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

DIPLOMA IN FOOD AND BEVERAGE

MATHEMATICS

DATE: 29/10/2020 **TIME: 11:30 – 2:30 AM**

INSTRUCTIONS: Answer Question One and Any Other Two Questions

1. a) A line passes through the points A(7,g) and B(4,5) and is perpendicular to the line Whose equations 4y=3x-9. Find the value of g. (5 marks)

   b) A plot of a land is valued at sh.1, 250,000.due to increase in demand; it appreciates at the rate of 6% every six months. What its value be after $3^1/_2$ years (5 marks)

   c) the 4^{th} and 7^{th} term of a geometric sequence are 24 and 192 . Find the common ratio and the first term of the sequence. (5 marks)

   d) The sum of the first four terms of an AP is 32 and the sum of the first seven terms is 98. Find the first term and the common difference (5 marks)

   e) a line L passes through points (-2,3) and (-1,6) and is perpendicular to a line passing through the point P at (-1,6).

      i. Find the equation of l in terms Y=mx+c (2 marks)

      ii. Find the equation of P in form of ax+by=c where a,b,c are constants.

   f) Compute

      i. $7c_3$ (2 marks)

      ii. $5p_2$ (2 marks)

2. A packet contains 3 red, 9 blue and 15 grey corks all identical in shape and size. Find the probability of picking.

a) i A red cork (1 mark)

ii A non –red cork (2 marks)

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

i. A red and grey cork are picked (3 marks)

ii. Both corks are of the same colour (4 marks)

c) Two dice are tossed together once. Prepare a table to illustrate the possible spaces for this experiment. Find the probability that the sum of the faces

i. P ($x \geq 6$) (3 marks)

ii. P($x < 8$) (2 marks)

iii. P ($6 \leq x \leq 12$) (3 marks)

3. a) The first term of an AP is 2. The sum of the first 8 terms is 156.

i. Find the common difference of the AP (2 marks)

ii. Given that the sum of the first n terms of the AP is 416, find n (3 marks)

b) The third, fifth and eighth terms of another AP forms the first three terms of a G.P. if the common difference of the A.P is 3 find.

i. The first of the G.P (3 marks)

ii. The sum of the first 10 terms of the G.P to 4 significant figures (3 marks)

c) Two concentric circles are radii 3.5 cm and 14 respectively. Find in terms of π cm^2

i. The area of the inner circle (2 marks)

ii. The area of the outer circle (2 marks)

iii. The probability that a point chosen at random in the bigger circle lies within the smaller circle (3 marks)

iv. The probability that appoint chosen at random lies outside the smaller circle (3 marks)

4. A paint dealer mixes three types of paint A,B and C in the ratio's A:B 3:4 and B:C1:2. The mixture is to contain 168 litres of C.

a) Find the ratio A: B: C (2 marks)

b) Find the required number of litres o f B (2 marks)

c) The cost per litre of type A is ksh.160, type B is 205 and type C is ksh.100.

i. Calculate the cost per litre of the mixture (4 marks)

ii. Find the percentage profit if the selling price of the mixture is ksh.182 per litre (3 marks)

iii. Find the selling price of a litre of the mixture if the dealer makes a 25% profit (3 marks)

d) Tap A can fill a tank in 5 hours while B can fill the same tank in 7 hours. Tap C can empty the same tank in 6 hours, how long would it take;

i. Tap A and B to fill the tank when its empty and tap C is closed (3 marks)

ii. Tap A and B to fill the empty tank with Tap C open (3 marks)