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Reg. No. :

Code No. : 5483

Sub. Code : HESM 23

M.A. (CBCS) DEGREE EXAMINATION, APRIL 2014.

Second Semester

Economics

STATISTICAL METHODS

(For those who joined in July 2012 onwards)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer.

1. Which of the following is a measure of central value?
- (a) median (b) standard deviation
(c) mean deviation (d) quartile deviation

2. An empirical relationship between range and quartile deviation about mean is
- (a) $R = 4 \text{ Q.D.}$ (b) $R = 9 \text{ Q.D.}$
(c) $R = 6 \text{ Q.D.}$ (d) None of the above
3. If X and Y are two variates, there can be at most :
- (a) one regression line
(b) two regression line
(c) three regression line
(d) An infinite number of regression line.
4. Correlation coefficient was invented in the year
- (a) 1910 (b) 1890
(c) 1908 (d) none of the above
5. If $\sigma_x = 0.5$, $\sigma_y = 1.5$ and $\sigma_{x-y}^2 = 1.5$, the coefficient of correlation between X and Y is :
- (a) 1 (b) $\frac{1}{4}$
(c) $\frac{1}{2}$ (d) $\frac{5}{6}$
6. Probability is expressed as :
- (a) ratio (b) proportion
(c) percentage (d) all of the above



7. If the observations recorded on five sampled items are 3, 4, 5, 6, 7 the sample variance is :

(a) 1 (b) 0
(c) 2 (d) 2.5

8. IF $x_1, x_2, \dots, x_n$ is a random sample from a population $N(\mu, \sigma^2)$, the sufficient statistic for σ^2 is :

(a) $\sum x_i$ (b) $\sum x_i^2$
(c) $\sum (x_i - \mu)^2$ (d) $\sum x$

9. A test based on a test statistic is classified as :

(a) Randomized test
(b) Sequential test
(c) Non-randomized test
(d) Bayes test

10. To test $H_0 : \mu = \mu_0$ vs $H_1 : \mu > \mu_0$ when the population standard deviation is known, the appropriate test is :

(a) t-test (b) z-test
(c) chi-test (d) none of the above

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PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) Find the average rate of increase in population which is in the first decade has increased by 20%, in the second decade by 30% and in the third decade by 40%.

Or

- (b) List out the properties of a good measure of variation.

12. (a) State the implications of positive and negative correlation.

Or

- (b) You are given the following data :

	X series	Y series
Arithmetic mean	36	82
Standard Deviation	11	09

Find the regression equation of X on Y.

13. (a) What is the probability that a leap year, selected at random, will have 53 Sundays?

Or

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- (b) A Machine produces 10 percent defective items. Ten items are selected at random. Find the probability of not more than two items being defective.

14. (a) Explain the law of Inertia of large numbers.

Or

- (b) Briefly explain the sampling theory.

15. (a) Explain the types of errors in testing hypothesis.

Or

- (b) A random sample of 100 students gave a mean weight of 58 kilogram with S.D. of 4kg. Test the hypothesis that the mean weight in the population is 60kg.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 600 words.

16. (a) Discuss the problems in the construction of Index numbers.

Or

- (b) Expound the significance of measuring variation.

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17. (a) Ten competitors in a beauty contest are ranked by three judges in the following orders :

1st Judge : 1 6 5 10 3 2 4 9 7 8

2nd Judge : 3 5 8 4 7 10 2 1 6 9

3rd Judge : 6 4 9 8 1 2 3 10 5 7

Use the correlation coefficient to determine which pair of judges has the nearest approach to common taste in beauty.

Or

- (b) The regression equations of Y on X and X on Y are $y = 1.25x$ and $x = 0.64y$ respectively. Where x and y are deviations of X and Y from their respective means. Variance of Y is known to be equal to 16. Find

- (i) the coefficient of determination
- (ii) the coefficient of correlation and
- (iii) the variance of X.

18. (a) A product is assembled from three components X, Y and Z, the probability of these components being defective is respectively 0.01, 0.02 and 0.05. What is the probability that the assembled product will not be defective?

Or

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- (b) Discuss elaborately Normal distribution and its characteristics.
19. (a) A population consists of five number 2, 3, 6, 8, 11. Consider all possible samples of size two which can be drawn with replacement from this population. Calculate the standard error of sample mean.

Or

- (b) Explain the concept of standard error. Discuss the role of standard error in large sample theory.
20. (a) Discuss the role of standard error in large sample theory.

Or

- (b) Explicate the central limit theorem.
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