Sanjay Ghodawat University, Kolhapur

2018-19
EXM/P/09/00

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

Year and Program: S.Y.M.Sc | **School: Science** | **Department: Physics**

Course Code: PHS 602 | **Course Title: Data Analysis Techniques (DAT)** | **Semester – IV**

Day and Date: Tuesday 21/05/2019 | **Examination: End Semester Examination (ESE)** | **Time:30 Mins** | **Max Marks: 20**

2:30pm to 3:00pm

Seat No.:	PRN No.:	Student Sign:
Invigilator Sign:	Examiner Sign:	Marks Obtained:

Instructions: 1) All Questions are compulsory.
2) Mark √ to the correct option. Do not circle.
3) More than one options marked will not be considered for assessment.
4) Rough calculations on paper are not allowed.
5) Use non-programmable calculator is allowed.

Q.1 Select the correct alternative	**Marks (20)**	**Marks**	**Bloom's Level**	**CO**
1	Example of throwing a dice lies in sampling technique of a) Stratified Sampling b) Clustered Sampling c) Systematic Sampling d) Random Sampling		1	L1	602.1
2	_____ are used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. a) Inferential statistics b) Descriptive statistics c) Normal statistics d) None of these		1	L2	602.1
3	A graph in which the values of two variables are plotted along two axes and the pattern of the resulting points reveal present correlation is known as a) Bar graphs b) Pie graphs c) Line graphs d) Scatter plots		1	L2	602.1
4	Coefficient of correlation could be a) Positive b) Negative c) Non-linear d) Positive and Negative both		1	L1	602.1
5	Probability that event B will occur, given that event A has occurred, is known to be a) Complimentary probability b) Compound probability c) Conditional probability d) Associative probability		1	L2	602.2

ESE

4	Non-overlapping categories or intervals are known as _____	1	L1	602.1
	a) Inclusive b) Exhaustive			
	c) Mutually exclusive d) Mutually exclusive and exhaustive			
5	Which of the following diagrams indicates the best relation between Boys, Girls and Students?	1	L2	602.2
	a)  b)  c)  d) 			
6	The events when we have no reason to believe that one is more likely to occur than the other is called:	1	L1	602.2
	a) Equally likely events b) Independent events			
	c) Dependent event d) Not equally likely events			
7	Method in which previously calculated probabilities are revised with new probabilities is classified as	1	L2	602.2
	a) updating theorem b) revised theorem			
	c) Bayes theorem d) dependency theorem			
8	A coin is tossed 3 times, what is probability that at least one head will occur?	1	L2	602.2
	a) 1/8 b) 2/8 c) 7/8 d) 8/8			
9	How many dependent variables are used in multiple regression?	1	L1	602.3
	a) One b) One or more c) Two or more d) Two			
10	Linear regression model is based upon some assumptions that can be categorized into	1	L1	602.3
	a) Two categories b) Three categories			
	c) Three categories d) Four categories			
11	In multiple regression analysis, estimation is not possible in case of	1	L2	602.3
	a) High standard error b) Multicollinearity			
	c) Low standard error d) High Coefficient of determination			
12	Expected value of a random variable is measurable for	1	L1	602.3
	a) Continuous random variable b) Discrete random variable			
	c) Continuous and discrete both d) Complimentary variable			
13	Considering model $y=\beta1 + \beta2*x$, variable x here is said to be	1	L1	602.3
	a) Biased variable b) Dependent variable			
	c) Independent variable d) Compound variable			
14	Number of independent variable increases with change in adjusted R^2 as	1	L2	602.3
	a) No increase/ decrease b) Increase is less			
	c) Increase is very high d) Decrease is very high			

17	How many dependent variables does a one-way ANOVA have?	1	L1	602.4
	a) Three b) One c) Four d) Two			
18	If the observations are classified according to two factors: these will be known as one way classified data	1	L2	602.4
	a) False b) True			
19	The Linear model expressed with mathematical model is given by	1	L2	602.4
	a) $x_{ij}= \mu + \alpha_i+ \beta_j+ e_{ij}$ b) $x_{ij}= \mu + \alpha_i+ \beta_j$			
	c) $x_{ij}= \alpha_i+ \beta_j+ e_{ij}$ d) $x_{ij}= \mu + \alpha_j+ \beta_i+ e_{ij}$			
20	In two way classified data degrees of freedom for SSA is given by	1	L1	602.4
	a) (h-1) b) (k-1) c) (hk-1) d) (h-1) (k-1)			

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Day and Date: Tuesday 21/05/2019 | **Examination: End Semester Examination (ESE)** | **Time: 2 Hrs 30 Mins** | **Max Marks: 80**

3:00 pm to 5:30 pm

Instructions:
1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Neat diagrams must be drawn wherever necessary.
4) Assume suitable data if necessary.
5) Use of logarithmic table and non-programmable calculator is allowed.

