Manmohan Technical University
Office of the Controller of Examinations
Exam Year: 2081, Mangsir(Model Question)

Exam Roll: ……
Exam Roll in words: ……

School: SOE	Level: BE	Invigilator's Sign: ……
Program: BCE	Year/Part: III/I	Superintendent's Sign: ……
Subject: ***Probability and Statistics (EG601SH)***		Code No. ……

i. Answers should be given by filling the Multiple-Choice Questions' Answer Sheet.
ii. The main answer sheet can be used for rough work.

Code No.

GROUP A *(Multiple-Choice Questions)*	**[10x1=10]**	**Time: 20 Minutes**

1. The science of collecting, organizing, presenting, analyzing and interpretation data to assist in making more effective decision is called:
   a) Statistic
   b) Parameter
   c) Population
   d) Statistics
2. Number of family members in different families in a town is an example of a:
   a) Discrete Variable
   b) Continuous Variable
   c) Dependent Variable
   d) Qualitative Variable
3. The suitable formula for computing the number of classes is:
   a) $3.322 \log N$
   b) $0.322 \log N$
   c) $1 + 3.322 \log N$
   d) $3.322 \log N$
   e) $1 - 3.322 \log N$
4. Cumulative frequency polygon can be used for the calculation
   a) Mean
   b) Median
   c) Mode
   d) Geometric Mean
5. When the values in a series are not of equal importance, we calculate the
   a) Arithmetic Mean
   b) Geometric Mean
   c) Weighted Mean
   d) Harmonic Mean
6. The mean and standard deviation of the binomial probability distribution are respectively
   a) $np\,, npq$
   b) $np\,, \sqrt{npq}$
   c) $np\,, nq$
   d) $n\,, pq$
7. In normal distribution
   a)
   b) $mean > median > mode$
   c) $mean = median = mode$
      $mean < median < mode$
   d) $mean \neq median \neq mode$
8. If the population standard deviation σ is known and the sample size $n$more than 30 the confidence interval for the population mean μ
   a) $\bar{X} \pm Z_\alpha \frac{\sigma}{\sqrt{n}}$
   b) $\bar{X} \pm Z_\alpha \frac{S}{\sqrt{n}}$
   c) $\bar{X} \pm Z_\alpha \sqrt{\frac{pq}{n}}$
   d) $\bar{X} \pm t_{\alpha,(n-1)} \frac{s}{\sqrt{n}}$
9. A passing student is failed by an examiner, it is an example of:
   a) Type-I error
   b) Type-II error
   c) Power of test
   d) All of the above
10. The value of the coefficient of correlation r lies between:
   a) $0\ and\ 1$
   b) $-1\ and\ 1$
   c) $-1\ and\ 0$
   d) $0.5\ and\ -0.5$

Multiple Choice Questions' Answer Sheet

Marks Secured: _____
In Words: _____
Examiner's Sign: _____ Date: _____
Scrutinizer's Marks: _____
In Words: _____
Scrutinizer's Sign: _____ Date: _____

Corrected Fill
Ⓐ ● Ⓒ Ⓓ
Incorrected Fill
~~Ⓐ~~ Ⓑ ● Ⓓ ✓

1.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10.	Ⓐ	Ⓑ	Ⓒ	Ⓓ

Manmohan Technical University
Office of the Controller of Examinations
Exam Year: 2081, mangsir

School: SOE	Level: BE	Time: 3 Hours
Program: BCE	Year/Part: III/I	Full Marks: 50
Subject: ***Probability and Statistics (EG601SH)***		

- ✓ *Candidates are required to give their answers in their own words as far as practicable.*
- ✓ *The figures in the margin indicate* ***Full Marks****.*
- ✓ *Assume suitable data if necessary*.

GROUP A *(Multiple-Choice Questions in separate paper)*

GROUP B ***(****Short Answer Questions -* ***Attempt Any Four Question)*** **[4 X (2+2)=16]**

11.(a) An analysis of the monthly wages paid to workers in two firms A and B belonging to the same industry gives the following result.

	Firm A	**Firm B**
No. of workers	**160**	**150**
Average wage	**260**	**275**
Variance of wage distribution	**100**	**121**

Calculate the mean and variance of all the workers taken together.

b. Define Mutually Exclusive event and independent event. A problem in statistics is given to three students A, B, and C whose chances of solving it are 1/3, ¼ and 1/5 respectively. Find the probability that, the problem will be solved and all three students A, B and C can solve the problem.

