R15/R14

ANURAG Engineering College
(An Autonomous Institution)
I B.Tech II Semester Supplementary Examinations, Jan/Feb-2024
MATHEMATICS – II
(COMMON TO ALL BRANCHES)

Time: 3 Hours **Max. Marks: 75**

Section – A (Short Answer type questions) (25 Marks)
Answer All Questions

		Course Outcome	B.T Level	Marks
1.	State convolution Theorem	CO1	L1	2M
2.	Find $L\{\cosh^2 2t\}$	CO1	L2	3M
3.	Find the value of $\Gamma\left(\dfrac{9}{2}\right)$	CO2	L2	2M
4.	Find the value of $\int\limits_0^\infty e^{-x^2}dx$	CO2	L2	3M
5.	Evaluate $\int\limits_{y=0}^{\frac{\pi}{2}}\int\limits_{x=-1}^{1} x^2 y^2 dxdy$	CO3	L2	2M
6.	Find the divergence of the vector function $\bar{F}=2x\bar{i}+3xy\bar{j}-yz^2\bar{k}$ at (-1, 0, 2)	CO3	L2	3M
7.	State Gauss Divergence Theorem	CO4	L1	2M
8.	Find $\int\limits_C \bar{F}.d\bar{r}$ where $\bar{F}=3xy\bar{i}-y^2\bar{j}$ and C is the curve $y = 2x^2$ from (0, 0) to (1, 2)	CO4	L2	3M
9.	Write the formula for the Fourier series of Half range Sine series in $(0, \pi)$	CO5	L1	2M
10.	Find the independent term in the Fourier series of $f(x)=x+x^2$ in (-π, π)	CO5	L2	3M

Section B (Essay Questions)
Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

		Course Outcome	B.T Level	Marks
11. A)	Find $L\left\{\dfrac{e^{-3t}\sin 2t}{t}\right\}$	CO1	L3	10M
	OR			
B)	Using Laplace Transforms, solve the differential equation $\dfrac{d^2y}{dt^2}+2\dfrac{dy}{dt}+2y=5\sin t, y(0)=0, y'(0)=0$	CO1	L3	10M
12. A)	Evaluate $\int\limits_0^2 x\left(8-x^3\right)^{1/3}dx$	CO2	L3	10M
	OR			
B)	Evaluate $\int\limits_0^{\pi/2} \sin^{7/2}\theta\cos^5\theta d\theta$	CO2	L3	10M

13. A) Change the order of integration and evaluate $\int\limits_{0}^{4a}\int\limits_{x^2/4a}^{2\sqrt{ax}} dy\,dx$ CO3   L3   10M

OR

B) Find the directional derivative of the scalar point function $\phi(x,y,z) = 4xy^2 + 2x^2yz$ at the point A(1, 2, 3) in the direction of the line AB where B = (5, 0, 4)   CO3   L3   10M

14. A) Use Gauss Divergence Theorem to evaluate $\iint\limits_{S} \bar{F}.\bar{n}\,ds$ where $\bar{F} = x^2\bar{i} + y^2\bar{j} + z^2\bar{k}$ and S is the surface bounded by the planes x = 0, y = 0, z = 0 and x + y + z = a   CO4   L3   10M

OR

B) Verify Green's theorem for $\oint\limits_{C}(xy + y^2)dx + x^2dy$ where C is bounded by y = x and y = x²   CO4   L3   10M

15. A) Obtain the Fourier series of $f(x) = \dfrac{\pi - x}{2}$ in (0, 2π)   CO5   L3   10M

OR

B) Find the Half range cosine series of $f(x) = \begin{cases} x, & 0 < x < \dfrac{\pi}{2} \\ \pi - x, & \dfrac{\pi}{2} < x < \pi \end{cases}$ CO5   L3   10M