TAKORADI POLYTECHNIC
SCHOOL OF APPLIED SCIENCE
DEPARTMENT OF MATHEMATICS AND STATISTICS
END OF FIRST SEMESTER EXAMINATION
2018/2019 ACADEMIC YEAR

DECEMBER 2018 PROBABILTY 1
STA 115 TIME:3 HOURS

ANSWER ALL QUESTIONS IN SECTION "A" AND TWO QUESTIONS IN SECTION "B"

SECTION A

Answer all questions in this section

1. (a) Let A be the set of all positive odd numbers less than 10. Describe Set A by:
   i. The roster method
   ii. The property method

   (b) Let U={1,2,3,4,5,6,7,8,9,10}.
   A= {1, 2, 3, 4, 5, 6}
   B= {4, 5, 6, 7}
   C= {2, 4, 6, 8, 10}.
   Find
   i. AUB
   ii. $(A \cap B)^c$
   iii. $(A^c \cap B)$
2. (a) Defined the following terms as used in Probability and Statistics:
   i. Sampling
   ii. Sampling with replacement
   iii. Sampling without replacement

   (b) (i) Let A and B be any two sets. Prove that $(A - B) \cup (B - A) = (A \cup B) - (B \cap A)$
   (ii) Prove the De-Morgan's laws of sets.

3. A School basketball squad for the inter-school competition has ten players. The coach must select a team for the first tournament.
   (a) How many different teams of five players can be constituted for this tournament?
   (b) If, in constituting the team, the coach also has to designate positions, how many different teams of five players can be constituted?

4. A box contains a GH₵ 1.00 note, a GH₵2.00 note, a GH₵ 5.00 note a GH₵ 10.00 note and a GH₵ 20.00 note. A person selects a note from the box at random. Find the probability that:

(a) The note selected is GH₵ 10.00 note
(b) The denomination of the note selected is more than GH₵ 2.00
(c) The note selected is a GH₵ 50.00 note
(d) The note selected is of an odd denomination.

5. A committee of 6 is to be formed from 13 men and 7 women. In how many ways can the committee be selected given that:
   (a) It must consist of 4 men and 2 women?
   (b) It must have at least one member of each sex?

6. (a) A pair of dice is rolled once. Find the probability of rolling:
   (i) A sum of 7
   (ii) A sum of 7 and 11
   (iii) A double.

SECTION B

Answer **two** questions **only** from this section

7. A box contains 8 red balls, 5 yellow balls, 3 black balls and 4 pink balls. If a ball is selected at random, find the probability that it is
   (i) Red
   (ii) Black or pink ball
   (iii) Not yellow
   (iv) An orange ball

8. (a) A box contains 8 bulbs, of which 5 are good and 3 are defective. If 3 bulbs are randomly taken from the box, what is the probability that all are good?
   (b) Two balls are selected at random without replacement from a box which contains 4 white and 8 black balls. Compute the probability that:
   (i) Both balls are white.
   (ii) The second ball is white.

9. A committee of 5 is to be formed from 12 men and 8 women. In how many ways can the committee be chosen so that there are 3 men and 2 women on it?