GLA University, Mathura

A

First- Mid Term Examination 2012-13

Course: - B.Tech

I-Year, II-Sem.

Subject: - Mathematic –II (AHM-102)

Uni. Roll No:-

Time:- 1 Hrs. 30 Minutes

Total Marks:- 20

Notes:-

1) Attempt **ALL** groups.
2) **ALL** questions of group A are compulsory. Attempt **ANY TWO** questions from Group B and **ANY TWO** questions from Group C.
3) All questions of a group should be answered at one place.
4) Answer should be brief and to-the-point.
5) Any missing or wrong data may be assumed suitably giving proper justification.

Section –A (0.5x10 = 5marks)

Q.1 In spherical polar coordinate dxdydz is replaced by

* $r^2 \sin\phi \, dr \, d\theta \, d\phi$ * $r^2 \sin\theta \, dr \, d\theta \, d\phi$ * $r^2 \sin 2\theta \, dr \, d\theta \, d\phi$ * $r^2 \sin^2\theta \, dr \, d\theta \, d\phi$

Q.2 The value of $\Gamma\left(\frac{1}{4}\right)\Gamma\left(\frac{3}{4}\right)$ is

* 2π * $\pi\sqrt{2}$ * $\sqrt{2\pi}$ * π

Q.3 Integral $\int_0^{2\pi} \sin^2 nx \, dx$ is equal to

* 2π * $\pi\sqrt{2}$ * $\sqrt{2\pi}$ * π

Q.4 The value of $\int_0^1 \int_0^1 e^x \, dy \, dx$ is

* -1 * 0 * 1 * 2

Q.5 The value of $\Gamma\left(-\frac{1}{2}\right)$ is

* $\sqrt{2}$ * $-\sqrt{2\pi}$ * $-2\sqrt{\pi}$ * $\sqrt{\pi}$

Q.6 For $\int_0^\infty \int_0^\infty f(x,y)\,dxdy$ the change of order of integration is

* $\int_0^\infty \int_0^\infty f(x,y)\,dxdy$ * $\int_0^\infty \int_0^\infty f(x,y)\,dydx$ * $\int_0^\infty \int_0^x f(x,y)\,dydx$ * None of these

Q.7 The value of $\int_0^\infty e^{-x}(x)^{\frac{1}{m}}dy$ is

*$\Gamma(m)$ * $\Gamma(m+1)$ *$m\Gamma(m)$ *None of these

Q.8 The transformation $x+y=u, \quad y=uv$ transforms the area element $dy\,dx$ into **J** du dv, where **J** is equal to

* 1 * u * -1 * None of these

Q.9 Integral $\int_0^\infty e^{-x}\, x^{11}dx$

* $\Gamma(11)$ * $\Gamma(12)$ * $\Gamma(10)$ *$\Gamma(n)$

Q.10 $\int_0^1\left(\log\frac{1}{y}\right)^{p-1}dx$ is equal to

* $\Gamma(p-1)$ * $\Gamma(p+1)$ * $\Gamma(p)$ * *none of these*

Section –B (2.5x2 = 5marks)

Q.1 Change into polar coordinate and evaluate $\int_0^a\int_0^{\sqrt{a^2-x^2}} y^2\left(x^2+y^2\right)dy\,dx$

Q.2 Prove that $\beta(n,3)=\frac{1}{3}$, find n, where n is a positive integer.

Q.3 Evaluate $\iiint_R (x-2y+z)\,dxdydz$ where $0\le x\le 1,\quad 0\le y\le x^2,\quad 0\le z\le x+y$

Section –C (5x2 = 10 marks)

Q.1 Change the order of the integration and evaluate $\int_0^2\int_{\frac{x}{2}}^{1}\frac{x^2}{\sqrt{x^4-4y^2}}dx\,dy$

Q.2 Find the Fourier series representing $f(x)=e^{-x}$ in the interval $0<x<2\pi$.

Q.3 Evaluate $\iiint x^{l-1}\,y^{m-1}z^{n-1}\,dx\,dy\,dz$ integrated over the region in the first octant below the surface $\left(\frac{x}{a}\right)^p+\left(\frac{y}{b}\right)^q+\left(\frac{z}{c}\right)^r=1$.