

05/08_EM-II_FE_Sem II (R-19)_Inst Name

University of Mumbai

* Required

EM-II_PART-B

1. Q1

(20 Marks Each)	Solve any Four out of Six	5 marks each
A	Solve $(3x^2y^4 + 2xy) dx + (2x^3y^3 - x^2) dy = 0$	
B	Solve $(D^4 - 1)y = e^x + \cos x \cos 3x$	
C	Change the order of integration and evaluate $I = \int_0^a \int_y^{\sqrt{ay}} \frac{x}{x^2 + y^2} dx dy$	
D	Evaluate $I = \iiint z^2 dx dy dz$, over the volume common to the sphere $x^2 + y^2 + z^2 = 1$ and the cylinder $x^2 + y^2 = x$	
E	Find the area between the parabola $y = x^2 - 6x + 3$ and the line $y = 2x - 9$	
F	Prove that $\int_0^\infty \frac{e^x - e^{-ax}}{x \sec x} dx = \frac{1}{2} \log \left(\frac{a^2 + 1}{2} \right), a > 0$	

Files submitted:

2. Q2

(20 Marks Each)	Solve any Four out of Six	5 marks each
A	Solve $\cos x \frac{dy}{dx} + y \sin x = \sqrt{y \sec x}$	
B	Using Method of Variation of Parameters solve $(D^2 + 1)y = \sec x \tan x$	
C	Solve $(D - 2)^2 y = 8(e^{2x} + \sin 2x + x^2)$	
D	Evaluate $I = \int_0^1 \int_0^{1-y} \int_0^{1-x-y} x^2 yz dz dy dx$	
E	Evaluate $I = \int_R \int (3x + 4y^2) dx dy$ where R is the region in the upper half of the area bounded by the circles $x^2 + y^2 = 1$, $x^2 + y^2 = 4$	
F	Show that $\int_0^{2\pi} \sin^2 \theta (1 + \cos \theta)^4 d\theta = \frac{21\pi}{8}$	

Files submitted:

3. Have you uploaded the required correct files *

Mark only one oval.

☐ Yes

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