

**FINAL TERM EXAMINATION**  
**Fall 2008**  
**MTH302- Business Mathematics & Statistics (Session - 3)**

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

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6!.....

▶ **720 (Correct)**

▶ 620

▶ 420

▶ 520

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

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Given : List Price = 5500Rs , Discount = 850Rs, then Net Cost Price will be

▶ 6350 Rs

6350 Rs

▶ 5508 Rs

5508 Rs

▶ 5585 Rs

▶ **4650 Rs (Correct)**

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

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The value of x after solving the following linear equation is

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

▶ 0

▶ 3

▶ 1/2

▶ **4/3**

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

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$A = [1]$ , then which statement is wrong about A?

- ▶ A is a column matrix.
- ▶ A is a row matrix.
- ▶ A is an identity matrix.
- ▶ **A is not a square matrix. (Correct)**

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

Percentage is a ratio of given number with standard number:

- 🕒 **100 (Correct)**
- 🕒 Same number

- 🕒 1000
- 🕒 10

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

Sum of annuity is always

- ▶ Present value
- ▶ **Future value (Correct)**
- ▶ Net present value
- ▶ Current value

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

If the principal P is 900 rupees, time period is 6 years and rate is 12% then the simple interest will be

- ▶ **648 (Correct)**
- ▶ 658
- ▶ 668
- ▶ 678

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

In the equation  $\bar{Y} = a + b\bar{X}$  the formula to calculate b is

▶ 
$$b = \frac{n \sum xy - \sum x \sum y}{n \sum x^2 - (\sum x)^2}$$

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

$P(A \text{ and } B) = P(A) \times P(B)$

What does this formula represent?

- ▶ (a) **The events A and B are Dependent. (Correct)**
- ▶ (b) The events A and B are Exclusive.
- ▶ (c) The events A and B are Independent.
- ▶ (d) Both (a) and (b)

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

The moving averages represent -----

- ▶ **Time series variations**
- ▶ Co-efficient of variations
- ▶ Statistical Dispersion
- ▶ Absolute deviation

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

Two dice are rolled and the numbers are added together. The probability of the total being 12 is  $\frac{1}{36}$

- ▶ True
- ▶ **False (Correct)**

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

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$$\frac{6!}{0!(6-6)!}$$

Evaluate

- ▶ 0
- ▶ 10
- ▶ 120
- ▶ **720 (Correct)**

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

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Which of the following terms is a measure of the central tendency?

- ▶ Standard Deviation
- ▶ Variance
- ▶ Average
- ▶ **None of these (Correct)**

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

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How many arrangements can be made of the letter BUSINESS

- ▶ 6723
- ▶ 6725
- ▶ **6720**
- ▶ 6721

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

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There are 5 Rock songs, 6 Carnatic songs and 3 Indian pop songs. How many different albums can be formed using the above repertoire if the albums should contain at least 1 Rock song and 1 Carnatic song?

- ▶ **15624**
- ▶ 16384
- ▶ 6144
- ▶ 240

Constant: 1 Rock song and 1 Carnatic song

Solution:

Rock Song has (5-1) combinations.

Hence,  $2^5 - 1 = 32 - 1 = 31$  ways ----- (A)

Carnatic Song:

Carnatic Song has (6-1) combinations.

Hence,  $2^6 - 1 = 64 - 1 = 63$  ways ----- (B)

Indi pop:

Indi pop can have all 3 combinations.

Hence,  $2^3 = 8$  ways ----- (C)

From A, B and C we have:

$31 * 63 * 8 = 15624$  ways (Ans)

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

In an exponential smoothing model, the weighting factor  $w$  is a number that falls between \_\_\_\_\_ and \_\_\_\_\_.

▶ 0; 1

▶ -1; 1

▶ -1; 0

▶ 4; 4

▶ -2; 2

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

In a positively skewed distribution

▶ The mean, median, and mode are all equal.

▶ The mean is larger than the median (Correct)

▶ The median is larger than the mean.

▶ The standard deviation must be larger than the mean or the median.

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

For what purpose is the method of least squares used on time-series data?

▶ It is used for eliminating irregular movements

▶ It is used for obtaining the trend equation.

▶ It is used for deseasonalizing the data.

▶ It is used for exponentially smoothing a series.

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

All of the following are assumptions of the error terms in the simple linear regression model except

▶ normality

- ▶ error terms with a mean of zero
- ▶ constant variance
- ▶ variance of one

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

Which one of the following statements is not true?

- ▶ Correlation shows a degree of association between two variables.
- ▶ You can make any predictions with results of correlation.
- ▶ Correlation helps proceed further with regression analysis.
- ▶ You can make Predictions on the base of regression equations.

**Question No: 21 ( Marks: 2 )**

Define frequency with example.

**Answer:**

The number of times a certain value or class of values occur.

**Question No: 22 ( Marks: 2 )**

Define Type-I error.

**Answer:**

Statistical probability in hypothesis testing that the test sample supports a conclusion that a value is misstated when, in fact, the value is correctly stated. Defined also as an incorrect decision to reject something that should have been accepted, it is the mirror image of type 2 error. If the level of significance (called alpha level) for a test result is set too high, the possibility of type 1 error is reduced but the possibility of type 2 error is raised by the same factor, and vice versa. Also called alpha error or alpha risk.

**Question No: 23 ( Marks: 2 )**

A coin can be tossed in 3 ways. A die can be thrown in 6 ways. A coin and a die together can be thrown in  $3 \times 6 = 18$ .....ways.

