Code No. 3444

FACULTY OF ENGINEERING AND TECHNOLOGY

B.E. / B.Tech. (Bridge Course) II-Semester (Backlog) Examination, June / July 2017

Subject : Mathematics

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

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 A coin is tossed once. Find the probability of getting a head. 2

2 If $P(A)=\frac{3}{8}$, $P(B)=\frac{1}{2}$ and $P(A\cap B)=\frac{1}{4}$, find $P(A\cup B)$. 3

3 State Rolle's theorem. 2

4 Find the radius of curvature of the circle $x^2 + y^2 = 9$ at (3, 0). 3

5 Evaluate $\int \frac{2x+4}{x^2+4x+2}\,dx$ 2

6 Evaluate $\int_0^1\int_0^1 (x+y)\,dx\,dy$ 3

7 Find a unit normal vector to the surface xyz = 4 at (1, 2, 2). 2

8 Find the value of 'a' such that the vector $\vec{F}=(x+3y)\hat{i}+(y-2z)\hat{j}+(x+az)\hat{k}$ is solenoidal. 3

9 State the relation between beta and gamma functions. 2

10 Define error function. Show that erf(-x) = - erf(x). 3

PART – B (50 Marks)

11 a) Calculate the mean and standard deviation for the following data giving the age distribution of 542 members. 5

Age (in years)	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of members	3	61	132	153	140	51	2

b) If P(A) = 0.4 , P(AUB) = 0.7 and A, B are independent events, find P(B). 5

12 a) State and prove Lagrange's mean value theorem. 5

b) Find the envelope of the family $\frac{x}{a}\cos\alpha+\frac{y}{b}\sin\alpha=1$, where ~ is a parameter. 5

13 a) Evaluate $\iint_R xy\,dx\,dy$ over the area between $y = x^2$ and y = x. 5

b) Evaluate $\int_{-1}^{1}\int_{0}^{z}\int_{x-z}^{x+z}(x+y+z)\,dy\,dx\,dz$. 5

..2

OU - 1607 OU - 1607

14 a) Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at (2, -1, 2). 5

b) If $\vec{F} = 2xyz\,\hat{i} + xz\hat{j} + 3x^2y\hat{k}$, then find $\nabla \cdot \vec{F}$ and $\nabla \times \vec{F}$. 5

15 a) Evaluate $\int_0^\infty \sqrt{x}\, e^{-x^2}\, dx$ using gamma function. 5

b) Show that $\beta(m,n) = \beta(m+1,n) + \beta(m,n+1)$. 5

16 a) State and prove addition theorem of probability. 5

b) Expand $f(x) = e^x \sin x$ in Taylor series about x = 0. 5

17 Verify Green's theore form $\oint_C (3x^2 - 8y^2)dx + (4y - 6xy)dy = 0$, where C is the boundary of the region defined by $y = x^2$ and $y^2 = x$. 10

******

OU - 1607 OU - 1607