



**Avinashilingam Institute for Home Science and Higher Education for Women**

(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)

Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B

Coimbatore - 641 043, Tamil Nadu, India

**Bachelor of Vocation Degree Examination – July 2020  
II Semester**

**Class : I B. Voc**

**Time : 3 hours**

**Major : Artificial Intelligence & Machine Learning**

**Max. Marks : 100**

**19VAIC07 Statistical Methods Using SPSS**

**Part – A**

**10 x 1 = 10**

**Choose the Correct Answer**

1. The modal size of the series of data 4, 4.5, 5, 4.5, 5.5, 5, 6, 4.5, 4, 4.5 is  
(a) 4 (b) 4.5 (c) 5.5 (d) 6
2. The formula for variance is given by  
(a)  $\sum(x-\bar{x})^2 / N$  (b)  $\sum(x-x)^2$  (c)  $\sum x^2 / N$  (d)  $\sum(x-\bar{x}) / N^2$
3. The Pearson's coefficient of correlation is denoted by the symbol  
(a) r (b) c (c) p (d) d
4. This is a tool for finding the degree of relationship between two variables.  
(a) correlation (b) regression (c) covariance (d) variance
5. This is the measure that provides estimates of value of the dependent variable from values of the independent variable.  
(a) correlation (b) regression (c) covariance (d) variance
6. For linear regression the curve is  
(a) smooth (b) straight line (c) bend (d) parabola
7. The component of a time series which is attached to short term variation is  
(a) seasonal variation (b) cyclic variation  
(c) irregular variation (d) all the above
8. Irregular variations in a time series are caused by  
(a) lockouts and strike (b) epidemics  
(c) floods (d) all the above
9. The F-distribution is named after the statistician  
(a) Falcon (b) Fisher (c) Franklin (d) Flemingo
10. Hypothesis is true but our tests reject it  
(a) Type I error (b) Type II Error  
(c) Null (d) Correct decision

**Part B** **5x6=30**  
**Answer ALL questions**  
**Answer should not exceed 400 words or two page**

- 11(a) Explain the relationship among Mean, Median and Mode using diagram and mathematical equation. Provide example to substantiate the same.  
 (or)  
 11(b) Find Quartile Deviation and Coefficient of quartile deviation for the following data.
- |          |   |    |    |    |    |    |    |
|----------|---|----|----|----|----|----|----|
| Roll No: | 1 | 2  | 3  | 4  | 5  | 6  | 7  |
| Marks:   | 0 | 28 | 40 | 12 | 30 | 15 | 50 |

- 12 (a) Explain the types of Correlation with relevant examples.  
 (or)  
 12 (b) Compute Spearman's Rank Correlation Coefficient for the following data:  
 Marks awarded out of 35:
- |             |    |    |    |    |    |    |    |    |
|-------------|----|----|----|----|----|----|----|----|
| Candidate : | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
| Judge X :   | 20 | 22 | 28 | 23 | 30 | 30 | 23 | 24 |
| Judge Y :   | 28 | 24 | 24 | 25 | 26 | 27 | 32 | 30 |

- 13 (a) Differentiate between Correlation and Regression Analysis.  
 (or)  
 13 (b) Obtain the two regression equations for the below data:
- |    |   |    |    |   |   |
|----|---|----|----|---|---|
| X: | 6 | 2  | 10 | 4 | 8 |
| Y: | 9 | 11 | 5  | 8 | 7 |

- 14 (a) Explain the Components of Time series.  
 (or)  
 14 (b) Fit a linear trend curve by the least-squares method to the following data :
- |                  |      |      |      |      |      |      |      |      |      |      |
|------------------|------|------|------|------|------|------|------|------|------|------|
| Year             | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Production (Kg.) | 3    | 5    | 6    | 6    | 8    | 10   | 11   | 12   | 13   | 15   |

