2020

TWO YEAR M. COM. SEMESTER 1 EXAMINATION

(New Syllabus under CBCS)

Instructions for Examinees

The students are required to strictly adhere to the following instructions:

1. Use A4 size paper for giving the examination.

2. Write the following on the top of the first page of answer sheet:

    i) Roll Number: (as per the Admit Card)

    ii) Registration Number: (as per the Admit Card)

    iii) Paper Code and Name of the Paper

    iv) Date of the examination

    v) Duration of examination (12 noon to 2pm)

3. Put page number on the top right of each page (including the first page).

4. Only one side of the paper should be used for examination.

5. Put your signature with date, at the bottom right of every page used.

6. Before sending your answer scripts, arrange the pages sequentially. Scan them in the order of page number and convert them into a single pdf. file.

7. Pdf. file name should be your **Full Roll Number <underscore> paper code**. While submitting the answer scripts, the subject of the mail will be exactly the same with the file name. [e.g., if the roll no of a student is C95/MCM/123456, for third paper (Paper Code CC103) the file name will be: C95/MCM/123456_CC103

8. Submit your answer scripts in pdf. format within the stipulated time through designated email id given to you.

9. Preserve your answer scripts in soft as well as hard-copy form of all the papers of your examination.

2020

COMMERCE

Paper Code: CC 103

Subject: **Statistics for Business Decisions**

(Full Marks -40)

The figures in the margin indicate full marks

Candidates are required to give their answers in their own words as far as practicable

Time: 2 Hours　　　　　　　**Duration of Examination: 12noon to 2pm**

Module –I

Answer *any two* questions

1. (a) If $P(A) = \frac{1}{4}$, $P(B) = \frac{2}{5}$ and $P(A \cap B) = \frac{1}{7}$; then find the value of (i) $P(A \cup B)$

   (ii) $P(A \cap B^c)$ (iii) $P(A^c \cup B^c)$ (iv) P(A/B) and (v) $P(A^c/B)$

   (b) At a petrol pump, the average quantity of petrol sold to a vehicle is 15 litres per day with a s.d. of 5 litres. If on a particular day, 200 vehicles took 25 or more litres of petrol from the pump, estimate the total number of vehicles who took petrol from the pump on that day.

   [5+5]

2. (a) In a small city 50 accidents took place in a span of 50 days. Assuming that number of accidents per day follows the Poisson Distribution, find the probability that there will be three or more accidents on a day.

   (b) The mean and standard deviation of a Binomial Distribution are 4 and $\sqrt{\frac{8}{3}}$

   respectively. What is the probability that the variable will be positive?

   (c) The life (in hours) of an electronic device is follows Exponential Distribution with mean 100 hours. What is the probability that the device will fail after 200 hours of its operation? What is the probability that the device will fail within 100 hours of its operation?

   [3+3+4]

3. (a) The probability of X, Y and Z becoming managers are 5/9, 1/9 and 1/3 respectively.

The probability that a new product will be introduced if X, Y and Z becoming managers are 2/11, 1/6 and 4/7 respectively. What is the probability that a new product will be introduced? What is the probability that the manager appointed was Y given that the new product has been introduced?

(b) If T_1, T_2 and T_3 are independent unbiased estimators of θ and all have the same variance, which one of the following unbiased estimators of θ would you prefer?

$$\frac{T_1 + 2T_2 + 2T_3}{5}, \frac{T_1 + T_2 + T_3}{3}, \frac{3T_1 + 2T_2 - 2T_3}{3}.$$

[5+5]

4. (a) If (X, Y) be a pair of discrete random variable with the joint distribution as follows:

Y X	1	3	5
2	6/30	4/30	2/30
4	1/30	3/30	3/30
6	3/30	4/30	4/30

Compute correlation coefficient between X and Y. Are X and Y independent?

(b) Briefly describe the process of Systematic Sampling and Multistage Sampling.

[(5+1)+4]

Module II
Answer *any two* questions

5. (a) Levi's is a popular brand for denim jeans. The brand manager of Levi's is very much concerned about the brand's market share. He thinks that the brand's market share may be unevenly distributed throughout India. Following information is derived from a survey based of random samples of 100 customers from each of its four sales regions:

Levi's	*Sales Regions*			
	East	*West*	*North*	*South*
Purchase	40	55	35	48
Don't Purchase	60	45	65	52

Test at 5% level of significance whether brand share is same across the four sales regions?

(b) In a test of two television commercials, each commercial was shown in a separate test area 6 times over a one-week period. The following week an electronic survey was conducted to identify individual who has seen the commercials were asked to state the primary message in the commercials. The following results were recorded:

Commercial	Number who saw Commercial	Number who recalled the primary message
A	150	73
B	200	80

Using 5% level, test the hypothesis that there is no difference in the recall proportions for the two commercials. Obtain 95% confidence interval for the difference between the recall proportions for the two populations.

[5+5]

6. (a) Fortune India is a famous research agency which ranks banded cars manufactured by different companies. In the current year's study involving two similar subcompact models from two automobile companies, the average gas mileage for 14 cars of Brand X was 27.2 mpg and the standard deviation was 3.8 mpg. 11 cars of Brand Y gave average mileage 32.4 mpg with standard deviation 4.3 mpg. Should it conclude that the Brand X cars have lower average mileage than that of Brand Y cars? Test it at 1% level of significance.

(b) The following zero order correlation coefficients are given:

$r_{12} = 0.60$, $r_{13} = 0.70$ and $r_{23} = 0.65$

Calculate coefficient of multiple determination treating First variable as Dependent Variable and second and third variables as Independent Variables. Compute the partial correlation between first and third variable eliminating the effect of second variable. Also interpret the results.

[5+5]

7. (a) In a study to compare the efficiency of three workmen X, Y and Z and the productivity of four machine brands, viz., G1, G2, G3 and G4, the workmen were required to select one machine each on the first day and a different machine on each of the remaining three days subsequently. The units produced by the three workers on each of the four machines are given below:

Workmen	Machine Brands			
	G1	G2	G3	G4
X	38	40	31	49
Y	45	42	49	56
Z	50	48	62	42

Are these workmen and machine brands identical in terms of their productivity?

(b) Compute the regression equation of X_1 on X_2 and X_3 from the following information:

$\bar{X}_1 = 60$	$s_1 = 3.2$	$r_{12} = 0.73$
$\bar{X}_2 = 70.4$	$s_2 = 4.5$	$r_{13} = 0.65$
$\bar{X}_3 = 99.5$	$s_3 = 6.1$	$r_{23} = 0.32$

[5+5]

8. (a) Forecast the sales for 2020 by Holt's exponential smoothing (with $\alpha=0.5$ and $\beta =0.1$) model from the following data:

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Sales (Lakh Rs)	150	205	245	295	312	365	437	475	501	565

(b) How do you measure accuracy of a forecasting model?

[7+3]

-: Table Values :-

[Given that, Φ (1.5) = 0.9331, Φ (1.0) = 0.8413, Φ (2.0) = 0.9772, $z_{0.025}$= 1.960, $z_{0.05}$= 1.645, $\chi^2_{0.05, 3}$ = 7.815, $\chi^2_{0.05, 4}$ = 9.488, $t_{0.01, 23}$= 2.500, $t_{0.01, 25}$ = 2.485, $t_{0.005, 19}$ = 2.861, $t_{0.005, 20}$ = 2.845, $F_{0.05, 3,6}$ = 4.757, $F_{0.05, 2,6}$ = 5.143, $F_{0.05, 3,2}$ = 19.164, e = 2.7183]