

PARUL UNIVERSITY
FACULTY OF PHARMACY
Pharm.D, October -2018 Examination

Year: 1

Subject Code: 08207131

Subject Name: Remedial Mathematics

Date: 27/10/2018

Time: 10:00 am to 1:00 pm

Total Marks: 70

Instructions

1. Figures to the right indicate maximum marks.
2. Make suitable assumptions wherever necessary.

Q.1 Essay Type Questions. (any 2 out of 3) (15 Mark Each)

1. a) Define Laplace Transform. Find the Laplace Transform of $\cos t$. (07)
- b) Find $\lim_{x \rightarrow 1} \left(\frac{x^2 - 6x + 5}{2x^2 - 5x + 3} \right)$ if it exists. (04)
- c) For ΔABC , if $\angle A = 30^\circ$, $b = \sqrt{3}$, and $c = 2$, then find a . (04)
2. a) Solve $\frac{dy}{dx} + \frac{1}{x^2} y = 6e^{\frac{1}{x}}$ (07)
- b) Let $A = \begin{bmatrix} 1 & -1 & 1 \\ 3 & 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & 1 \\ 4 & 2 & 1 \\ 1 & 7 & 5 \end{bmatrix}$ find AB . (04)
- c) Find the inverse of $A = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$ (04)
3. a) If $y = 2e^{3x} + 3e^{-2x}$ then prove that $\frac{d^2y}{dx^2} - \frac{dy}{dx} - 6y = 0$. (07)
- b) The motion of a particle is given by $s = t^3 + 2t^2 - 3t + 5$ find the velocity $\left(\frac{ds}{dt} \right)$ at $t=1$. (04)
- c) Evaluate $\cos 0^\circ + 3\sin 0^\circ + 2\sin 90^\circ + 5\cos 90^\circ$ (04)

Q.2 Short Essay Type Questions. (any 4 out of 5) (5 Mark Each)

1. If $y = x^x$, then prove that $\frac{dy}{dx} = x^x(1 + \log x)$ (20)
2. Evaluate $\int_0^1 x e^x dx$.
3. If $A(-1, 3)$, $B(-1, m)$ and $C(4, 3)$ are the vertices of ΔABC and if $\angle B = 90^\circ$ then find the value of m .
4. Show that the points $(5, 1)$, $(1, -1)$ and $(11, 4)$ lie on a straight line.
5. Solve the system $2x + 3y = 1$, $-4x + y = 2$ using matrices.

Q.3 Short Answers. (2 Mark Each)

1. Find the Laplace Transform of the function $f(t)=1$. (20)
2. Solve: $\frac{dy}{dx} = ky$
3. Solve: $xdy - ydx = 0$
4. Find $\frac{dy}{dx}$ for $y = x + \cos 3x - e^{-2x}$
5. Find $\frac{dy}{dx}$ if $x = at^2$, $y = 2at$, $t \neq 0$.
6. Find the mid-point of $(0,0)$ and $(2, 5)$.
7. Evaluate $\int_{-1}^1 x dx$

8. Evaluate $\int_0^{\pi} \cos 2x dx$

9. The line $3x-2y+k=0$ passes through the origin. The value of k is _____.

10. Find $A + B$ if $A = \begin{bmatrix} 1 & 1 \\ -2 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 0 & -3 \\ 2 & 4 \end{bmatrix}$.