

FINAL TERM EXAMINATION
Spring 2009
MTH302- Business Mathematics & Statistics (Session - 2)

Time: 120 min
Marks: 80

Student Info	
Center:	OPKST
ExamDate:	7/1/2009 12:00:00 AM

Question No: 1 (Marks: 1) - Please choose one

The Basic salary of an employee is Rs 7,000. What is the contribution of the company on account of gratuity to the Gratuity Trust Fund?

- ▶ **Rs 636.36**
- ▶ Rs 6363.6
- ▶ Rs 63.636
- ▶ Rs 6363

Question No: 2 (Marks: 1) - Please choose one

An arrangement of data by successive time periods is called a

- ▶ Exponential Smoothing
- ▶ **Time Series**
- ▶ Combination
- ▶ Permutation

Question No: 3 (Marks: 1) - Please choose one

The graph of time series is called

- ▶ **Straight line**
- ▶ Smooth Curve
- ▶ Parabola
- ▶ Histogram

Question No: 4 (Marks: 1) - Please choose one

When a straight is fitted to time series data, it is called

- Linear equation
- Linear regression
- Linear trend
- Non-Linear equation

Question No: 5 (Marks: 1) - Please choose one

What variation does moving average method eliminate?

- Seasonal
- Cyclical
- Irregular
- Secular trend

Question No: 6 (Marks: 1) - Please choose one

The temperature was 30°C in the afternoon and the temperature dropped to 26°C in the evening. Find the percentage change in the temperature.

- 13.33%
- 15%
- 14.26%
- 12%

Question No: 7 (Marks: 1) - Please choose one

Observed errors, which represent information from the data which is not explained by the model, are called?

- Marginal values
- Residuals
- Mean square errors
- Standard errors

Question No: 8 (Marks: 1) - Please choose one

An insurance company wants to predict sales from the amount of money they spend on advertising. Which would be the independent variable?

- ▶ (i) sales
- ▶ (ii) advertising
- ▶ (iii) insufficient information to decide

- ▶ (iv) Both (i) and (ii) are correct.

Question No: 9 (Marks: 1) - Please choose one

Frequency of occurrence is used in finding the

- ▶ weighted mean
- ▶ median
- ▶ mode
- ▶ variance

Question No: 10 (Marks: 1) - Please choose one

If the equation of regression line is $y = 5$, then what result will you take out from it?

- ▶ The line passes through origin.
- ▶ The line passes through (5, 0)
- ▶ The line is parallel to y-axis.
- ▶ The line is parallel to x-axis

Question No: 11 (Marks: 1) - Please choose one

Which of the following graphs is a visual presentation using horizontal or vertical bars to make comparisons or to show relationships on items of similar makeup?

- ▶ bar graph
- ▶ pie graph
- ▶ pictograph
- ▶ line graph

Question No: 12 (Marks: 1) - Please choose one

In how many ways can the letters of the word MANAGEMENT be rearranged so that the two As do not appear together?

- ▶ $10! - 2!$
- ▶ $9! - 2!$
- ▶ $10! - 9!$
- ▶ None of these

Question No: 13 (Marks: 1) - Please choose one

Which of the following describe the middle part of a group of numbers?

- ▶ Measures of central tendency
- ▶ measures of variability
- ▶ measures of shape
- ▶ measures of association

Question No: 14 (Marks: 1) - Please choose one

In the United States, 43% of people wear a seat belt while driving. If two people are chosen at random, what is the probability that both of them wear a seat belt?

- ▶ 18%
- ▶ 20%
- ▶ 25%
- ▶ None of these

Question No: 15 (Marks: 1) - Please choose one

The midrange is **not** greatly affected by outliers

- ▶ False
- ▶ True

Question No: 16 (Marks: 1) - Please choose one

In which of the following form, can the probability be written?

- ▶ fraction
- ▶ decimal
- ▶ percentage
- ▶ All of these.

Question No: 17 (Marks: 1) - Please choose one

The moving averages of the Prices 90,70,30,110 are

- ▶ 63.33, 70
- ▶ 73.33,80
- ▶ 45.45, 68
- ▶ 65.50, 75

Question No: 18 (Marks: 1) - Please choose one

Sum of annuity is always

- ▶ Present value
- ▶ Future value
- ▶ Net present value
- ▶ Current value

Question No: 19 (Marks: 1) - Please choose one

Write a formula to find the simple interest (I) if \$5000 is invested at 4% for 2 years.

