3/121

0302E1382

Candidate's Seat No : _____

MBA Sem.-1 (IBFT/DM) Examination

IBFT/DM-102

QA

February-2025

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

- ***Question no 1 to 5 carry 14 marks each.***
- ***Question no. 1 is compulsory.***
- ***Graph paper will be provided on demand.***
- ***Use of Non-programmable scientific calculator and statistical table are permissible.***

Q-1. a) The following data distribution shows the data of the number of wickets taken by the bowlers in one-day matches. Construct a more than ogive for the following frequency table: **[5]**

Number of Wickets	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of Bowlers	5	15	20	23	17	11	9

b) Consider the following data which relate to profits of 100 companies: **[5]**

Profit (Rs. Lakhs)	8-10	10-12	12-14	14-16	16-18	18-20
No. of Companies	8	12	20	30	20	10

Compute the standard deviation and average of profit.

c) It is observed that 50% of mails are spam. There is a software that filters spam mail before reaching the inbox. Its accuracy for detecting a spam mail is 99% and chances of tagging a non-spam mail as spam mail is 5%. If a certain mail is tagged as spam find the probability that it is not a spam mail. **[4]**

Q-2. Attempt any **TWO** of the following:

a) For some computers, the time period between charges of the battery is normally distributed with a mean of 50 hours and a standard deviation of 15 hours. Rohan has one of these computers and needs to know the probability that the time period will be between 50 and 70 hours. [14]

b) The number of industrial injuries per working week in a particular factory is known to follow a Poisson distribution with the mean 0.5. Find the probability that
   I) in a particular week there will be more than 2 accidents.
   II) In a particular week there will be less than one accident.

c) Define and classify the sampling in detail.

(P.T.O)

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Q-3. Attempt any **TWO** of the following: [14]

a) In two samples of women from Punjab and Tamilnadu, the mean height of 1000 and 2000 women are 67.6 and 68.0 inches respectively. If population standard deviation of Punjab and Tamilnadu are same and equal to 5.5 inches then, can the mean heights of Punjab and Tamilnadu women be regarded as same at 1% level of significance?

b) In a random sample of 100 persons from town A, 60 are found to be high consumers of wheat. In another sample of 80 persons from town B, 40 are found to be high consumers of wheat. Do these data reveal a significant difference between the proportions of high wheat consumers in town A and town B (at $\alpha = 0.05$)?

c) From the following data find the regression line equation of x on y. Estimate the value of x when y=6.

x	1	3	4	6	8	9	11	14
y	1	2	4	4	5	7	8	9

Q-4. Attempt any **TWO** of the following: [14]

a) A person wants to invest in one of three alternative investment plans: stocks, bonds and saving account. It is assumed that the person wishes to invest all of the funds in a plan. The conditional payoffs of the investments are based on three potential economic conditions: accelerated, normal or slow growth. The payoff matrix is given below:

Alternative Investment	Economic Conditions		
	Accelerated Growth (in Rs.)	Normal Growth (in Rs.)	Slow Growth (in Rs.)
Stocks	10,000	6500	- 4000
Bonds	8000	6000	1000
Saving Account	5000	5000	5000

Determine the best investment plan using each of the following criteria:

I) Laplace criteria
II) Maximax criteria
III) Hurwicz criteria with coefficient of optimism $\alpha = 0.6$

b) The following table gives the payoffs of three acts A, B, C and the states of nature P, Q, R along with the probability distribution for various combinations:

States of Nature	Acts			Probabilities		
	A	B	C	A	B	C
P	10	-10	60	0.65	0.60	0.35
Q	20	20	-20	0.20	0.25	0.45
R	30	40	20	0.15	0.15	0.20

Calculate and tabulate the EMV for each act and using the EMV criterion, obtain the best act.

c) Find the best act using EOL criterion from the following data:

States of Nature	Good	Fair	Poor
Act	Probability		
	0.2	0.5	0.3
Act 1	4	11	19
Act 2	1	4	23
Act 3	-2	19	39
Act 4	-3	29	34

Q-5. a) An educator claims that the average IQ of college student is at most 110 and that in a study made to test this claim, 150 college students selected at random, had an average IQ of 111.2 with a standard deviation of 7.2. Use a level of significance of 0.01 to test the claim of the educator. [7]

b) What is the difference between a sampling error and a non-sampling error? [7]

OR

a) A manufacturing company has purchased three new machines of different makes and wishes to determine whether one of them is faster than the others in producing a certain output. Five hourly production figures are observed at random from each machine and the results are given as follow: [7]

Machine A	Machine B	Machine C
25	31	24
30	39	30
36	38	28
38	42	25
31	35	28

Use analysis of variance technique and determine whether the machines are significantly different in their mean speed at 5% level of significance. [7]

b) For the following data construct a histogram:

Income (Rs.)	No. of Persons
500-1000	18
1000-1500	20
1500-2500	30
2500-3000	25
3000-4500	10
4500-5000	12
5000-7000	5

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