Data Analysis & Quantitative Techniques (BFS CC 8)

Duration: 2hrs   **Maximum Marks:60**

Instructions:
1) Start each question on fresh page.
2) Figures to the right indicate maximum marks.
3) Use graph paper to draw the graphs
4) Q1. is compulsory, however internal choice is available.
5) Answer 'any 4' from Q2. to Q7.
6) The Z distribution table will be provided on request

Q1. Answer ANY 5 of the following: **(5x4=20 Marks)**

A. A stock trader, wants to calculate the three yearly moving average for Apple by looking at the closing prices of the stock for the last six years. The closing stock prices for Apple for the last six years are as follows:

Year	2015	2016	2017	2018	2019	2020	2021
Year Close price	26	29	42	39	73	133	178

Help the stock trader showing the trend on the graph. Does it show increasing or decreasing trend?

B. The parents of Mr. A are worried about the amount of time he wastes in watching television. His parents believe that, the more time a student spends watching TV, the lower their exam scores tend to be. Using the data given below, find the correlation and help his parents come to conclusion.

Time spent on TV (in hrs)	5	3	2	1
Exam Scores (out of 10)	2	5	7	9

C. The temperature in Goa has climbed heights over few months. The following table gives the sales of air conditions during past few months, Find the trend values assuming four yearly cycle. Comment on the trend

Month	No. of Air conditions sold (in 1000)
October	6
November	5
December	4
January	6
February	14
March	16
April	18.5
May	20

D. An organization consists of 25 members including 4 doctors. A committee of 4 is formed at random. Find the probability that the committee contains:
   i) No doctor
   ii) Exactly two doctors.

E. The population of India from years 2013 to 2020 is listed below. Find the trend by method of 5 yearly moving average. Comment on the trend?

Year	2020	2019	2018	2017	2016	2015	2014	2013
Population (in 10000000)	138	137	135	134	132	131	129	128

F. Sixty percent of people staying in a building read 'DNA', fifty percent read 'Times', while thirty percent of them read both. Find the probability that a randomly chosen person staying in the building
   i) Reads at least one of the two.
   ii) Reads Times or does not read DNA

Q2. Scientists might use different amounts of fertilizer on different fields and see how it affects crop yield. Fit a linear regression fertilizer as the predictor variable and crop yield as the response variable. Hence find   **(10 Marks)**

   A) Arithmetic means
   B) Variances
   C) Standard Deviation
   D) Covariance
   E) The coefficient of correlation
   F) The coefficients of regression
   G) Equations of lines of regression

Amount of Fertilizer (in 100 kg)	2	6	8	10	11	14	18	20
Crop Yield (in 100 kg)	10	17	20	27	30	35	40	45

Q3. The fund manager of a mutual fund found following yield % for 8 years. Fit the linear trend to this data and estimate yield % for 9th year.   **(10 Marks)**

Year	1	2	3	4	5	6	7	8
Yield (%)	5.77	6	6.4	6.7	7.1	7.5	7.7	7.9

Q7. Answer the following:

A) Given the following information about the sales and advertisement expenditure of a firm, obtain the two lines of regression, if the correlation coefficient between the lines is 0.9. **(4 Marks)**

	Sales in Crores	Advertisement expenditure in crores
	X	y
Mean	40	6
Standard Deviation	10	1.5

B) Last January, a supermarket wanted to stock ice creams for summer. The following table shows temperature vs ice cream sales of the supermarket last year during summers. Compute the correlation if any between them by Karl Pearson's coefficient of correlation, and comment. **(6 Marks)**

Temperature	25	28	32	38
Ice-cream sales (in 1000 units)	4	5	8	10

****