- ▶ $I=PRT$
- ▶ $I=P+R+T$

- ▶ $I=PT$
- ▶ $I=P(R+T)$

Question No: 20 (Marks: 1) - Please choose one

Solve $3x = 27$ for x

- ▶ 0.9
- ▶ 6
- ▶ 18
- ▶ 9

Question No: 21 (Marks: 1) - Please choose one

If the value of r is zero then the graph of the data points shows

- ▶ evenly skewness
- ▶ positively scattered
- ▶ no associations
- ▶ negative associations

Question No: 22 (Marks: 1) - Please choose one

The minimum number of points required to calculate the intercept of a straight line is/are

- ▶ one
- ▶ two
- ▶ three
- ▶ one or three

Question No: 23 (Marks: 1) - Please choose one

What will be the rate of 20 as a base and percentage is 25?

- ▶ 120%
- ▶ 125%
- ▶ 130%
- ▶ None of these

Percentage

Percentage is formed by multiplying a number called the base by a percent, called the rate. Thus

$$\text{Percentage} = \text{Base} \times \text{Rate}$$

$$25 = 20 \times \text{Rate}$$

$$\text{Rate} = 25/20 = 1.25$$

Question No: 24 (Marks: 1) - Please choose one

The value of x after solving the following linear equation is

$$-2x + 6 = 4x - 2$$

- ▶ 0
- ▶ 3
- ▶ 1/2
- ▶ 4/3

Question No: 25 (Marks: 1) - Please choose one

Order of a Matrix =

- ▶ Number of Columns x Number of Rows
- ▶ Number of Rows / Number of Columns
- ▶ Number of Rows x Number of Columns
- ▶ None of these

Question No: 26 (Marks: 1) - Please choose one

Markdown means a reduction from the

- ▶ Original cost price
- ▶ Original sale price
- ▶ Original Net price
- ▶ None of these

Question No: 27 (Marks: 1) - Please choose one

If an asset is purchased at Rs 3000 on the date 6/29/2008 and the first depreciation period ends on 11/29/2008, where salvage value is 300 and period is taken as 1 on 20% interest rate where basis =1, then which of the following function Returns the depreciation for given accounting period

- ▶ =AMORLINC(3000, 6/29/2008, 11/29/2008, 300, 1*12, 20%, 1)
- ▶ =AMORLINC(3000, 6/29/2008, 11/29/2008, 300, 1, 20% / 12 , 1)
- ▶ =AMORLINC(3000, 6/29/2008, 11/29/2008, 300, 1, 20%, 1)
- ▶ =AMORLINC(3000, 6/29/2008, 11/29/2008, 300, 1*12 , 20%/12, 1)
- ▶ None of these

Question No: 28 (Marks: 1) - Please choose one

Which of the following is the system of linear equations?

- ▶ $4x + 6y = 9$
- ▶ $3x^2 + 5y^2 = 7, x + y = 8$
- ▶ $5x + 7y = 12, 2x + 8y = 10$
- ▶ $2x^2 - 5x + 7 = 0$

Question No: 29 (Marks: 1) - Please choose one

To find average of numbers given in figure, one can apply the excel formula

	C	D	E	F	G
1					
2					
3					
4					
5			239		
6			245		
7			250		
8			255		
9			249		
10			261		
11			241		
12			231		
13					
14					
15					

- ▶ `=AVERAGE(E12:E13)`
- ▶ `=AVERAGE(E5:E12)`
- ▶ `=SUMIF(E5:E12)`
- ▶ `=DSUM(E5:E12)`

Question No: 30 (Marks: 1) - Please choose one

An arrangement of all or some of a set of objects in a order is called permutation.

- ▶ Definite
- ▶ Indefinite
- ▶ Same
- ▶ Different

Question No: 31 (Marks: 1) - Please choose one

6!.....

- ▶ 720
- ▶ 620
- ▶ 420
- ▶ 520

Question No: 32 (Marks: 1) - Please choose one

Expected =

- ▶ Trend - Seasonal
- ▶ Trend + Seasonal
- ▶ Trend * Seasonal
- ▶ Trend / Seasonal

Question No: 33 (Marks: 1) - Please choose one

Random =

- ▶ Actual / expected
 - ▶ Actual +expected
- ▶ Actual * expected
- ▶ Actual - expected

Question No: 34 (Marks: 1) - Please choose one

The standard deviation is

- ▶ a measure of variability.
- ▶ the square root of the variance.
- ▶ twice the standard error.

