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 3

Question No.	Questions	Module	Level*	PI	CO
Q1.	.Match the following (a) $\beta\,(p,q)$ 1) $\Gamma 1/2$ (b) $\frac{\Gamma m\,\Gamma n}{\Gamma m+n}$ 2) $\int_0^\infty \frac{y^{p-1}}{(1+y)^{(p+q)}}\,dy$ (c) $\sqrt{\pi}$ 3) $\beta\,(m,n)$ $(d)\,\frac{\pi}{Sin\,p\pi}$ 4) 0 5) Γp Γ1-p	3	1	1.1.1	3
Q2	Choose the correct alternative in each of the following: (a)The value of $\int_0^\infty \sqrt{y}e^{-y^3}$dy is (i) $\frac{\sqrt{\pi}}{2}$ (ii) $\frac{\sqrt{\pi}}{3}$ (iii) $\sqrt{\pi}$ (iv) $\frac{\sqrt{\pi}}{6}$ (b) If B(n,2) = 1/6 , and n is a positive integer , then the value of n is (i)3 b) -2 c) 2 d) -3 (c) The value of $\int_0^\infty \frac{t^2}{1+t^4}$dt is $(i)\,\frac{\pi}{2\sqrt{2}}$ b) $\frac{\sqrt{\pi}}{2}$ c) $\frac{\pi}{2}$ d) $\frac{\pi}{4}$	3	1	1.1.1	3

Q3	**State True or False** 1)The length of the curve $x = \frac{y^4}{4} + \frac{1}{8y^2}$ is $\frac{123}{32}$ 2) The length of the curve given by $\theta = f(r)$ is $S=\int_{\theta_1}^{\theta_2} \sqrt{r^2 + (\frac{dr}{d\theta})^2}\, d\theta$ 3) The length of the curve given by $r = f(\theta)$ is $S=\int_{r_1}^{r_2} \sqrt{1 + r^2(\frac{d\theta}{dr})^2}\, dr$	3	1	1.1.1	3
Q4.	1.Show that $\int_0^{\infty} (x+1)^2 e^{-x^3} dx = \frac{1}{3}\left[1+\Gamma(\frac{1}{3})+2\Gamma(\frac{2}{3})\right]$ 2. State and prove Duplication formula 3. Show that $\int_0^{\pi/6} \sin^2 6\theta \cos^6 3\theta d\theta = \frac{7\pi}{384}$	3	2,3	1.1.1	3
Q5.	1.Assuming the validity of differentiation under integral sign prove that $\int_0^{\pi/2} \frac{\log(1+cos\alpha cosx)}{cosx} dx = \frac{\pi^2 - 4\alpha^2}{8}$ 2. Evaluate $\int_0^{\infty} \frac{e^{-x}}{x}(1-e^{-ax})dx$ a> -1 3. Show that $\int_0^{\infty} \frac{(tan^{-\frac{x}{a}} - tan^{-\frac{x}{b}})}{x} dx = \frac{\pi}{2}\log\left(\frac{b}{a}\right)$ where a>0,b>0 4.*Evaluate* $\int_0^{\frac{\pi}{2}} \frac{dx}{a+bcosx}$, $a > 0, b > 0$. *And deduce that* $\int_0^{\pi} \frac{dx}{(a+bcosx)^2} = \frac{\pi b}{(a^2-b^2)^{3/2}}$ *and* $\int_0^{\pi} \frac{cosx dx}{(a+bcosx)^2} = -\frac{\pi b}{(a^2-b^2)^{3/2}}$	3	2,3	1.1.1	3

Q.6	1.Find total length of loop of curve $9y^2 = (x+7)(x+4)^2$ 2. Show that the length of the parabola $y^2 = 4ax$ from the vertex to the end of the latus rectum is a $[\sqrt{2} + \log(1+\sqrt{2})]$. Hence prove that length of the arc cut off by the line $3y = 8x$ is a $[\log 2 + \frac{15}{16}]$ 3.Find the length of cardiode r = a cos θ lying inside the circle r = a(1 – cos θ) 4. Find the total length of the curve $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$	3	2,3	1.1.1	3
Q.7	Illustrate Rectification	3	4	1.1.1	3