

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2026		
Program: B. Tech , Scheme : I/B/III III		
Regular/Supplementary Examination: FY Semester: II		
Course Code: BSC201 and Course Name: Engineering Mathematics-II		
Date of Exam: 25.05.2026	Duration: 2.5 Hours	Max. Marks: 60

Instructions:				
(1) All questions are compulsory.				
(2) Draw neat diagrams wherever applicable.				
(3) Assume suitable data, if necessary.				
Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any two questions out of three: (05 marks each)	10		
a)	Find by double integration the area common to the cardioids $r = a(1 + \cos\theta)$ and $r = a(1 - \cos\theta)$	5	5	3
b)	Solve $(xy \sin xy + \cos xy)ydx + (xy \sin xy - \cos xy)x dy = 0$	5	1	3
c)	Solve $(D^4 - 4D^3 + 8D^2 - 8D + 4)y = 0$	5	2	3
Q 2	Solve any two questions out of three: (05 marks each)	10		
a)	Evaluate $\int_0^1 x^6(1 - x^2)^{1/2} dx$	5	3	3
b)	Evaluate $\int_0^{\pi/2} \int_0^{a(1-\sin\theta)} r^2 \cos\theta dr d\theta$	5	4	3
c)	Using Euler's method find the approximate value of y , when $\frac{dy}{dx} = x^2 + y^2$ and $y=1$ when $x=0$ at $y=2$ in five steps.	5	6	3
Q.3	Solve any two questions out of three. (10 marks each)	20		
a)	Evaluate $\iiint \frac{dx dy dz}{(1+x+y+z)^3}$ over the volume of the tetrahedron $x = 0, y = 0, z = 0, x + y + z = 1$	10	5	3
b)	Solve $\frac{dy}{dx} = xy + y^2 e^{(-x^2/2)} \log x$	10	1	3
c)	Solve $(D^2 + 2)y = x^2 e^{3x} + e^x - \cos 2x$	10	2	3

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Q.4	Solve any two questions out of three: (10 marks each)	20		
a)	i) Prove that $\int_0^\infty e^{-ax} \frac{\sin mx}{x} dx = \tan^{-1} \left(\frac{m}{a} \right)$	5	3	3
	ii) Find the length of the curve $y = (x/2)^{2/3}$ from $x=0$ to $x=2$	5		
b)	Change the order of integration and evaluate $\int_0^1 \int_x^{\sqrt{2-x^2}} \frac{xdy dx}{\sqrt{x^2+y^2}}$	10	4	3
c)	Evaluate $\int_0^4 e^x dx$ by using		6	3
	(i) Simpson's 1/3 rd rule	10		
	(ii) Trapezoidal Rule			