**Question No: 24 ( Marks: 3 )**

Determine two variable X and Y are correlated or uncorrelated by using the following table

X	0	4
Y	2	2

Solution:

X	0	4	4
Y	2	2	4
XY	0	8	8
X <sup>2</sup>	0	16	16
Y <sup>2</sup>	4	4	8

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

$$r = \frac{8 - \frac{(4)(4)}{2}}{\sqrt{((16) - (4))((8) - (4))}}$$

$$r = \frac{8 - 8}{\sqrt{(12)(4)}}$$

$$r = \frac{0}{\sqrt{48}}$$

$$r = \frac{0}{6.9}$$

$r = \text{uncorrelated}$

**Question No: 25 ( Marks: 3 )**

Show that X and Y are uncorrelated by using the following table

X	2	4
Y	3	3

**Solution:**

X	2	4	6
Y	3	3	6
XY	6	12	18
X <sup>2</sup>	4	16	20
Y <sup>2</sup>	9	9	18

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

$$r = \frac{18 - \frac{(6)(6)}{2}}{\sqrt{((20) - (9))((18) - (9))}}$$

$$r = \frac{18 - 18}{\sqrt{(11)(9)}}$$

$$r = \frac{0}{\sqrt{99}}$$

$$r = \frac{0}{9.9}$$

$r = \text{uncorrelated}$

**Question No: 26 ( Marks: 3 )**

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**Explain negative binomial distribution.**

**Answer:**

It returns the probability that there will be number failures before the number\_s-th success, when the constant probability of a success is probabilities. This function is similar to the binomial distribution, except that the number of successes is fixed, and the number of trials is variable. Like the binomial, trials are assumed independent.

**Question No: 27 ( Marks: 5 )**

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What will be the correlation coefficient r between variables X and Y if varX=4

$$\sum (X - \bar{X})(Y - \bar{Y})$$

VarY=9 , No. of observation n=8 and

=5.

**Solution:**



$$\text{cov}(X, Y) = \frac{\sum (X - \bar{X})(Y - \bar{Y})}{n}$$

$$\text{cov}(X, Y) = \frac{5}{8}$$

$$\text{cov}(X, Y) = 0.625$$

$$r = \frac{\text{Cov}(X, Y)}{\sqrt{\text{var}(X) \text{var}(Y)}}$$

$$r = \frac{0.625}{\sqrt{4 \times 9}}$$

$$r = \frac{0.625}{\sqrt{36}}$$

$$r = \frac{0.625}{6}$$

$$r = 0.104$$

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**Question No: 28 ( Marks: 5 )**

On a final examination in mathematics the mean was 72 and the standard deviation was 15. Determine the standard scores of students receiving marks

(a) 60, (b) 93, (c) 72

**Solution:**

(a) 60

$$z = \frac{x - \mu}{\sigma}$$

$$z = \frac{60 - 72}{15}$$

$$z = \frac{-12}{15}$$

$$z = -0.8$$

(b) 93

$$z = \frac{x - \mu}{\sigma}$$

$$z = \frac{93 - 72}{15}$$

$$z = \frac{21}{15}$$

$$z = 1.4$$

(c) 72

$$z = \frac{x - \mu}{\sigma}$$

$$z = \frac{72 - 72}{15}$$

$$z = \frac{0}{15}$$

$$z = 0$$

**Question No: 29 ( Marks: 5 )**

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a) Write all the combinations of  $abcd$  taken 1 at a time.

**Answer :  $4!/1!(4-1)! = 4$**

b) Write their combinations taken 2 at a time.

**Answer :  $4!/2!(4-2)! = 4.3.2/2.2 = 6$**

c) Write their combinations taken 3 at a time.

**Answer :  $4!/3!(4-3)! = 4.3.2/3.2 = 6$**

d) Write their combinations taken 4 at a time.

**Answer :  $4!/4!(4-4)! = 1$**

**Question No: 30 ( Marks: 10 )**

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Find the standard deviation and variance for 10 randomly selected data values :

44, 50, 38, 96, 42, 47, 40, 39, 46, 50 .

**Solution:**

X	(X- $\bar{X}$ )	(X- $\bar{X}$ )^2
38	-11.2	125.44
39	1-10.2	104.04
40	-9.2	84.64
42	-7.2	51.84
44	-5.2	27.04
46	-3.2	10.24
47	-2.2	4.84
50	0.8	0.64
50	0.8	0.64
96	46.8	2190.24
Sum=492		Sum=2600

$$Mean = \frac{\sum x}{n}$$

$$Mean = \frac{492}{10}$$

$$Mean(\bar{X}) = 49.2$$

$$Variance = \frac{\sum (X - \bar{X})^2}{n}$$

$$Variance = \frac{2600}{10}$$

$$Variance = 260$$

$$S \tan dard \ Deviation = \sqrt{\frac{\sum (X - \bar{X})^2}{n}}$$

$$S \tan dard \ Deviation = \sqrt{\frac{2600}{10}}$$

$$S \tan dard \ Deviation = \sqrt{260}$$

$$S \tan dard \ Deviation = 16.12$$

**Question No: 31 ( Marks: 10 )**

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Find the mean, median, mode, and range for the following list of values:  
13, 18, 13, 14, 13, 16, 14, 21, 13

**Solution:**

X
13
13
13
13
14
14
16
18
21
Sum=135

$$Mean = \frac{\sum x}{n}$$

$$Mean = \frac{135}{9}$$

$$Mean = 15$$

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

$$Median = \frac{9+1}{2}$$

$$Median = \frac{10}{2}$$

$$Median = 5^{th} \text{ Value}$$

$$Median = 14$$

$$Mode = \text{Most Repeated Value}$$

$$Mode = 13$$

$$Range = \text{Largest Value} - \text{Smallest Value}$$

$$Range = 21 - 13$$

$$Range = 8$$