Government College of Engineering, Amravati

(An Autonomous Institute of Government of Maharashtra)

B. TECH IV Engg. Mathematics IV SHU 401 CT2 Dt: 08/03/2016 Time 1 Hour

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SOLVE ANY FIVE (15)

1. If $V = R^3$ is a vector space of ordered triples of real numbers with usual operations addition and scalar multiplication . determine whether the subset $W = \{(x, y, z)\ either\ x = y\ or\ y = z\}$ is a subspace of V or not.

2. Six dice are thrown 729 times. By using binomial distribution find how many times do you expect at least three dice to show a five or six ? 233

3. Find the distribution function for random variable x whose density function is

$$f(x) = {}^{x}/_{2} \qquad 0 \le x \le 2$$
$$= 0 \qquad \text{otherwise}$$

$0 \quad x<0$
$\frac{x^2}{4} \quad 0\le x\le 2$
$1 \quad x>2$

4. A random variable x has density function $f(x) = {}^{c}/_{x^2+1}$, $\quad -\infty < x < \infty$.

$1/\pi \qquad \frac{1}{2} + \frac{1}{\pi}\tan^{-1}x$

Find i) constant c, ii) distribution function and iii) $P(^1/_3 \le x^2 \le 1)$ 0.0216

5. Six dice are thrown 6400 times using Poisson distribution, determine the approximate probability of getting heads x times?

6. Define vector space with all axioms.

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CT- II Summer -2019 SHU401 ENGG. MATHS-IV (EE/ET/IN) Marks :15

TIME- 1 HOUR Date: 05/03/2019

Q .1) A dice is thrown 6 times. If "getting an odd number" is a "success". What is the Probability of

i) 5 successes ii) At least 5 successes iii) At most five success. (03)

Q.2) Attempt any four: (12)

a) Find basis for the null space of $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 2 & 0 \\ 0 & 1 & 1 \end{bmatrix}$

b) Check whether the set $S = \{(-1,2,3), (2,5,7), (3,7,10)\}$ is linearly dependent on R^3.

c) Show that the vectors $\vec{v}_1 = (2,-1,3)$, $\vec{v}_2 = (4,1,2)$ and $\vec{v}_3 = (8,-1,8)$ do not span R^3.

d) Two cards are drawn from a well shuffled pack of 52 cards. Find the probability they are both aces, if first card is i) replaced ii) Not replaced.

e) Let $T_1: R_2 \to R_3$ and $T_2 : R_2 \to R_2$ be transformation given by,

$T_1(x_1,y_1) = (2x_1, y_1, x_1+y_1)$ and $T_2(x,y) = (x+y, y)$. Show that T_1 and T_2 are linear transformations.