Q.2 Answer the following questions.	**Marks (16)**	Marks	Bloom's Level	CO
a) i.	What is scatter diagram? Explain how this can be used to indicate the degree and type of association between two variables?	8	L4	602.1
ii.	Construct the scatter diagram of the data given below. Draw a free hand line through the group of points and from your diagram discuss the probable amount of correlation.	4	L3	602.1

Average Values in Lakhs

	1946	1947	1948	1949	1950	1951	1952	1953
Cotton Imports	47	64	100	97	126	203	171	115
Export of Cotton	70	85	100	103	111	139	133	115

b) A chemical engineer desiring to study the evaporation rate of water from brine evaporation beds obtained data on the number of inches of evaporation in each of 55 July days spread over 4 years. The data are given in the following stem and leaf plot, which shows that the smallest data value was .02 inches, and the largest .56 inches. — 4 — L2 — 602.1

0.0	2, 6
0.1	1, 4
0.2	1, 1, 1, 3, 3, 4, 5, 5, 5, 6, 9
0.3	0, 0, 2, 2, 2, 3, 3, 3, 3, 4, 4, 5, 5, 5, 6, 6, 7, 8, 9
0.4	0, 1, 2, 2, 2, 3, 4, 4, 4, 5, 5, 5, 7, 8, 8, 8, 9, 9
0.5	2, 5, 6

Find the (a) sample mean; (b) sample median; (c) sample standard deviation of these data. (d) Do the data appear to be approximately normal?

OR

ESE

0.0	2, 6
0.1	1, 4
0.2	1, 1, 1, 3, 3, 4, 5, 5, 5, 6, 9
0.3	0, 0, 2, 2, 2, 3, 3, 3, 3, 4, 4, 5, 5, 5, 6, 6, 7, 8, 9
0.4	0, 1, 2, 2, 2, 3, 4, 4, 4, 5, 5, 5, 7, 8, 8, 8, 9, 9
0.5	2, 5, 6

Find the (a) sample mean; (b) sample median; (c) sample standard deviation of these data. (d) Do the data appear to be approximately normal?

Q.3 Answer the following questions. **Marks (16)**

a)	i. Discuss conditional probability with example.	8	L5	602.2
	ii. The organization that Jones works for is running a father–son dinner for those employees having at least one son. Each of these employees is invited to attend along with his youngest son. If Jones is known to have two children, what is the conditional probability that they are both boys given that he is invited to the dinner? Assume that the sample space S is given by S = {(b, b), (b, g), (g, b), (g, g)} and all outcomes are equally likely [(b, g) means, for instance, that the younger child is a boy and the older child is a girl].	4	L3	
b)	What is the condition of independency? If events A and B are independent, prove that $\overline{A}$ and $\overline{B}$ are also independent.	4	L2	602.2
	OR			
b)	Write a note on Poisson random variable.	4	L2	602.2

Q.4 Answer the following questions. **Marks (24)**

a)	Explain the method of distribution of estimators.	12	L3	602.3
b)	Explain multiple linear regression method in detail.	8	L4	602.3
	OR			
b)	Estimate the value of μ by using weighted least square estimator method when Y_1 and Y_2 are defined by, $Y_1 = X_1 + \ldots\ldots + X_k$, and $Y_2 = X_{k+1} + \ldots\ldots + X_n$, $k<n$	8	L4	602.3
c)	Explain the method of assessing model with analysis of residuals.	4	L2	602.3
	OR			
c)	Explain least square estimators of the regression parameters.	4	L2	602.3

Q.5 Answer the following questions. **Marks (24)**

a)	i. What are the steps involved in computation of one way classified data?	8	L4	602.4
	ii. Explain the concept of analysis of variance.	4	L2	
b)	How parameters can be estimated in two factor analysis of variance?	8	L3	602.4
	OR			

c) A random sample of five motor car tyres is taken from each of 3 brands manufactured by three companies. The lifetime of these tyres is shown below. On the basis of the data, test whether the average lifetime of three brands of tyres are equal or not. Given $F_{0.05}=3.89$ 4 L2 602.4

Life time of Tyres ('000 miles)

Brand	A	B	C
	35	32	34
	34	32	33
	34	21	32
	33	28	32
	34	29	33

OR

c) Prove $P_F\{D \geq d\}$ is the same for any continuous distribution F. 4 L2 602.4