MACHAKOS UNIVERSITY

University Examinations 2019/2020

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

CERTIFICATE IN INFORMATION COMMUNICATION TECHNOLOGY (TVET)

MATHEMATICS

DATE: 30/10/2020   **TIME: 8:30 – 11:30 AM**

INSTRUCTIONS:

    Answer All Questions

1.   a)   Expand $(2-x)^6$ up to the fourth term. hence use your expansion to estimate the value of $(1.75)^6$ (4 marks)

       b)   A pack contains 3 red, 9 blue and 15 grey corks all are identified in shape and size. Find the probability of picking   (4 marks)

           i.   A red cork

           ii.   A non-red cork

           Two corks are picked at random, one at a time without replacement. Find the probability that

           (i)   A red and grey cork are picked   (4 marks)

           (ii)   Both corks are of same colour   (5 marks)

       c)   i)   expand $(x + \frac{1}{2x})^6$ up to the independent term.

           ii   Use the expansion above to find the largest value $^{28}/_9)^6$ correct to 4 significant figures   (5 marks)

       d)   The height in cm of 60 children attending a clinic was recorded as below:

Height in cm	30-32	33-35	36-38	39-41	42-44
No of children	2	3	15	12	18

Calculate

      (i)   Mean of the data   (4 marks)

      (ii)   Median   (4 marks)

2.   a)   Today Philip intends to go walking. The probability of good weather (G) is ¾. If the weather is good, the probability he will go walking (W) is $^{17}/_{20}$. If the weather forecast is not good (NG) the probability he will go walking is $^{1}/_{5}$.

      i.   Complete the probability tree diagram to illustrate the information

      ii.   What is the probability that Philip will go walking   (6 marks)
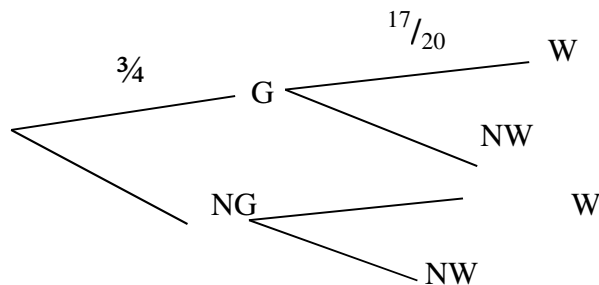
    b)   A box contains 10 coloured light bulbs, 5 green, 3 red and 2 yellow.

      i.   One light bulb is selected random and put in to light fitting room A. What is the probability that the light bulb selected is

          I.   Green   (2 marks)

          II.   Not green   (2 marks)

      ii   A second light bulb is selected at random and put the light fitting room B. What is the probability that:

          I.   The second light bulb is green given that the first bulb was green

                                               (2 marks)

          II.   Both light bulbs were not green   (2 marks)

          III.   One room had a green bulb and the other room does not have a green light bulb   (3 marks)

      ii.   A third bulb is selected at random and put it in the light fitting room C. What is the probability that:-

          I.   All the three rooms have green light bulbs

          II.   Only one room has a green light bulb.

3. a) The following results were obtained from a survey concerning the reading habits of students.

60% read magazine P

50% read magazine Q

50% read magazine R

30% read magazine P and Q

20% reads magazine Q and R

30% read magazine P and R

10% read all the three magazines

Represent all of this information on a Venn diagram   (6 marks)

b) The Venn diagram below shows the number of students studying science (S), mathematics (M) and History (H) out of 20 college students. Some of the students do not study any of the subjects, 8 study science, 10 study Maths and 9 study history
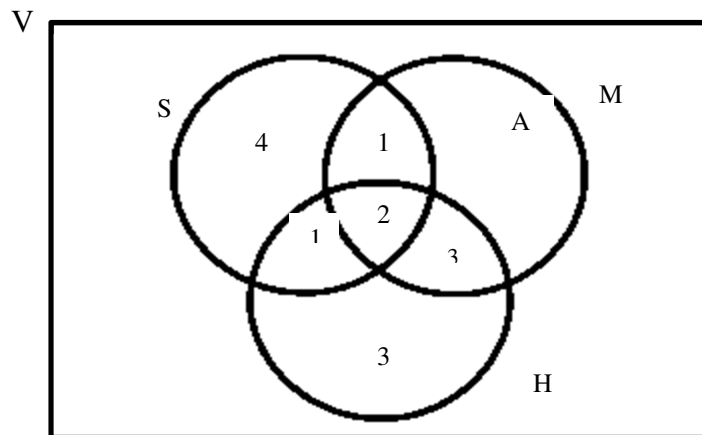
(i)   How many students belong to the region labeled A   (2 marks)

(ii)   describe in words the region labeled A   (2 marks)

(iii) How many students do not study any of the three subjects?   (5 marks)

(iv)   Find

S∩M

S∪H

M∩H^c

c) Given S {1, 2, 3, 4, 5} and T = {2, 4, 6, 8}   (2 marks)

Find S∪T

S∩T