



R17 Regulation

Subject code:1B2AG

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech I Year II Semester supplementary Examinations, July 2025

MATHEMATICS - II

(Common to *EEE, ECE, CSE & IT*)

Maximum Marks: 70

Date:11.07.2025 Duration: 3 hours

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

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| 1 | Write the relation between Beta and Gamma function. |
| 2 | Evaluate $\Gamma(\frac{7}{2})$ |
| 3 | Evaluate $\int_0^1 \int_0^2 (xy) dy dx$ |
| 4 | Find the limits of the integration where the region bounded by the x-axis, ordinate at $x = 2a$ and the parabola $x^2 = 4ay$. |
| 5 | Define gradient of a scalar point function. |
| 6 | Write the formula to find a unit normal vector to the surface $f(x,y,z)$. |
| 7 | State gauss divergence theorem. |
| 8 | Which vector integral theorem gives a relation between line and surface integrals |
| 9 | State first shifting theorem |
| 10 | Find $L^{-1}(\frac{1}{(s+1)^2+1})$ |

Part-B

Answer the following questions (5X10M=50Marks)

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|----|--|
| 11 | Prove that $\int_0^1 \frac{x^{m-1}(1-x)^{n-1}}{(x+a)^{m+n}} dx = \frac{B(m,n)}{a^n(1+a)^m}$ (10M) |
| OR | |
| 12 | Evaluate $\int_0^2 (8 - x^3)^{1/3} dx$ using $\beta - \Gamma$ functions. (10M) |
| 13 | Find $\int \int_R x^2 dx dy$ over the region bounded by hyperbola $xy=4$; $y = 0$; $x = 1$; $x = 4$. (10M) |
| OR | |
| 14 | Evaluate $\int_0^1 \int_0^x \int_0^{x+y} (x+y) dz dy dx$ (10M) |
| 15 | A. Prove that $\text{div curl } \vec{f} = 0$ (5M)
B. Find the angle between the surface $xy^2z = 3x+z^2$ and $3x^2 - y^2 + 2z = 1$ at $(1,-2,1)$ (5M) |

OR

16	Prove that if \vec{r} is the position vector of any point in space, then $r^n \vec{r}$ is irrotational. (10M)
17	Find the work done by $\vec{F} = (2x - y - 3)\vec{i} + (x + y - z)\vec{j} + (3x - 2y - 5z)\vec{k}$ along a curve C, $x^2 + y^2 = 4 : z = 0$ (10M)
OR	
18	Verify Stokes theorem for $F = y^2 \vec{i} + y \vec{j} - 3x \vec{k}$ and S is the upper half of the sphere $x^2 + y^2 + z^2 = a^2$ and $z \geq 0$ (10M)
19	Find $L\left(\frac{\cos at - \cos bt}{t}\right)$ (10M)
OR	
20	Find $L^{-1}\left[\frac{s^2}{(s^2 + a^2)(s^2 + b^2)}\right]$ using convolution theorem. (10M)