MACHAKOS UNIVERSITY

University Examinations 2020/2021 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

FIRST YEAR FIRST TERM EXAMINATION FOR

CERTIFICATE IN BUILDING TECHNOLOGY

1902/106: MATHEMATICS

DATE: 3/6/2021 **TIME: 11.30-2.30 PM**

INSTRUCTIONS:

. must have a scientific calculator and mathematical table.

. question 1 is compulsory (section A)

. choose any other 7 questions from section B.

SECTION A

1. a) a donation of 28 cartons of exercise books were distributed among 288 pupils in a school. If each carton had 144 exercise books, determine the number of books each pupil received (4 marks)

   b) the ratio of men, women to children who attended a church service was 2:3:6 respectively. If there were 150 men, determine;

      i. the difference between women and men who attended the service (2 marks)

      ii. the total number of people who attended the service (2 marks)

   c) a hemispherical bowl of internal diameter 42 cm, is filled with milk. Determine the capacity in litres of milk it can hold (4 marks)

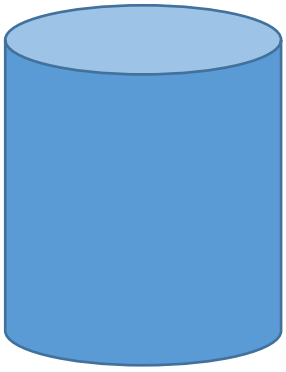
   d) the marked price of a fridge was ksh 48000.a customer bought it at 15% discount. If the trader made a profit of 8%, determine the amount of profit made to the nearest whole number in shillings. (4 marks)

   e) without using a calculator evaluate ${}^5P_2+{}^6P_3$ (4 marks)

f) a group of 6 boys has a mean weight of 54kg.when two more boys joined the group, one with $x$kg and the other with $(x + 10)kg$,the new mean is 55kg.determine the value of x. (6 marks)

SECTION B

2. consider the figure below:



Given its internal and external radii to be 42cm and 35cm respectively and the height is 53cm (assuming the figure to be closed)

a) determine it surface area leaving your answer interms of π (4 marks)

b) find the capacity of the tin in litres (6 marks)

3. a) express as a single fraction

i) $\frac{x-3}{4} + \frac{2x-3}{5}$

ii) $\frac{2x+3}{2} - \frac{x+3}{3}$ (5 marks)

b) in a class of p students ,3 are absent during a history lesson. If those who are present are to sit in groups of five, how many such groups will there be? (5 marks)

4. a) find the ratio of $x: y$ in the following equations

i) $(x + y): (x - y) = 25: 7$

ii) $(3x + 2y): (3x - 2y) = 25: 17$

iii) $\frac{5}{4} = \frac{3x+5y}{3x-5y}$ (6 marks)

b) if $a: b = 7: 11, find\ the\ ratio\ of\ \ (5a - 3b): (2a + 3b)$ (4 marks)

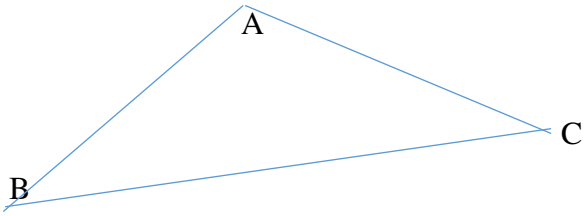
5. a container in the shape of a cylinder has a radius of 1.5m.it contains water to a depth of 3.5m, a solid plastic sphere of 0.8 m is placed inside the container and the level of water rises to x m calculate x to the nearest unit (10 marks)

6. a) if y varies constantly and partially as x: if x=16 when y=2 and x=33 when y=3.find the value of x when y=5 (6 marks)

b) find the area of a triangular piece of cake measuring 70cm by 45cm by98cm (4 marks)

7. Applying cosine rule. Find the length of AB in the figure below

Given that AC=12cm,BC=16cm and angle BAC=33º (5 marks)



Derive the sine rule. (6 marks)

8. a) the sum of the first 5 terms of an A.P is 54 and the sum of the first 8 terms of the same A.P is 84.

Determine

i. the first term and the common difference of the A.P.

ii. the fifth term (6 marks)

b) calculate the area of a sector formed by a radius of 6cm and subtending an angle of 73.4º (4 marks)

9) a) if two dice are tossed together and their outcomes recorded in pairs (1,1) (1,2) etc. Construct a table of possible outcomes. Find the probabilities that they show;

i) the same number

ii) different numbers

iii) 2 as one of the numbers (8 marks)

b) Define the term measures of central tendency (2 marks)

10. a) 9 men working in a factory produces 20 pans in 6 working days. How long will it take 12 men working in the same rate to produce the same number of pans.(5 marks)

b) an alloy consists of three meta A, B and C. If the ratio of A: B=3:4 and B:C=6:7. find

i. proportion of A:C

ii. given the quantity of metal B in the alloy to be 36kg.determine the mass of the alloy. (5 marks)