FYBMS/SEM I/BS/17.10.2019

Time: 2½ Hrs. Marks:75

Note:
1. **All questions are compulsory.**
2. **Attempt both the sub-parts A and B in Q.1.**
3. **Figures to the right indicate full marks.**
4. **Use of non-programmable calculator is allowed.**
5. **Graph paper will be provided on request.**

Q.1 (A) Fill in the blanks with the correct alternative. (Attempt any eight) (08)

(i) The data collected for the first time is known as _____.
(a) secondary data (b) primary data (c) raw data (d) none of these

(ii) The diagram used to get rough idea about relationship between variables x and y is known as _____ diagram.
(a) scatter (b) pie (c) bar (d) none of these

(iii) The _____ variations occur due to seasonal changes in a time series.
(a) seasonal (b) cyclic (c) irregular (d) none of these

(iv) The co-efficient of correlation always lies between _____.
(a) 0 &1 (b) -1 & 1 (c) -1 & 0 (d) none of these

(v) If A and B are any two events associated with an experiment, the probability of occurrence of event A or B or both A and B is expressed as _____.
(a) $A \cup B$ (b) $A \cap B$ (c) $A' \cup B'$ (d) none of these

(vi) The correlation coefficient is _____ of regression co-efficients.
(a) arithmetic mean (b) geometric mean (c) weighted mean (d) none of these

(vii) The method used to derive regression constants of a regression equation is known as _____.
(a) product moment (b) least squares (c) moving average (d) none of these

(viii) Least square method is used to compute _____.
(a) non linear trend (b) linear trend (c) seasonal trend (d) none of these

(ix) In decision making problems there is only one _____.
(a) policy maker (b) policy (c) state of nature (d) none of these

(x) The middlemost observation, dividing the entire distribution into two equal parts is known as _____.
(a) mean (b) median (c) mode (d) none of these

(B) State whether the following statements are True or False. Justify your answer. (Attempt any seven) (07)

(i) Decision tree calculations begin from right to left.
(ii) Histogram is used to represent median graphically.
(iii) If correlation co-efficient is zero, then the association between two variables is perfect positive.
(iv) While calculating rank correlation, if the values of variable x are ranked in increasing order, then the values of variable y must be ranked in increasing order.
(v) There are four components of time series.
(vi) Extreme variations of the data can be indicated by the method of mean deviation.
(vii) Fishers index number uses all information like prices P_1, P_0 and quantities Q_1, Q_0.
(viii) If the values of regression co-efficients are 0.7 each, then the value of correlation co-efficient is 0.35.
(ix) Quartiles are measures of central tendency.

(10)

(x) Statistical survey is a scientific process of collection and analysis of numerical data.

Q.2 Attempt either A or B.

(A) (p) Draw a greater than ogive for the following data. **(07)**

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	4	6	10	15	25	22	11	7

(q) In 2005, out of a total of 3000 workers, 2300 were skilled workers. The number of women employed was 300 out of which 250 were unskilled. In 2006, the number of skilled workers was 2750 of which 2500 were men. The number of unskilled workers was 760 of which 300 are women. Tabulate the given data with working note. **(08)**

(OR)

(B) (r) Find the arithmetic mean for the following data. **(07)**

Age	10-19	20-29	30-39	40-49	50-59	60-69	70-79
No. of persons	8	14	22	25	18	9	4

(s) If the median daily wage is Rs.114, find the missing frequency. **(08)**

Daily wages in Rs.	60-75	75-90	90-105	105-120	120-135	135-150
No. of workers	3	3	6	5	---	6

Q.3 Attempt either A or B.

(A) (p) Calculate Karl Pearson's co-efficient of correlation for the following data. **(07)**

X	17	8	12	13	10	12
Y	13	7	10	11	8	9

(q) Calculate standard deviation for the following data. **(08)**

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	11	15	25	12	7

(OR)

(B) (r) Calculate Spearman's rank correlation for the following data. **(07)**

X	12	15	13	20	15	14	19	13	21	18
Y	25	21	15	18	20	17	20	16	20	22

(s) Find the regression equation of Y on X. Estimate Y when $X = 13$. **(08)**

X	11	7	9	5	8	6	10
Y	16	14	12	11	15	14	17

Q.4 Attempt either A or B.

(A) (p) Calculate three yearly moving averages and draw it on a graph paper. Also, represent the original time series on the graph. **(07)**

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007
Production (in 1000 units)	12	15	20	18	25	32	30	40	44

(q) For the following data, calculate index number by (i) aggregative method (ii) average price relative method. **(08)**

Commodity	Unit	Price in rupees	
		1985	1995
Rice	Kg	4	8.50
Wheat	Kg	3	7.00
Pulses	Kg	8	30.00
Sugar	Kg	6	13.00

(OR)

(B) (r) From the following data calculate (i) Laspeyre's index number (ii) Paasche's index number (iii) Fisher's index number. **(07)**

Commodity	Base Year		Current Year	
	Price	Quantity	Price	Quantity
A	6	50	9	55
B	2	100	3	125
C	4	60	6	65
D	10	30	14	25

(s) Fit a straight line trend for the following data representing production in thousands of units. Plot the data and the trend line on graph paper. **(08)**

Year	1999	2000	2001	2002	2003	2004	2005
Production (in thousand units)	14	15	17	16	17	20	13

Q.5 **Attempt either A or B.**

(A) (p) Following is the pay-off matrix corresponding to four states of nature S_1, S_2, S_3, S_4 and four courses of action A_1, A_2, A_3, A_4. **(07)**

States of nature	Course of action				Probability of State
	A_1	A_2	A_3	A_4	
S_1	50	400	-50	0	0.15
S_2	300	0	200	300	0.45
S_3	-150	100	0	300	0.25
S_4	50	0	100	0	0.15

(a) Calculate expected pay off and find best course of action using EMV.

(b) Calculate EOL for each course of action and hence find best action using EOL.

(q) A random variable X has the following probability distribution. **(04)**

X	-2	-1	0	1	2	3
P(X)	0.1	k	0.2	2k	0.3	k

Find the value of k and hence find E(X) and V(X).

(r) A box contains 5 white balls and 3 black balls. If 5 balls are selected from the box, what is the probability that 3 of them are white? **(04)**

(OR)

(B) **Attempt any three.** **(15)**

(s) Write a note on skewness and kurtosis.

(t) Write a brief note on collection of secondary data.

(u) Mention the merits and demerits of mean.

(v) What are the limitations of statistics?

(w) State the elements common to decision theory problems?

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