SOLUTION MID-1

Time: 60 minutes   **Max Mark: 30**

Question 01:   **[CLO-1]**   **[2+3=5]**

a) There are four blood types, A, B, AB, and O. Blood can also be Rh + and Rh −. Finally, a blood donor can be classified as either male or female. How many different ways can a donor have his or her blood labeled? Justify your answer with tree diagram. **16 ways**

b) Suppose that vehicles taking a particular freeway exit can turn right (R), turn left (L), or go straight (S).Consider observing the direction for each of three successive vehicles.

    i.   List all outcomes in the event A that all three vehicles go in the same direction. **A={ RRR ,LLL,SSS}**

    ii.   List all outcomes in the event B that all three vehicles take different directions. **B={RLS ,RSL ,LRS ,LSR ,SLR ,SRL }**

    iii.   List all outcomes in the event C that exactly two of the three vehicles turn right. **C={RRL,LRR,RLR,RRS,SRR,RSR}**

Question 02:   **[CLO-1]**   **[3+2=5]**

Distribution of CEO ages of software house is as follows:

Age	21-30	31-40	41-50	51-60	61-70	71-80
Frequency	1	8	27	29	24	11

a) Find

    i.   Mean, Median and the coefficient of variation (use calculator) **55.5, 55.328 ,21.12%**

    ii.   Sketch relative frequency histogram or OGIVE (<)

b) If a CEO is selected at random, find the probability that his or her age is

    i.   Between 31 and 40   **0.08**

    ii.   Over 30 and under 51   **0.35**

Question 03:   **[CLO-1]**   **[3+2=5]**

a) A box contains 24 laptops, 4 of which are defective. If 4 are sold at random, find the following probabilities.

    i.   Exactly 2 are defective   **0.107**

    ii.   All are defective.   **0.094 $X10^{-3}$**

    iii.   None is defective   **0.456**

b) The license plates of a state consist of three letters followed by three digits.

    i.   How many license plates are possible?   **17576000**

    ii.   How many license plates are possible on which no letter or digit is repeated? **11232000**

    iii.   Find the probability of a randomly selected one of these plates with the first latter is vowel and first digit is odd. **0.096**

Question 04:   [CLO-2]   [05]

The table below represents the university degrees awarded in a recent academic year by gender.

	Bachelor's	Master's	Doctorate
Men	573	211	24
Women	775	301	21

	B	Ma	D
M	0.301	0.111	0.013
W	0.407	0.158	0.011

Choose a degree at random. Find the probability that it is

    i.   A doctorate or a degree awarded to a woman. 0.588
    ii.   A doctorate awarded to a woman. 0.011
    iii.   Not a master's degree. 0.731
    iv.   A master's degree given that degree holder is man. 0.262
    v.   Are events "Women" and "Master's" are independent? Justify No , P(W | M)≠P(W)

Question 05:   [CLO-1]   [5+5=10]

Fill in the blanks

1) Two dice are rolled the probability of getting a sum less than 5 is-----------0.167

2) Two cards are drawn from a deck the probability of getting all spades is ---------0.059

3) A couple has three children than probability of all girls or all boys ---------0.25

4) The number of ways of arranging the letter of the word CORRUPTION -------------907200

5) A person selects 6 candy bars from a list of 10 and 6 salty snakes from a list of 12 to put in Vending machine in ---------ways   194040

Choose the correct answer

1) Which one measurement does not divide a set of observations into equal parts?
a) Quartiles   b) Standard Deviations   c) Percentiles   d) Median

2) Which one is the not measure of dispersion.
a) The Range   b) 50th Percentile   c) Inter-Quartile Range   d) Variance

3) Which of the following measures of central tendency are sensitive to extreme scores?
a) Mode   b) Median   c) Mean   d) None of these

4) In a five number summary, which of the following is not used for data summarization?
a) The smallest value   b) The largest value   c) The median   d) The mean

5)The median is higher than the mode and the mean is higher than the median, the distribution is
a) Negative skewed   b) Positive skewed   c) No skewed   d) None of these

ALL THE BEST

1(a)
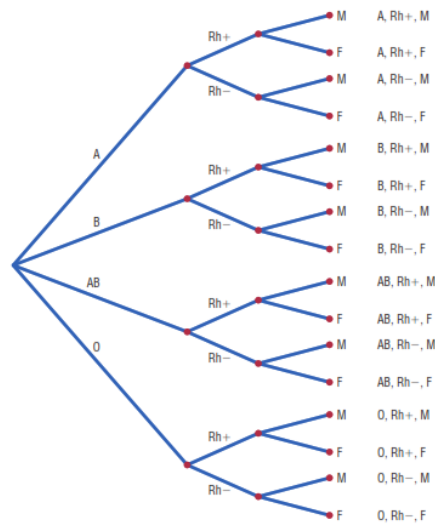
2(a)
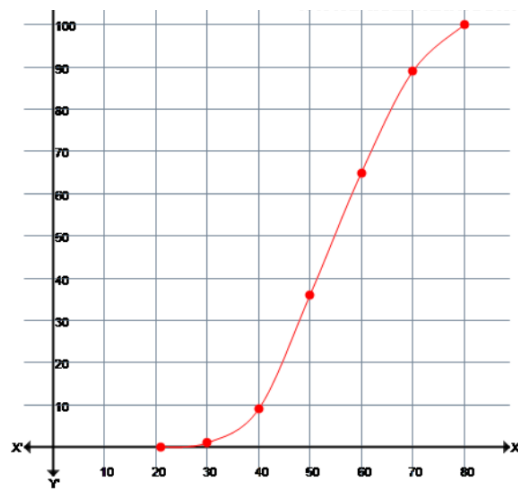
OGIVE (<) Curve

3(a)

There are $_{24}C_4$ ways to sell 4 transistors, so the denominator in each case will be 10,626.

a. Two defective transistors can be selected as $_4C_2$ and two nondefective ones as $_{20}C_2$. Hence,

$$P(\text{exactly 2 defectives}) = \frac{_4C_2 \cdot _{20}C_2}{_{24}C_4} = \frac{1140}{10,626} = \frac{190}{1771}$$

b. The number of ways to choose no defectives is $_{20}C_4$. Hence,

$$P(\text{no defectives}) = \frac{_{20}C_4}{_{24}C_4} = \frac{4845}{10,626} = \frac{1615}{3542}$$

c. The number of ways to choose 4 defectives from 4 is $_4C_4$, or 1. Hence,

$$P(\text{all defective}) = \frac{1}{_{24}C_4} = \frac{1}{10,626}$$