (8)
15. A string is stretched and fastened to points  $x = 0$  and  $x = l$  apart. CO5 -App (8)  
Motion is started by displacing the string into the form  
 $y = k(lx - x^2)$  from which it is released at time  $t = 0$ . Interpret the displacement of any point on the string at a distance of  $x$  from one end at time  $t$ .