BTC305

[1]

Enroll. No. -

SUPPLEMENTARY EXAMINATION : JUNE - JULY, 2017

APPLIED MATHEMATICS - III

Time :3 Hrs

Maximum Marks :70

Note: Attempt questions from all sections as directed.

Section - A **: *Attempt any five questions out of six. Each question carries 06 marks.*** **[30 Marks]**

Q1. Form a partial differential equation by eliminating the arbitrary function from $\phi\left(x+y+z, x^2+y^2-z^2\right)=0$.

Q2. Solve $xp+yq=3z$.

Q3. Obtain the Fourier series to represent

$$f(x)=\frac{(\pi-x)^2}{4}, 0<x<2\pi.$$

Q4. State convolution theorem. Use it to evaluate $L^{-1}\left\{\frac{1}{(s-2)(s+2)^2}\right\}$.

Q5. Solve $\frac{\partial^3 z}{\partial x^3}-3\frac{\partial^3 z}{\partial^2 x \partial y}+4\frac{\partial^3 z}{\partial y^3}=e^{x+2y}$.

Q6. An aeroplane can carry a maximum of 200 passengers. A profit of Rs. 400 is made on each first class ticket and a profit of Rs. 300 is made on each second class ticket. The airline reserves at least 20 seats for first class. However, at least four times as many passengers prefer to travel by second class than the first class. Determine how many tickets of each type must be sold to maximum profit for the airline. Form an LPP and solve it graphically.

Section – B**: *Attempt any two questions out of three. Each question carries 10 marks.*** **[20 Marks]**

Q7. Obtain a half range cosine series for

$$f(x)=\begin{cases} kx, & \text{for } 0\le x\le \frac{m}{2} \\ k(m-x) & \text{for } \frac{m}{2}\le x\le m \end{cases}$$

Deduce the sum of the series $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\ldots\ldots$

Q8. Solve $\left(D^2+DD'-6D'^2\right)z=y\,\text{Sin}x$.

Q9. Find the Laplace transform of each of the following:

(a) $\frac{\text{Sin at}}{t}$ (b) $\frac{1-e^{-t}}{t}$ (c) $\frac{1-\text{Cos t}}{t}$

Section - C : ***Compulsory question*** **[20 Marks]**

Q10. (a) Use Two-phase method to solve the problem:

Min. $Z = \frac{15}{2} x_1 - 3x_2$

subject to constraints

$3x_1 - x_2 - x_3 \geq 3$

$x_1 - x_2 + x_3 \geq 2$

and $x_1, x_2, x_3 \geq 0$

(b) Use Laplace transform to solve $y'' - 4y' + 4y = 64 \sin 2t$ with $y(0)=0$, $y'(0) = 1$.