Hall Ticket Number:

Code No.: 32003 AS

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

M.C.A. II-Semester (CBCS) Advanced Supplementary Examinations, August-2017

Probability and Statistics

Time: **3** hours Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. Explain Measures of Central Tendency.
2. Write the mean of the composite series.
3. State Addition theorem for three events.
4. A die is rolled. If the outcome is an odd number, what is the probability that it is a prime?
5. State Probability Mass Function.
6. Define Binomial Distribution.
7. Explain Continuous Random Variable with an example.
8. Define Gamma Distribution.
9. Write Applications of t-distribution.
10. Write the conditions for the validity of χ^2- test.

Part-B (5 × 10 = 50 Marks)
(All bits carry equal marks)

11. a) Calculate Quartile deviation and Mean deviation from mean, for the following data:

Marks	0 – 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
No. of Students	6	5	8	15	7	6	3

b) Calculate the correlation coefficient for the following heights (in inches) of fathers(X) and their sons(Y):

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

12. a) An integer is chosen at random from the first two hundred positive integers. What is the probability that the integer chosen is divisible by 6 or 8?

b) There are 3 true coins and 1 false coin with head on both sides. A coin is chosen at random and tossed 4 times. If head occurs all the 4 times, what is the probability that the false coin has been chosen and used?

13. a) A random variable X has the following probability distribution

x	-2	-1	0	1	2	3
P(x)	0.1	K	0.2	2K	0.3	3K

i) Find K, *ii)* Evaluate P(X < 2) and P(-2 < X < 2), *iii)* find the cdf of X.

b) Out of 800 families with 5 children each, how many would you expect to have?
i) 3 boys *ii)* 5 girls *iii)* at least one boy

Contd... 2

14. a) A continuous random variable X has a pdf $f(x) = 3x^2$, $0 \le x \le 1$. Find a and b such that *i)* $P(X \le a) = P(X > a)$, and *ii)* $P(X > b) = 0.05$.

    b) In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and variance of the distribution.

15. a) A random sample of size 25 from a normal population has the mean 47.5 and the standard deviation 8.4. Does this information support or refute the claim that the mean of the population is 42.1?

    b) The following data give the number of air-craft accidents that occurred during the various days of a week.

Day	Mon	Tues	Wed	Thu	Fri	Sat
No. of accidents	15	19	13	12	16	15

    Test whether the accidents are uniformly distributed over the week.

16. a) Derive the regression line of Y on X.

    b) The odds that a book on Statistics will be favourably reviewed by 3 independent critics are 3 to 2, 4 to 3 and 2 to 3 respectively. What is the probability that of three reviews Majority of the reviews will be favourable?

17. Answer any ***two*** of the following:

    a) A manufacturer of cotter pins knows that 5% of his product is defective. If he sells cotter pins in boxes of 100 and guarantees that not more than 10 pins will be defective, what is the approximate probability that a box will fail to meet that guaranteed quality?

    b) A continuous random variable X has the distribution function:

$$F(x) = \begin{cases} 0 & ,if\ x \le 1 \\ k(x-1)^4 & ,if\ 1 < x \le 3 \\ 1 & ,if\ x > 3 \end{cases}$$

    Find *i)* k, *ii)* mean of X.

    c) Two random samples of sizes 8 and 11 drawn from two normal populations are characterized as follows:

Sample	Size	Sum	Sum of squares
1	8	9.6	61.52
2	11	16.5	73.26

    Test whether the two populations have the same variance.