12.(a) What are the chief characteristics of Binomial distribution?

(b) The number of accidents that occur at busy intersection is 3.5 per week. Find the probability of following events

i. No accidents in one week

ii.Five or more accident in one week III. One accident today

13.(a) Define population, sample, parameter and statistic with an example.

(c) A company produces automobile tyres, the manager of the company want to estimate the limits in which expected trend life of his tyres will probably lie. A test sample of 64 tyres was taken and a test run showed the average trend life of 50000 miles. Find 95% and 99% confidence limits for population mean. Given that population standard deviation is 3000 miles.

14.(a) Define Type-I error, Type-II error and Power of test of the hypothesis testing.

(b) A manufacture claims that the mean life of batteries manufactured by his company is 44 months. A random sample of 40 of these batteries was tested, resulting in a sample mean life of

41 onths with a sample standard deviation of 9 months. Test at $\alpha = 0.05$.

15.(a). Differentiate between correlation and regression analysis.

(b). For fifty files transmitted, the regression equation of time taken (Y) on the transmission files is 40 GB. The ratio of the standard deviation $\sigma_Y : \sigma_X$ is 5:2. Find the average time taken to transmit file and the coefficient of correlation between the time and size of the file

GROUP C (*Long Answer Questions (* **Attempt Any Four questions)** **[4 X 6=24]**

16. As part of a study monitoring acid rain, measurements of sulfate deposits (kg/hectare) are recorded for different locations on the Eastern Terai of Nepal. The results are listed in the following table for 15 recent and consecutive years:

Acid Rain: Sulfate Deposited (kg/hectare)

Year	Location 1 (x)	Location 2 (y)	Location 3 (z)
1	11.94	13.09	7.96
2	11.28	10.88	12.84
3	10.38	12.19	7.38
4	8.00	10.75	7.26
5	12.12	17.21	10.12
6	10.27	10.26	8.89
7	14.80	15.49	11.60
8	13.52	11.61	9.02
9	10.55	10.53	7.78
10	9.81	12.50	8.70
11	11.27	9.94	10.50
12	12.12	11.21	9.95
13	11.68	9.71	15.59
14	11.77	9.37	10.54
15	17.29	13.87	13.64

(a) Find sample mean, sample standard deviation and coefficient of variation for sulfate deposits for each location.

(b) Give your conclusion about variability and uniformity from the analysis.

17. The burning time of an experimental rocket is a random variable having a normal distribution with mean 4.76 sec and standard deviation 0.04 sec. What is the probability that this kind of rocket will burn?

I. Less than 4.66 sec
II. More than 4.8 sec
III. Between 4.7 to 4.8 sec

18. A population consists of the four numbers **2, 3, 4 , 5**

I. Write down all possible sample size of two without replacement.
II. Verify that the population mean is equal to the mean of the sample mean.
III. Calculate the standard error of the sampling distribution of the sample mean.

19. A city health department wishes to determine the mean bacteria count per unit volume of water at a lake beach. Researchers have collected 10 water sample of unit volume and have found the175, 190, 215, 198, 184, 207, 210, 193, 196, 180

OR,

Define chi-square distribution. From the following data can you conclude that there is association between the purchase of brand and geographical region? Use 5% level of significance.

	Region		
	Central	**Eastern**	**Western**
Purchase brand	**40**	**55**	**45**
Do not purchased brand	**60**	**45**	**55**

20. A sample of 10 values of three variables X_1, X_2 and X_3 were obtained as

$\sum X_2$=10	$\sum X_2$=20	$\sum X_2$=30
$\sum {X_1}^2$=20	$\sum {X_2}^2$=68	$\sum {X_3}^2$=170
$\sum X_1X_2$=10	$\sum X_1X_3$=15	$\sum X_2X_3$=64

i) Partial correlation between X_1 and X_3 eliminating the effect of X_3.

ii) Multiple correlation between X_1, X_2 and X_3 assuming X_1 as dependent.

OR

The following data gives the experience of machine operators in years and their performance as given by the number of good parts turned out per 100 pieces.

Experience (X)	**16**	**12**	**18**	**4**	**3**	**10**	**5**	**12**
Performance (Y)	**87**	**88**	**89**	**68**	**78**	**80**	**75**	**83**

i) Fit the regression equation of performance ratings on experience and estimate the probable performance if an operator has 8 years experiences.

ii) Calculate coefficient of determination and interpret it.

THE END