

Enroll No

K.E.Society's
Rajarambapu Institute of Technology, Rajaramnagar
 (An Empowered Autonomous Institute, affiliated to SUK)
Unit Test -II (2025-26)
S.Y. B.Tech.- Electrical Engineering

Q.P.Code
UT 3157

Course Code- EE211
Day & Date: Friday 19.09.2025
Time: 11.45.a.m.to 12.45.p.m.

Course Name: Mathematics for Electrical Engineering

Max Marks- 25

- Instructions:** 1) All questions are compulsory.
 2) Figures in rounded () brackets within the question, indicate the scheme of marking for respective part of the question, whereas, figures in the first right column indicate total marks for that whole question.
 3) CO is the index number of the Course Outcome statement.
 4) The Bloom's taxonomy level (BL) for 1,2,3,4,5 and 6 is remember, understand, apply, analyze, evaluate and create respectively.
 5) Assume suitable data if necessary.
 6) Use of non-programmable calculators is allowed

- Q.1** Attempt the following 15M COs BL
- a) Find directional derivative $\phi = xy^2 + yz^3$ at (2,-1,1) in the direction $i + 2j + 2k$ 5M CO-3 1
- b) Find the $\text{div}\vec{F}$ & $\text{curl}\vec{F}$ where $\vec{F} = (x^2 - yz)i + (y^2 - zx)j + (z^2 - xy)k$ 5M CO-3 1
- OR
- b) If $\vec{F} = (X + 2y + az)i + (bx - 3y - z)j + (4x + cy + 2z)k$ CO-3 2
 Is irrotation find a, b, c. 5M
- c) If \vec{a} & \vec{b} are constant, $\vec{r} = \vec{a} \cos nt + \vec{b} \sin nt$ show that 5M CO-3 3
 i) $\vec{r} \times \frac{d\vec{r}}{dt} = n(\vec{a} \times \vec{b})$ (2M) ii) $\frac{d^2\vec{r}}{dt^2} + n^2\vec{r} = 0$ (3M)
- Q.2** Attempt the following 10M COs BL
- a) The probability density function of a variable X is, 5M
- | | | | | | | |
|------------|-----|----|-----|----|-----|---|
| X | -2 | -1 | 0 | 1 | 2 | 3 |
| $P[X = x]$ | 0.1 | K | 0.2 | 2K | 0.3 | k |
- i) Find value of k. (1M) ii) Mean (2M) iii) Variance (2M)
- OR
- a) The probability continuous function of a variable X is, 5M CO-4 2
 $f(x) = kx^2, -1 < x < 2$
 i) Find value of k. (1M) ii) Mean (2M) iii) Variance (2M)
- b) The probability that a person who undergoes a kidney operation will cover is 0.7. Find the probability that of the six patient who undergo similar operations. CO-4 3
- i) All will recover (2M) ii) At least one recover (3M) 5M

