Master of Business Administration
First Semester
Statistical & Quantitative Methods
(MBA - 104)

Duration: 3Hrs. **Full Marks: 70**

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins. **Marks: 50**

Answer any *four* from *Question no.* 2 to 8
***Question no.* 1 is compulsory.**

1. The following distribution gives the pattern of overtime work done by 100 employees of a company. Calculate mean and variance for overtime work done by per employee. **10**

Overtime hours:	10-15	15-20	20-25	25-30	30-35	35-40
Number of employees:	11	20	35	20	8	6

2. (A) Find the values of : **5**

$$\lim_{x \to 2} \frac{x2 - 3x + 2}{X2 + x - 6}$$

(B) Find $\frac{dy}{dx}$ **5**

$Y = \sin(\cos x^2)$

3. (A) What are the different measures of central tendency? There are two units of an automobile company in two different cities employing 760 and 800 employees respectively. The A.M of monthly salaries paid to employees in these two units is Rs. 18,750 and Rs. 16,950. Find the combined A.M of salaries of the employees in both the units. **4**

(B) Two salesman selling the same product, show the following results over a long period of time: **6**

	Salesman X	Salesman Y
Average sales volume per month(Rs.)	30,000	35,000
S.D	2,500	3,600

Which salesman seems to be more consistent in the volume of sales?

4. (A) Find the determinant of the following matrix: **3**

$$A=\begin{bmatrix}1 & 3 & 4\\ 2 & -3 & 2\\ 1 & 5 & 6\end{bmatrix}$$

(B) Solve the following system of linear equations, using Matrix Inverse Method: **7**

$$2X-Y+3Z = 9$$
$$X+Y+Z = 6$$
$$X-Y+Z = 2$$

5. (A) A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is 1/7 and that of wife's selection is 1/5. What is the probability that: **5**

i. Both of them will be selected.

ii. Only one of them will be selected.

iii. None of them will be selected.

(B) The incidence of occupational disease in an industry is such that the workers have 20 percent chance of suffering from it. What is the probability that out of six workers 4 or more will come in contact of the disease? **5**

6. (A) What is meant by 'correlation'? Distinguish between positive, negative and zero correlation with examples and diagrams. **5**

(B) Given the following information about advertising expenditure and sales: **5**

	Advertisement(X) (Rs. in lakh)	Sales(Y) (Rs. in lakh)
Arithmetic mean, $\bar{X}$	10	90
Standard deviation,σ	3	12

Correlation coefficient = 0.8

Obtain the two regression equations.

7. What is sampling? Critically examine the well – known methods of sampling techniques. **2 +8=10**

8. (A) Write short notes on the following: **3**

i) Null and alternative hypothesis

ii) Type I and Type II errors

iii) Level of significance

(B) 200 digits are chosen at random from a table. The frequencies of the digits are as follows: **7**

Digit:	0	1	2	3	4	5	6	7	8	9
Frequency:	18	19	23	21	16	25	22	20	21	15

Use χ^2 test to assess the correctness of the hypothesis that the digits were distributed in equal numbers in the table from which they were chosen.

Given, $\chi^2_{0.05}(9\ df) = 16.22$

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Duration: 20 minutes **Marks – 20**

(PART A - Objective Type)

1. The algebraic sum of the deviations from mean is :

   A. Maximum B. Minimum C. zero D. None

2. If mean and coefficient of variation of a set of data is 10 and 5, respectively, then the standard deviation is :

   A. 10 B. 50 C. 5 D. None

3. The sum of squares of deviations from mean is :

   A. maximum B. minimum C. zero D. None

4. If the first and third quartiles are 22.16 and 56.36 , respectively, then the quartile deviation is :

   A. 17.1 B. 34.2 C. 51.3 D. None

5. A bag contains 3 red, 6 white and 7 blue balls. If two balls are drown at random, then the probability of getting both white balls is :

   A. 5/40 B. 6/40 C. 7/40 D. 14/40

6. The standard deviation of the binomial distribution is :

   A. np B. npq C. $\sqrt{np}$ D. $\sqrt{npq}$

7. If $P(A \cap B) = 0.20$ and $P(B) = 0.8$, then $P(A/B)$ is,

   A. 0.25 B. 0.4 C. 0.5 D. 0.75

8. Which of the following is non-probability sampling?

A. Purposive sampling
B. Random sampling
C. Cluster sampling
D. Stratified sampling

9. A significant difference between the statistic and parametric value implies that:

A. statistic values used to approximate parameter
B. sample statistic is representative of the population
C. the difference is real
D. none of the above

10. The degrees of freedom used in a t- distribution are equal to

A. sample size n
B. sample size n-1
C. sample size n+1
D. (a) or (b) but not (c)

11. The test statistic to test $\mu_1 = \mu_2$ for normal population is

A. F-test
B. z- test
C. t-test
D. none

12. A null hypothesis is accepted when

A. $\chi^2_{cal} \leq \chi^2_{tab}$
B. $\chi^2_{cal} \geq \chi^2_{tab}$
C. $\chi^2_{cal} = \chi^2_{tab}$
D. None

13. If the relationship between x and y is positive, as variable y decreases, variable x

A. increases
B. decreases
C. remains same
D. changes linearly

14. If two coefficients of regression are 0.8 and 0.2 , then the value of coefficient of correlation is :

A. 0.16
B. - 0.16
C. 0.40
D. – 0.40

15. If $f(x) = x^n$, then derivatives of f(x) is

A. nx^{x-1}
B. x^{n-1}
C. x^n
D. None

16. An m x n matrix is said to be square matrix if

A. m =n B. m > n C. n > m D. None

17. Find ${}^{n}C_{r}$, if n=9 and r=3

A. 84 B. 46 C. 42 D. 40

18. The value of correlation coefficient lies between,

A. -1 to +1 B. 0 to 1 C. -1 to 0 D. None

19. If variables X and Y are independent, then the angle between the two regression lines,

A. 90° B. 45° C. 180^{0} D. None

20. If μ=30.5 , n=100 , $\bar{x}$ = 28.8 and σ = 8.35, then IzI =

A. 2.5 B. 1.98 C. 2.4 D.2.68

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