



MACHAKOS UNIVERSITY

University Examinations 2017/2018

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

FIRST YEAR SECOND SEMESTER EXAMINATION FOR CERTIFICATE IN
ELECTRICAL AND ELECTRONICS ENGINEERING.

ECU 00101 : MATHEMATICS 11

DATE: 5/12/2017

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

Answer questions ONE (Compulsory) and any other TWO questions.

QUESTION ONE

1. a) Simplify;

(i) 300cm^3 : 6 litres

(ii) $3\frac{1}{2} : 2\frac{2}{5} : 5\frac{3}{5}$ (5 marks)

b) Rationalize $\frac{2\sqrt{5} + \sqrt{2}}{\sqrt{5} - \sqrt{2}}$ (5 marks)

c) Given that a varies as the cube of b and that a =180 when b =3. find the value of a when b = $\frac{1}{4}$ (6 marks)

d) Determine the stated term in the following series.

(i) $-12 + (-2) + 8 + \dots$ the 18th term.

(ii) $\frac{3}{4} + 1\frac{1}{2} + 3 + \dots$ the 11th term. (6 marks)

- e) A triangle has sides 5cm, 9cm and 10 cm.

Calculate:

- (i) its perimeter
- (ii) its area
- (iii) the smallest angle in the triangle (8 marks)

QUESTION TWO (20 MARKS)

- a) A quantity l is inversely proportional to the cube of r . When $l = 5$, $r = 0.05$. Find the value of r when $l = 20$, (7 marks)
- b) The mass, m , of a roller varies jointly with its length, l , and the square of its diameter d . A roller of diameter 80cm is 2m long and has a mass of 90kg. Calculate the mass in kg of a roller 110cm in diameter and 3m long. (5 marks)
- c) A solid cylinder has a total surface area of 8.4m^2 , Determine its volume, to 3 s.f, given that its height is $\frac{1}{2}$ m. (8 marks)

QUESTION THREE (20 MARKS)

- a) The second term of a G.P is 2 and the fifth term is 128. Calculate the;
- (i) First term and common ratio.
 - (ii) Sum of the first six terms. (7 marks)
- b) i) Given that $X:Y = 4:7$ and $X:Z$ is $3:2$, Find the ratio of $X:Y:Z$.
- ii) Increase Ksh 64,000 in the ratio 8:5 (7 marks)
- c) An artisan deposited Sh 30,000 in the bank offering simple interest of 15% p.a .
- Calculate;
- (i) interest after 8 years
 - (ii) total saving after $4\frac{1}{4}$ years (6 marks)

QUESTION FOUR (20 MARKS)

- a) In a triangle XYZ, YZ is the base and a point N is 5 cm from Y, Angle XNY is a right angle and $XN = 9$ cm. If XZ is 11cm, determine;
- i) The lengths XY and NZ.
 - ii) Area of the triangle XYZ. (8 marks)

- b) Peter borrows a sum of sh 80,000 at 10% p.a simple interest and lends that to Lena at the same rate but at compound interest. How much will Peter gain by this transaction at the end of the third year. (6 marks)
- c) Omondi joined a firm which offered a salary of K£ 8,100 p.a, with an annual increase of 10% of his salary of the previous year;
- (i) Write down his salary for the first 3 years
- (ii) How much does he receive during his 7th year. (6 marks)

QUESTION FIVE (20 MARKS)

- a) In an Arithmetic Progression, the sum of the 5th and the 8th term is 62. The sum of the first seven terms is 147. Determine the 20th term. (5 marks)
- b) The second term of a geometrical progression is $\frac{5}{4}$ while its sum to infinity is $\frac{20}{3}$. Calculate the sum of the first 8 terms. (7 marks)
- c) An area is enclosed by the curve $y= 4x^2 + 12x$ and the x – axis. Use trapezoidal rule with 6 strips to calculate the area. (8 marks)