INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)

May/June 2016 End Semester Examinations

Master of Business Administration (MBA)
INTERNATIONAL TRANSPORTATION AND LOGISTICS/
PORT AND SHIPPING MANAGEMENT
Second Semester (From 2009 – 2015 batch only)

Quantitative Techniques for Business (PG21T 2201/PG22T2201)

Date : 08.06.2016 **Maximum Marks: 60**
Time: 3 Hrs **Pass Marks : 30**

SECTION- A

(12x 1 = 12 Marks)

Answer each question by selecting the right choice :-

1. When A and B two events are not mutually exclusive , then

   (a) P(A U B) = P(A) + P(B) –P(A∩ B)
   (b) P(A U B) = P(A) + P(B)+ P(A∩ B)
   (c) P(A U B) = P(A) - P(B)+ P(A∩ B)
   (d) P(A U B) - P(A) = P(B)+ P(A∩ B)

2. A card is drawn at random from a well shuffled pack of cards. What is the probability that it is a heart or a queen.

   (a) 1/52
   (b) 1/26
   (c) 2/13
   (d) 4/13

3. A questionnaire is used to collect the following type of data

   (a) Tertiary data
   (b) Secondary data
   (c) Primary data
   (d) None of the above

4. The relation between A.M, G.M and H.M

(a) A.M $\geq$ G.M $\leq$ H.M
(b) A.M $\geq$ G.M $\geq$ H.M
(c) A.M $\leq$ G.M $\leq$ H.M
(d) None of the above

5. The goodness of fit is tested by the

(a) F distribution
(b) t distribution
(c) χ^2 distribution
(d) Z distribution

6. In testing of hypothesis, Type I error is

(a) Rejection of null hypothesis H_o when it is true
(b) Accepting null hypothesis H_o when it is true
(c) Accepting null hypothesis H_o when it is false
(d) None of the above

7. The variable X is Binomial (n,p), the mean of X is given by

(a) n/p
(b) p/n
(c) np
(d) np/(1-p)

8. The variable Y is Poisson(λ) , the variance of Y is given by

(a) λ^2
(b) λ
(c) $1/\lambda$
(d) None of the above

9. If the variable X is normally distributed N(μ , σ^2), the standard Z is having:

(a) N(0,1)
(b) χ^2
(c) students t
(d) None of the above

10. If the standard deviation of X is σ, then the standard deviation of 5X is given by :

(a) 25σ
(b) $\sigma/5$
(c) 5σ
(d) $5\sigma^2$

11. If the arithmetic mean of X is μ, then the arithmetic mean of 5+X is given by :

(a) $25+\mu$
(b) $\mu/5$
(c) $5+\mu$
(d) $5\mu^2$

12. If A and B are independent events, then P(AB) =

(a) P(A).P(B)
(b) P(A)/P(B)
(c) P(B)/P(A)
(d) None of the above

SECTION - B

(5 x 4 = 20 Marks)

Answer any five questions:-

13. Draw a Pie chart to represent the following information pertaining to the various components of costs of a shipping vessel in a particular operation.

Cost of materials : Rs38.40 lakhs ; Cost of labour : Rs.30.72 lakhs ;
Direct expenses of service :
Rs 11.52 lakhs; Overhead expenses : Rs 15.36 lakhs

14. An aeroplane flies around the four sides of a square, each of the sides measures 100 kms. The aeroplane covers at a speed of 100 kms. per hour the first side , at 200 kms. per hour the second side, at 300 kms. per hour the third side, and at 400 kms. per hour the fourth side.

Find out the average speed of the aeroplane around the square using the appropriate method.

15. The following table shows the distribution pattern of unloading time(in seconds) of containers at the Port of Samudragarh . Compute the coefficient of variations (in percentage) of unloading time of containers.

Unloading	59-61	61-63	63-65	65-67	67-69	Total

time of a container (sec.)						
No. of containers	4	30	45	15	6	100

16. A bag contains 3 white and 4 black balls. One ball is drawn from the bag and then replaced. Again another ball is drawn . Find the probability that the both balls drawn are white.

17. A firm makes chairs and tables. The contribution for each product as computed by the accounts department is Rs20 per chair and Rs30 per table. Both products are processed on three machines M1, M2 and M3. The time required by each product and total time available per week on each machine are given below.

Machine	Chair	Table	Available time in hours
M1	3hrs	3hrs	36hrs
M2	5hrs	2hrs	50hrs
M3	2hrs	6hrs	60hrs

Formulate the objective function to maximise profits of the firm and the constraints under LP.

18. The total cost function $TC = 31 + 24Q - 5.5Q^2 + Q^3/3$, where Q denotes quantity produced. Find out the values of Q at which TC attains maxima or minima.

19. Find out $\int 12X^2 (X^3 + 2) dX$

20. State briefly applications of statistics in business and economy.

SECTION - C

(4 x7 = 28 Marks)

Answer any four questions . All questions carry equal marks.

21. A survey of 320 families with 5 children revealed the following distribution.

No. of boys	5	4	3	2	1	0
No. of girls	0	1	2	3	4	5
No. of families	14	56	110	88	40	12

Is the result consistent with the hypothesis that male and female births are equally probable ?
($\chi^2_{4,0.5} = 9.488$, $\chi^2_{5,0.5} = 1$ .070, $\chi^2_{6,0.5} = 12.592$)

22. The average life time of a sample of 100 bulbs is 1570 hours with a standard deviation of 120 hours. The company claims that the average life time of the bulbs produced is 1600 hours. Is the claim acceptable at 5% level of significance ? (Given $Z_{0.025} = 1.96$)

23. The mean yield of wheat from district A was 210 kgs. with standard deviation 10 kgs. per acre from a sample of 100 plots. In district B , the mean yield was 220 kgs. with standard deviation 12 kgs. per acre from a sample of 150 plots. Assuming that the standard deviation of the yield in the entire state was 11 kgs. per acre, test whether there is any significant difference between the mean yield of crops in the two districts. (Given $Z_{0.025} = 1.96$)

24. The degree of whiteness readings obtained for three detergents under varying conditions of water temperatures are given below.

Water Temperature	Detergent A	Detergent B	Detergent C
Cold water	57	55	67
Warm water	49	52	68
Hot water	54	46	58

Perform a two way analysis of variance using 5% level of significance.
(Given $F_{2,8,0,.05} = 6.94$)

25. Discuss the applications of Operation Research in business.

26. Solve by graphical method.

Maximise $Z = 3X_1 + 5X_2$, Subject to

$X_1 \leq 4$

$2X_2 \leq 12$,

$3X_1 + 2X_2 \leq 18$,

$X_1 , X_2 \geq 0$

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