VIT
Vellore Institute of Technology

Fall Semester – 2019-2020
Continuous Assessment Test – II
Programme Name & Branch : B.Tech./M.Tech.

Course Code & Name : MAT2001 – Statistics for Engineers
Exam Duration : 90 Minutes

Slot : B2+TB2
Maximum Marks : 50

Instruction: Use of Statistical table is allowed.

Answer ALL the Questions

Each question carries equal marks (5 × 10 = 50 Marks)

1. Given the data :

x :	0	1	2	3	4	5	6	7	8	9
y :	9.1	7.3	3.2	4.6	4.8	2.9	5.7	7.1	8.8	10.2

Fit a regression curve of the form $y = \beta_0 + \beta_1 x$ and also, find the estimate value of y at when $x = 2$.

[10 M]

2. An insurance sales representative sells policies to 5 men, all of identical age and in good health. According to the actuarial tables, the probability that a man of this particular age will be alive 30 years is $\frac{2}{3}$. Find the probability that in 30 years (i) all 5 men, (ii) at least 3 men, (iii) only 2 men, (iv) at least 1 man will be alive.

[10 M]

3. Suppose that buses arrive are scheduled to arrive at a bus stop at noon but are always X minutes late, where X is an exponential random variable with probability density function $f(x) = \lambda e^{-\lambda x}$, $x > 0$. Suppose that you arrive at the bus stop precisely at noon.
   (a) Compute the probability that you have to work for more than five minutes for the bus to arrive.
   (b) Suppose that you have already waiting for 10 minutes. Compute the probability that you have to wait an additional five minutes or more.

[10 M]

4. Two groups A and B, each consist of 100 people who have a disease. A serum is given to Group A but not to Group B (which is called the *control group*); otherwise, the two groups are treated identically. It is found that in Groups A and B, 75 and 65 people, respectively, recover from the disease. Test the hypothesis that the serum helps to cure the disease using a level of significance of (i) 0.01, (ii) 0.05. And also find the P value of the test.

[10 M]

5. You independently draw 100 data points from a normal distribution.
   (a) Suppose you know that the distribution is $N(\mu, 4)(4 = \sigma^2)$ and you want to test the null hypothesis $H_0 : \mu = 3$ against hypothesis $H_1 : \mu \neq 3$. If you want a significance level of $\alpha = 0.05$. What is your rejection region? (*You must state clearly that what test statistic you are using*).
   (b) Suppose that the 100 data points have sample mean 5. What is the P-value for this data? Should you reject H_0?

[10 M]

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