G.R. No. |

Paper Code - U218-911 (T2)

OCTOBER 2018/ IN-SEM (T2)
S. Y. B. TECH. (CIVIL ENGINEERING) (SEMESTER - I)

COURSE NAME: Engineering Mathematics III

COURSE CODE: CVUA21171

(PATTERN 2017)

Time: [**1Hour**]   [Max. Marks: **30**]

(*) **Instructions to candidates:**
1)   **Answer Q.1 OR Q.2 and Q.3 OR Q.4.**
2)   **Figures to the right indicate full marks.**
3)   **Use of scientific calculator is allowed**
4)   **Use suitable data whereever required**

Q.1)

a) The first four moments of a distribution about the value 30.2 are 0.255, 6.222, 30.211 and 400.25. Calculate the first four moments about the mean and comment upon the skewness and kurtosis. Also find mean and variance.

[6 marks]

b) Obtain regress lines for the following data

X	2	3	5	7	9	10	12	15
Y	2	5	8	10	12	14	15	16

Also estimate y when x = 6   [6 marks]

c) In a certain city 4000 tube lights are installed. If the lamps have average life of 1500 burning hours with standard deviation 100 hours. How many lamps will last beyond 1600 hours. (Given Area corresponding to z=1 is 0.3413)

[4 marks]

OR

Q.2)

a) For the following distribution find first four moments about the mean .Also find β_1 & β_2

X	2	2.5	3	3.5	4	4.5	5
F	5	38	65	92	70	40	10

[6 marks]

b) The regression line of y on x is 8x-10y= -66 and regression line of x on y is 40x -18y=214.The value of variance of x is 9.Find

1) The mean value x and y   2) The correlation coefficient between x and y.

3) The standard deviation of y.   [6 marks]

c) According to past record of one day internationals between India and Pakistan, India has won 15 matches and lost 10.If they play a series of 6 matches now, what is the probability of India winning the series?(Draw is ruled out)

[4 marks]

Q.3)

a)Show that vector field $\vec{F} = (2xz^3 + 6y)\vec{i} + (6x - 2yz)\vec{j} + (3x^2z^2 - y^2)\vec{k}$ is irrotational and hence find corresponding scalar field ϕ such that $\vec{F} = \nabla\phi$

[6 marks]

b) Find directional derivative of $xy^2 + yz^3$ at $(2,-1,1)$ along the line

$2(x-2) = (y+1) = (z-1)$

[4 marks]

c) Show that $\nabla^2 \left[\nabla.\left(\frac{\vec{r}}{r^2}\right)\right] = \frac{2}{r^4}$

[4 marks]

OR

Q.4)

a) Show that vector field $f(r)\vec{r}$ is always irrotational and determine f(r) so that $f(r)\vec{r}$ is solenoidal vector field.

[6 marks]

b) Show that $\nabla\left(\frac{\vec{a}.\vec{r}}{r^n}\right) = \frac{\vec{a}}{r^n} - \frac{n(\vec{a}.\vec{r})}{r^{n+2}}\vec{r}$

[4 marks]

c) Find the directional derivative of $\emptyset = e^{2x-y-z}$ at $(1,1,1)$ in the direction of tangent to the curve $x = e^{-t}, y = 2sint + 1, z = t - cost$ at t=0

[4 marks]

##end##