VIT-AP UNIVERSITY

Name of the Examination: WINTER 2023-24-CAT-1

Course Code: MAT 1011
Set Number: 01
Duration: 90 minutes

Course Title: Applied Statistics
Date of Examination: 06/02/2024 (FN)(B1)
Total Marks: 50

1. The age distribution of 400 persons in a colony having median age 32 is given below

Age(In years)	$20-25$	$25-30$	$30-35$	$40-45$	$45-50$	$50-60$
Number of Students	110	a	b	75	55	30

(a) Find the value of a and b.
(b) Find the *mean* and *mode* of the above distribution. 15 **M**

2. Two plants C and D of a factory show the following results about the number of workers and the wages paid to them.?

No. of workers	500	6000
Average monthly wages($)	2500	2500
Standard deviation	9	10

Using coefficient of variation formulas, find in which plant, C or D, is there greater variability in individual wages. **5M**

3. We roll a fair die twice and obtain two numbers X_1= result of the first roll and X_2= result of the second roll. We know that $X_1 + X_2 = 6$, what is the probability that $X_1 = 3$ or $X_2 = 3$? **10M**

4. A total of 48 percent of the women and 37 percent of the men that took a certain "quit smoking" class remained nonsmokers for at least one year after completing the class. These people then attended a success party at the end of a year. If 62 percent of the original class was male, what percentage of those attending the party were women?

10M

5. The resistance X of an electrical component has a probability density function

$$f(x) = \begin{cases} \frac{x}{3} & 0 \le x \le 2 \\ 0 & \text{otherwise.} \end{cases}$$

(a) Calculate the cumulative distribution function.
(b) What is the probability that the electrical component has a resistance between 1 and 1.5?

10M

VIT-AP UNIVERSITY

QUESTION PAPER

Name of the Examination: Winter 2023-24 – CAT 1

Course Code: MAT1011 **Course Title: Applied Statistics**

Set number: 04 **Date of Exam:** 06/02/2024 (AN) (B2)

Duration: **Total Marks: 50**

Instructions:

1. Assume data wherever necessary.
2. Any assumptions made should be clearly stated.

Q1. Find the arithmetic mean and median weight of 40 male college students at state university by using the following frequency distribution. **(10M)**

Weight (in lb)	118-126	127-135	136-144	145-153	154-162	163-171
frequency	3	5	9	12	5	4

Q2. (a) Find the standard deviation of the following numbers gives the number of weeks needed to find a job for 25 older workers that lost their jobs as a result of corporation downsizing.

13, 3, 17, 7, 22, 22, 26, 17, 13, 14, 16 **(5+5M)**

(b) A survey of 25 faculty members is taken in a college to study their vocational mobility. They were asked the question "In addition to your present position, at how many educational institutes have served on the faculty?" Compute the mode of the following frequency distribution of their responses.

x	0	1	2	3
f	8	11	5	1

Q3. A number is chosen from the first 100 natural numbers. Find the probability that it is a number 4 or 6. **(10M)**

Q4. Three persons A, B and C have applied for a job in a private company. The chance of their selections is in the ratio 1:2:4. The probabilities that A, B and C can introduce changes to improve the profits of the company are 0.8,0.5 and 0.3 respectively. If the change does not take place, find the probability that it is due to the appointment of C. **(10M)**

Q5. The length of time, in minutes, that a customer queues in Post office is a random variable T, with probability density function

$$f(t) = \begin{cases} c(81 - t^2), 0 \le t \le 9 \\ 0, \quad elsewhere \end{cases}$$

(a) What is the value of c.

(b) Find the probability that a customer will queue longer than three minutes. **(5+5 M)**

VIT-AP UNIVERSITY

QUESTION PAPER

Name of the Examination: Winter 2023-24 Regular Semester – CAT 1

Course Code: MAT1011 **Course Title: Applied Statistics**

Set number: 05 **Date of Exam:** 05/02/2024 (FN) (AN)

Duration: 90 min **Total Marks: 50**

Instructions:

1. Assume data wherever necessary.
2. Any assumptions made should be clearly stated.

Q1. If the mean of the given frequency distribution is 35, then find the missing frequency *k*. Also, calculate the median and mode of the distribution.

Class	10-20	20-30	30-40	40-50	50-60
Frequency	2	4	7	*k*	1

(10M)

Q2. In a class of 200 students, the mean and standard deviation of the marks obtained in FAT exam of Discrete Mathematics were found to be 40 and 15, respectively. Later on it was discovered that the marks 43 and 35 were misread as 34 and 53, respectively. Find the corrected mean and standard deviation corresponding to the corrected marks and using them also find the corrected coefficient of variation. **(10M)**

Q3. For married couples living in a certain city, the probability that the husband will vote on a bond referendum is 0.21, the probability that the wife will vote on the referendum is 0.28, and the probability that both the husband and the wife will vote is 0.15. What is the probability that

(a) at least one member of a married couple will vote?

(b) a husband will vote, given that his wife will not vote? **(10M)**

Q4. Factory A produces 1000 toys of which 20 are defective, factory B produces 4000 toys of which 40 are defective and factory C produces 5000 toys of which 50 are defective. All these toys from the three factories are put together in a stockpile. One of the toys is chosen from the stockpile and is found to be defective. What is the probability that it is from

(a) factory A (b) factory B. **(10M)**

Q5. The amount of time (in hours) that a semi-conductor device works before breaking down is a continuous random variable having probability density function defined by:

$$f(x)=\begin{cases}\lambda e^{\frac{-x}{100}} & x\geq 0\\ 0 & x<0\end{cases}$$

(a) Find the value of λ.

(b) Find the probability that the device will work between 50 and 150 hours before breaking down. **(10M)**