



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

DIPLOMA IN FOOD AND BEVERAGES

2802/102: 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 b)

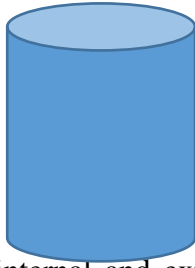
Choose any other 7 questions from section B.

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 its surface area leaving your answer in terms 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 by 98cm (4 marks)
7. a) the following data shows the distribution of weekly incomes 108 randomly selected vegetable vendors in a town.

Income (ksh 100)	frequency
40-48	6
49-57	22
58-66	43
67-75	28
76-84	9

Calculate the;

- i) Mean
 - ii) Mode (8 marks)
 - b) define the term probability as applied in mathematics (2 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 73.4° (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)