- ▶ half the range.

Question No: 35 (Marks: 1) - Please choose one

Coefficient of variation shows dispersion of the

- ▶ standard deviation about mean.
- ▶ standard deviation about mode.
- ▶ variance about mean.
- ▶ variance about mode.

Question No: 36 (Marks: 1) - Please choose one

If a hypothesis specifies the population distribution is called

- ▶ composite hypothesis
- ▶ test statistic
- ▶ alternative hypothesis

▶ simple hypothesis

Question No: 37 (Marks: 1) - Please choose one

Which distribution is most commonly used to model the number of random occurrences of some phenomenon in a specified unit of space or time?

- ▶ Normal Distribution
- ▶ Binomial Distribution
- ▶ Poisson Distribution
- ▶ Negative Binomial Distribution

Question No: 38 (Marks: 1) - Please choose one

A regression equation was computed to be $Y = 35 + 6X$, the value of 35 indicates that

- ▶ An increase in one unit of X will result in an increase of 35 in Y
- ▶ The coefficient of correlation is 35
- ▶ The coefficient of determination is 35
- ▶ The regression line crosses the Y-axis at 35

Question No: 39 (Marks: 1) - Please choose one

Chi-distribution is used to decide whether or not certain variables are

- ▶ Dependent
- ▶ Independent
- ▶ Discrete
- ▶ Continuous

Question No: 40 (Marks: 1) - Please choose one

Time series data is analyzed by the moving average.

- ▶ True
- ▶ False

Question No: 41 (Marks: 2)

A student is chosen at random from a class of 16 girls and 14 boys. What is the probability that the student chosen is not a girl?

Solution:

$P = \frac{\text{Total number of events}}{\text{total number of possible outcome}}$

$$P = \frac{14}{30}$$

$$P = 0.46$$

Question No: 42 (Marks: 2)

For the marks obtained by 9 students ,given $Q_1 = 56$ marks , $Q_2 = 65$ marks ,
 $Q_3 = 74$ marks .Find Q.D .

Solution:

$$\text{Quartile Deviation} = \frac{Q_3 - Q_1}{2}$$

$$\text{Quartile Deviation} = \frac{74 - 56}{2}$$

$$\text{Quartile Deviation} = \frac{18}{2}$$

$$\text{Quartile Deviation} = 9$$

Question No: 43 (Marks: 2)

Describe the difference between Poisson distribution and Cumulative Poisson Distribution.

Solution:

Poisson Distribution

A Poisson random variable is the number of successes that result from a Poisson experiment. The probability distribution of a Poisson random variable is called a Poisson distribution.

Cumulative Poisson Probability

A cumulative Poisson probability refers to the probability that the Poisson random variable is greater than some specified lower limit and less than some specified upper limit.

Question No: 44 (Marks: 3)

Eleven subjects carried out the same task using a pocket calculator. The times (in seconds) taken were: 69, 75, 83, 58, 95, 72, 86, 88, 77, 79, 90. Find the range & median .

Solution:

58	69	72	75	77	79	83	86	88	90	95
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Range = Largest Value – Smallest Value

$$\text{Range} = 95 - 58$$

$$\text{Range} = 37$$

$$\text{Median} = \frac{n+1}{2}$$

$$\text{Median} = \frac{11+1}{2}$$

$$\text{Median} = \frac{12}{2}$$

Median = 6th Value

$$\text{Median} = 79$$

Question No: 45 (Marks: 3)

Find the trends in the data below:

	A	B	C	D	E	F
1						
2						
3						
4						
5		Day	Period	Data	Moving average.	Trend
6			1 Morning	170		
7			Afternoon	140	180	
8			Evening	230	182	
9			2 Morning	176	186	
10			Afternoon	152	187	
11			Evening	233	189	
12			3 Morning	182	192	
13			Afternoon	161	195	
14			Evening	242		
15						

Solution:

Actual Data – Moving Average = trend

Actual Data	Moving average	Trend
140	180	-40

230	182	48
176	186	-10
152	187	-35
233	189	44
182	192	10
161	195	-34

Question No: 46 (Marks: 3)

A random sample of size n is drawn from normal population with mean 6 and S.D

1.2; if $z = 4$, $\bar{x} = 8$ what is n?