- 15 (a) Discuss the one-way classification technique of ANOVA  
 (or)  
 15 (b) In a sample of 8 observations, the sum of the squared deviations of items from the mean was 84.4. In another sample of 10 observations the value was found to be 102.6. Test if the difference is significant at 5% level. ( $F_{0.05} = 3.29$ )

**Part C** **5X12=60**  
**Answer ALL questions**  
**Answer should not exceed 800 words or four pages**

- 16 (a) Calculate Mode (or empirical mode if ill-modal) of the data given below.
- |                 |         |         |         |         |         |         |         |         |
|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Weights:        | 100-110 | 110-120 | 120-130 | 130-140 | 140-150 | 150-160 | 160-170 | 170-180 |
| (in lbs)        |         |         |         |         |         |         |         |         |
| No. of Persons: | 4       | 6       | 20      | 32      | 33      | 17      | 8       | 2       |
- (or)

- 16 (b) ((i) Find Mean Deviation from the mean for the given data.

Size :	0-10	10-20	20-30	30-40	40-50
Frequency :	7	12	18	25	16

- (ii) Calculate Standard Deviation using Step Deviation method.

Wages X (in Rs. '000) :	0-10	10-20	20-30	30-40	40-50	50-60
No. of Workers :	12	17	23	39	16	3

17 (a) Making use of the data summarized below, calculate the coefficient of correlation

<b>Case</b>	A	B	C	D	E	F	G	H
<b>X1</b>	10	6	9	10	12	13	11	9
<b>X2</b>	9	4	6	9	11	13	8	4

(or)

17 (b) Find the coefficient of correlation for the following

<b>Cost</b>	39	65	62	90	82	75	25	98	36	78
<b>Sales</b>	47	53	58	86	62	68	60	91	51	84

18 (a) From the following data obtain the two regression equations.

<b>Sales</b>	91	97	108	121	67	124	51	73	111	57
<b>Purchase</b>	71	75	69	97	70	91	39	61	80	47

(or)

18 (b) In a correlation study the following values are obtained:

	X	Y
Mean	65	67
Standard Deviation	2.5	3.5
Coefficient of correlation	0.8	

Find the two regression equations that are associated with the above values.

19 (a) The price of a commodity during 2000 – 2005 is given below. Fit a parabola  $Y = a + bX + cX^2$  to this data. Estimate the price of the commodity for the year 2010 :

<b>Year</b>	2000	2001	2002	2003	2004	2005
<b>Price</b>	100	107	128	140	181	192

Also plot the actual and trend values on graph.

(or)

19 (b) Find seasonal variations by the ratio-to-trend method from the following data :

<b>Year</b>	<b>1st Quarter</b>	<b>2nd Quarter</b>	<b>3rd Quarter</b>	<b>4th Quarter</b>
2000	30	40	36	34
2001	34	52	40	44
2002	40	58	54	48
2003	54	76	68	62
2004	80	92	86	82

20(a) A tea company appoints four salesman A, B, C and D and observes their sales in three seasons; summer, winter and monsoon. The figures (in lakhs) are given as follows. Carry out the Analysis of Variance. ( $F_{0.05} = 3.49$ )

<b>Sessions</b>	<b>Salesman</b>				<b>Season's Total</b>
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	
Summer	36	36	21	35	128
Winter	28	29	31	32	120
Monsoon	26	28	29	29	112
	90	93	81	96	360

(or)

20(b) Kerala Traders Co. Ltd., wishes to test if its three salesman A, B and C tend to make sales of the same size or if they differ in their selling ability as measured by the average size of their sales. During the last week there have been 14 sale calls – A made 5 calls, B made 4 calls and C made 5 calls. Following are the weekly sales record of the three salesmen: ( $F_{0.05} = 3.98$ ) (**use coding method – divide the data by 1000**)

<b>Salesman A (in Rs.)</b>	<b>Salesman B (in Rs.)</b>	<b>Salesman C (in Rs.)</b>
3000	6000	7000
4000	3000	3000
3000	3000	4000
5000	4000	6000
0	-	5000