Mahatma Gandhi Mission's College of Engineering and Technology
Kamothe,Navi Mumbai

Branch: ALL **Academic Year: 2020-21**

Course Code: FEC 201 **Course Name: Engineering Mathematics II [Choice Based]**

Assignment 4

Ques. No.	Question	Module	Level*	PI	CO
1	**Choose the correct answer from the options below:** 1.dx.dy is a --------- (A) is a double derivative (B) a differential area (C) derivative of x wrt y (D) double integral **2.** Evaluate the double intergral $\int_0^1 \int_0^1 (x+y)dxdy$ (A) 3/2 (B)1 (C)1/2 (D)-1 **3.** Determine the volume of the solid under $z = 4xy + x^2$ over the rectangle R =[1,2] × [0,3]. (A) 34 (B) 41 (C) 46 (D) 51 4 Given $3\frac{dy}{dx} + y^2 = e^x$, y(0.3) = 5 and using a step size of h=0.3, the value of y(0.9) using Runge-Kutta 4th order method is most nearly (i)-1.6604 (ii) – 1.1785 (iii) - 0. 45831 (iv) 2.7270	4 6	1 1	1.1.1 1.1.1	4 6
2	.Match the following a) $\iint_A f(r,\theta)dA$ i) $\int_a^b \int_{f_1(x)}^{f_2(x)} (x,y)$dydx $b)$ $\iint_A f(x,y)dA$ ii) $\int_{\propto}^{\beta} \int_{f_1(\theta)}^{f_2(\theta)} (r,\theta)$dydx	4	1	1.1.1	4
3	Fill in the blanks i)$\int_0^1 dx \int_0^x e^{\frac{y}{x}}$ dy is……………………………….. ii) $\int_0^{\frac{\pi}{2}} \int_0^{a\cos\theta} r\sin\theta \, dr \, d\theta$ is………………………………	4 4	1	1.1.1 1.1.1	4

			1		4
4	Define the following i)Double Integration in cartesian form ii)Double Integration in polar form	4	1	1.1.1	4
5.	State True or False i) If f is continuous on $[a,b] \times [c,d]$, then $\int_a^b\int_c^d f(x,y)\,dy\,dx = \int_c^d\int_a^b f(x,y)\,dx\,dy$ ii)It is always the case that $\int_0^1\int_0^x f(x,y)\,dy\,dx = \int_0^1\int_0^y f(x,y)\,dx\,dy$. iii)It is true that. $\int_{-1}^1\int_0^{\sqrt{1-x^2}} dy\,dx = \int_0^\pi\int_0^1 r\,dr\,d\theta = 2\int_0^{\pi/2}\int_0^1 r\,dr\,d\theta$	4	1	1.1.1	4
6 i).	Evaluate ▪ $\int_{-1}^1\int_{-2}^2 (x^2-y^2)\,dy\,dx$	4	2	1.1.1	4
ii)	▪ $\int_{-4}^4\int_0^{x^2} \sqrt{64-x^3}\,dy\,dx$	4	2	1.1.1	4
iii)	Show that $\int_1^2\int_3^4 (xy+e^y)dydx = \int_3^4\int_1^2 (xy+e^y)dxdy$	4	2	1.1.1	4
iv)	Evaluate $\int_0^\pi\int_0^{\pi/2} \sin x\cos y\, dydx$	4	2	1.1.1	4
v)	Evaluate:- $\int_0^4\int_0^{x-1} 3xydydx$	4	2	1.1.1	4
vi)	Evaluate $\iint (4x-y^3)\,dxdy$ where region bounded by the curves $y=\sqrt{x}$, $y=x^3$, x=0, x=1	4	2	1.1.1	4
vii)	Evaluate $\iint e^{\frac{x}{y}}$dxdy where y varies from 1 to 2 and x varies from y to y^3	4	2	1.1.1	4
viii)	Evaluate $\iint r^3 drd\theta$ over the region between the circle r=2sin(θ) and r=4sin(θ)	4	2	1.1.1	4

7 i	Evaluate $\iint xy(x+y)dxdy$ over the region bounded by $x^2 = y, y = x$.	4	2	1.1.1	4
ii	Find the area bounded by the parabolas $y^2 = 4-x, y^2 = 4-4x$ as a double integral and evaluate it.	4	2	1.1.1	4
iii	Evaluate $\iint ydxdy$ over the region enclosed by the parabola $x^2 = y$ and the line y=x+2	4	2	1.1.1	4
	Change the order of integration and hence evaluate $\int_1^3 \int_{y=0}^{6/x} x^2 dydx$	4	2	1.1.1	4
	Change the order of integration in $\int_0^a \int_{a-y}^{\sqrt{a^2-y^2}} ydxdy$ and hence evaluate it	4	2	1.1.1	4
	By changing to polar co-ordinates find the value of the integral $\int_0^{2a} \int_0^{\sqrt{2ax-x^2}} (x^2+y^2)dydx$	4	2	1.1.1	4
	By changing to polar co-ordinates show that $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)}dxdy = \frac{\pi}{4}$. Hence evaluate $\int_0^\infty e^{-t^2} dt$.	4	2	1.1.1	4
8	a)Using Euler's method , to solve the differential equation $\frac{dy}{dx}$ = -y with y(0) = 1 taking h = 0.01 at x = 0.04 b)Use Euler's Modified Method to solve the differential equation $\frac{dy}{dx}$ = x – y ^{2} , y(0) = 1 for (i) x = 0.2 and (ii) x = 0.4	6	2	1.1.1	6
9	My Ideas Explain how you will use double integration in real life .Give some example	4	3	1.1.1	4