Solution:

$$z = \frac{X - \bar{X}}{S.D}$$

$$4 = \frac{X - 8}{1.2}$$

$$4 \times 1.2 = X - 8$$

$$4.8 = X - 8$$

$$4.8 + 8 = X$$

$$X = 12.8$$

Put the Value of X in S.D

$$S.D = \frac{X - \bar{X}}{n}$$

$$1.2 = \frac{12.8 - 6}{n}$$

$$1.2n = 6.8$$

$$n = \frac{6.8}{1.2}$$

$$n = 5.67$$

$$n = 6$$

Question No: 47 (Marks: 5)

Use the given data to find the equation of the regression line. Round the final values to three significant digits, if necessary.

x	y
1	143
3	116
5	100
7	98

Solution:

X	Y	XY	X ²	Y ²
1	143	143	1	20449
3	116	348	9	13456
5	100	500	25	10000
7	98	686	49	9604
9	90	810	81	8100
Sum=25	Sum=547	Sum=2487	Sum=165	Sum=61609

$$r = \frac{n \sum xy - (\sum X)(\sum Y)}{\sqrt{(n \sum x^2 - (\sum x)^2)(n \sum y^2 - (\sum y)^2)}}$$

$$r = \frac{(5)(2487) - (25)(547)}{\sqrt{(5(165) - (25)^2)(5(61609) - (547)^2)}}$$

$$r = \frac{12435 - 13675}{\sqrt{(825 - 625)(308045 - 299209)}}$$

$$r = \frac{-1240}{\sqrt{(200)(8836)}}$$

$$r = \frac{-1240}{\sqrt{1767200}}$$

$$r = \frac{-1240}{1329}$$

$$r = -0.933$$

Question No: 48 (Marks: 5)

Find the probability that a man flipping a coin gets the sixth head on the tenth flip.

Solution:

The probability of success (P) is 0.50, the number of trials (x) is 10, and the number of successes (r) is 6. We enter these values into the negative binomial formula.

Negative Binomial Distribution $P(X = r) = {}_{n-1}C_{r-1} p^r (1-p)^{n-r}$

(r) is 1. We enter these values into the negative binomial formula.

$$b^*(x; r, P) = {}_{x-1}C_{r-1} * Pr * Q^{x-r}$$

$$b^*(10,6,0.50) = {}_{10-1}C_{6-1} * 0.50^6 * (1-0.5)^{10-6}$$

$$b^*(10,6,0.50) = {}_9C_5 * 0.015625 * (0.5)^4$$

$$b^*(10,6,0.50) = 126 * 0.015625 * 0.0625$$

$$b*(10,6,0.50) = 0.123046$$

Question No: 49 (Marks: 5)

Calculate the mean, median and mode for the following set of data
1,2,8,5,4,9,3,4,5,8,6,2,4,5,8,8000.

Solution

1	2	2	3	4	4	4	5	5	5	6	8	8	8	9	8000
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$$Mean = \frac{\sum x}{n}$$

$$Mean = \frac{8074}{16}$$

$$Mean = 504.625$$

$$Median = \frac{n+1}{2}$$

$$Median = \frac{16+1}{2}$$

$$Median = \frac{17}{2}$$

$$Median = 8.5^{th} \text{ Value}$$

$$Median = 5 + .5(5 - 5)$$

$$Median = 5 + .5(0)$$

$$Median = 5$$

$$Mode = 4, 5, 8$$

Question No: 50 (Marks: 10)

A family has 3 boys and 2 girls.

a) Find the number of ways they can sit in a row

b) How many ways are there if the boys and girls are each to sit together?

Solution:

a) The Five can sit in a row.

$$5 \times 4 \times 3 \times 2 \times 1 = 5! = 120$$

b) There are two ways to distribute them according to sex.

BBBGG or GGGBB

In each case boys can sit in $3 \times 2 \times 1 = 3! = 6$ ways

The girls can sit $2 \times 1 = 2! = 2$ ways

Thus together they are...

$$= 2 \times 3! \times 2!$$

$$= 2 \times 6 \times 2$$

$$= 24 \text{ ways}$$