

**VIT**

Vellore Institute of Technology

**Continuous Assessment Test –II**

Programme Name &amp; Branch: B.Tech &amp; MIS

Exam Duration: 90 mins

Slot: E2+TE2

Semester: Winter Semester 2019-20

Maximum Marks: 50

Course Code: MAT 2001

Course Title: Statistics for Engineers

Exam Type: Closed book

General Instructions: 1. Use of statistical table is allowed

2. Non-programmable scientific calculator is allowed.

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Exam Duration: 90 minutes

Maximum Marks: 50

Answer any Five questions

1. A group of twelve children participated in a psychological study designed to assess the relationship, if any between age,  $x$  (in years) and Average Total Sleep Time (ATST)  $y$  (in minutes). To obtain a measure for ATST, recordings were taken on each child on five consecutive nights and then averaged. The results obtained are shown in the table given below. Calculate the correlation coefficient between  $x$  and  $y$  and interpret your results.

Child	A	B	C	D	E	F	G	H	I	J	K	L
Age ( $x$ )	4.4	6.7	10.5	9.6	12.4	5.5	11.1	8.6	14.0	10.1	7.2	7.9
ATST ( $y$ )	586	565	515	532	478	560	493	533	575	490	530	515

[10]

2. Find the regression lines of Sales on Advertisement expenditure ( $X$ ) and Advertisement expenditure on Sales ( $Y$ ) from the data given below.

Sales ( $X$ ) (Rs.Crores)	14	16	18	20	24	30	32
Adv. Exp. ( $Y$ ) (Rs.Lakhs)	52	62	65	70	76	80	78

Estimate :

- (a) The Sale for advertising expenditure of Rs. 100 lakhs  
(b) The advertisement expenditure for sales of Rs. 47 crores

[10]

3. a) The mean and variance of a binomial distribution are 4 and 3 respectively. Find  $P(X = 0)$ ,  $P(X = 1)$  and  $P(X \geq 2)$ . [5]
- b) The number of monthly breakdown of a computer is a random variable having a Poisson distribution with mean equal to 1.8. Find the probability that this computer will function for a month with (i) only one breakdown (ii) at least one breakdown. [5]
4. The time (in hours) required to repair watch is exponentially distributed with parameter  $= \frac{1}{2}$ . (i) what is the probability that the repair time exceeds two hours? (ii) what is the probability that a repair takes more than eleven hours given that its duration exceeds eight hours. With mean 120 days, find the probability that such a watch will (iii) have to set in less than 24 days and (iv) not have to be reset in at least 180 days. [10]
5. The mean breaking strength of the cables supplied by a manufacturer is 1800 with a standard deviation of 100. By a new technique in the manufacturing process, it is claimed that the breaking strength of the cable has increased. In order to test this claim, a sample of 50 cables is tested and it is found that the mean breaking strength is 1850. Can the claim be supported at 1% Level of Significance. [10]
6. In a referendum submitted by the students to the body at a university, 850 men and 560 women voted. 500 men and 320 women voted favourably. Does this indicate a significant difference of opinion between men and women on this matter at 1% Level of Significance? [10]

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