MID-WESTERN UNIVERSITY
FACULTY OF MANAGEMENT
FINAL EXAMINATION: 2073
MASTER OF BUSINESS ADMINISTRATION (MBA)
SEMESTER – III

R.No. .....

Subject: Quantitative techniques for business | Course Code: MGMT 535
Full Marks: 100 | Time: 4:00 Hours

SECTION A: MULTIPLE CHOICE QUESTIONS (1 × 20 = 20 MARKS)/ (TIME: 20 MINUTES)

Tick the best answers.

Q1. The term regression is introduced by:

a) Sir Francis Galton
b) R.A. Fisher
c) Karl Pearson
d) None of the above

Q2. Two regression coefficients have:

a) Opposite sign
b) Same sign
c) Either same or opposite sign
d) Nothing can be said

Q3. If X and Y are two variates, there can be at most:

a) Three regression line
b) One regression line
c) Two regression line
d) An infinite number of regression lines

Q4. Two lines of regression intersect at the point:

a) (0, 0)
b) (1, 1)
c) (X, Y)
d) $(\bar{X}, \bar{Y})$

Q5. The idea of testing of hypothesis was first set forth by:

a) J. Neyman
b) R.A. Fisher
c) E.L. Lehman
d) A. Wald

Q6. A wrong decision about H_0 leads to:

a) One kind of error
b) Two kind of error
c) Three kind of error
d) Four kind of error

Q7. The hypothesis under test is:

a) Simple Hypothesis
b) Alternative hypothesis
c) Null hypothesis
d) None of the above

Q8. A hypothesis may be classified into:

a) Simple
b) Composite
c) Null
d) All of the above

Q9. Probability of drawing a unit at each selection remains same in:

a) SRSWR
b) SRSWOR
c) Both a) and b)
d) None of the above

Q10. Probability of selection varies at each subsequent draw in:

a) Sampling with replacement

b) Sampling without replacement

c) Both of the above

d) None of the above

Q11. A function of variates for estimating a parameter is called:

a) An estimate

b) A frame

c) An estimator

d) A statistic

Q12. Which of the following statement is true?

a) More the standard error, better it is

b) Standard error is always zero

c) Standard error is always unity

d) Less the standard error, better it is

Q13. Estimation of parameters in all investigations is of:

a) Prime importance

b) Secondary importance

c) No use

d) Deceptive nature

Q14. Estimate and estimator are:

a) Synonyms

b) Different

c) Related to population

d) None of the above

Q15. If an estimator T_n of population parameter θ converges in probability to θ as n tends to infinity, it is said to be:

a) Sufficient

b) Efficient

c) Consistent

d) Unbiased

Q16. A sample consists of:

a) All units of the population

b) 50% units of the population

c) 5% units of the population

d) Any fraction of the population

Q17. Tossing of 3 unbiased coins, there will be ...sample space.

a) 8

b) 12

c) 6

d) 9

Q18. What is the probability of drawing king of ace from well shuffled cards?

a) 1

b) 0

c) 1/2

d) ¼

Q19. Bayes' theorem is the modified form of ...

a) Additional probability

b) Multiplication probability

c) Conditional probability

d) None

Q20. Which of the following is the type of estimates?

a) Point estimate

b) Interval estimate

c) Estimation of confidence region

d) all of the above

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You are required to answer in your own words as far as applicable. The figures in the margin indicate full marks.

SECTION B: SHORT ANSWER QUESTIONS (5X6 = 30 MARKS)

Answer any FIVE questions:

Q1. What do you mean by exhaustive case of an outcome? If two unbiased dice are thrown, give the formula for finding exhaustive cases of an outcome. Also give layout of its sample space. [2+2+2]

Q2. A random sample size 36 is drawn from a finite population consisting 101 units. If the population standard deviation is 12.6. find the standard error of sample mean when the sample is drawn (i) with replacement (ii) without replacement. [3+3]

Q3. Define point and interval estimate. What are the criteria of a good estimator? Explain. [2+4]

Q4. If $f(x) = \log x$, show that (i) $f(ab) = f(a) + f(b)$ (ii) $f\left(\frac{a}{b}\right) = f(a) - f(b)$ [3+3]

Q5. Prove that: $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc\left(1 + \frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$ [3+3]

Q6. Evaluate the following limits : [3+3]

a) $\lim_{x} 0 \left[\frac{1}{x+3} + \frac{1}{x-3}\right]$

b) $\lim_{x} 2 \frac{x^2-4}{\sqrt{3x-2}-\sqrt{x+2}}$

Q7. The demand equation for a certain commodity is $P = \frac{1}{12}Q^2 - 10Q + 300\ (0 \leq Q \leq 60)$. Find the value of Q, the corresponding value of P that maximizes the revenue and the maximum revenue. [6]

SECTION C: LONG ANSWER QUESTIONS (2X15 = 30 MARKS)

Answer any TWO questions:

Q8. XYZ Company Ltd. makes two drugs D and F with the help of three chemicals C_1, C_2 and C_3. The requirements of the different chemicals for 1 kg of each of D and F are given below in suitable units.

Drug/ Chemicals	C_1	C_2	C_3
D	10	16	18
F	12	15	16

The prices of the chemicals in three different markets M, N and P are as follows:

Chemicals/ Markets	M	N	P
C_1	20	8	6
C_2	19	9	7
C_3	16	7	8

Assuming that the company should buy all chemicals from the same market, find the cheapest market if 5 kg of D and 8 kg of F are to be produced. [15]

Q9. Two random samples drawn from normal populations are as follows:

Sample I	20	16	26	27	23	22	18	24	25	19	20
Sample II	17	23	32	25	22	24	28	18	31	33	27

Test whether the two populations have the same variance. [15]

Q10. Three related variate X_1, X_2 and X_3 take the following sets of values.

X_1	1	2	3	4	5
X_2	2	1	5	4	3
X_3	3	1	4	5	2

Calculate the partial correlation coefficient $r_{12.3}$ and the multiple correlation coefficient $R_{1.23}$. [15]

SECTION D: CASE STUDY (20 MARKS)

Q11. *Read a case given below and answer the following questions:*

In 1981, a survey was conducted in remote area by the government of Nepal. The key objective of the survey was to find if there exists any relationship between the age of husband and wife. After survey the enumerator has collected all the relevant data and classified in bivariate continuous form. The collected data include number of husbands and wives in various age groups, is shown below.

Ages of wives in years	Ages of husbands in years				
	20-30	30-40	40-50	50-60	60-70
15-25	5	9	3	-	-
25-35	-	10	25	2	-
35-45	-	1	12	2	-
45-55	-	-	4	16	5
55-65	-	-	-	4	2

Now you are required to:

i) Formulate the above data in appropriate form. [5]

ii) Find, if there exists any relationship between age of wives and husbands. [5]

iii) Test the significance of the result and interpret it. [5]

iv) Determine the age of wife whose husbands' age is 75 years. [5]

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