



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN ELECTRICAL ENGINEERING

AMA1150 : ENGINEERING MATH 1

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of Choose No questions. Attempt Choose instruction.

Do not write on the question paper.

Question ONE

a) Evaluate

i) $\log_4 x = 2\frac{1}{2}$ (2marks)

ii)
$$\frac{(3^2)^{\frac{3}{2}} x (8^{\frac{1}{3}})^2}{(3^2)x(4^3)^{\frac{1}{2}}x(9)^{\frac{-1}{2}}}$$

(3mks)

b) Simplify

$$\frac{x^2y}{xy^2-xy}$$
 (2mks)

ii) Simplify $\frac{a^3b^2c^4}{abc^{-2}}$ and evaluate when $a=3$, $b=\frac{1}{8}$, and $c=2$ (3marks)

c) Given y is directly proportional to x and $y=2.48$ when $x=0.4$. determine

i) coefficient of proportionality+

ii) value of y when $x=0.65$ (4marks)

d) Solve the simultaneous equation (3marks)

$$3p=2q$$

$$4p+q+11=0$$

e) The sum of 7 terms of an AP is 35 and common difference is 1.2. determine the first term of the series (3marks)

f) Determine the area of regular hexagon that has sides 8cm long (4marks)

g) Calculate the volume and total surface area of hemisphere of diameter 5cm (4marks)

e) Evaluate $(\frac{81}{16})^{\frac{3}{4}}$ (2marks)

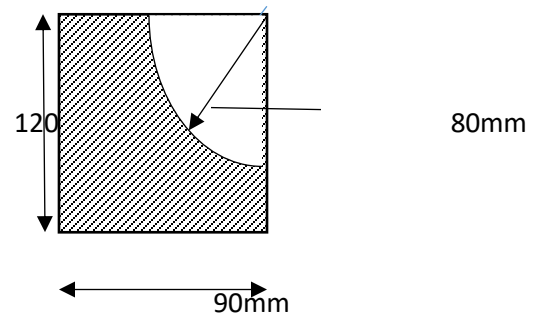
Question TWO

The resistance $R\Omega$ of length of wire at $t^{\circ}\text{C}$ is given by $R=R_0(1+\alpha t)$ where R_0 is the resistance at 0°C and α is temperature coefficient of resistance in 0°C . find values of R_0 and α if $R=30\Omega$ at 50°C and $R=35\Omega$ at 100°C (5marks)

b) Solve by factorisation $3x^2-11x-4=0$ (3mark)

c) Find the area of the template shown below (3marks)

radius



d) Calculate the resultant of $V_1-V_2+V_3$ when $V_1=22$ units at 140°C , $V_2=40$ units at 190°C and $V_3=15$ units at 290°C (7marks)

e) Evaluate $81^{0.25}$ (2marks)

Question THREE

a) Solve the equation $2x^2 - 7x + 4 = 0$ using the quadratic formula. Give your answer to (3 decimal places)
(5mks)

b) The force between two magnets is inversely proportional to the square of distance x between them, when $x=3$, $F=4$. Determine

i) F when $x=2$

ii) x when $F=64$ (5marks)

c) Solve the equation $2^{(x+1)} = 3^{(2x-5)}$ correct to (2 decimal places)

d) A football stadium floodlight can spread its illumination over an angle of 45° to a distance of 55m. determine maximum area that is floodlit (2mks)

e) Find volume and surface area of sphere of diameter 8cm (3mks)

Question FOUR

a) Which term of the series 2187, 729, 243, is $\frac{1}{9}$ (5mks)

b) Solid metal cylinder of radius 6cm and height 15cm is melted down and recast into a shape comprising hemisphere surmounted by a cone. Assuming 8% of metal is wasted in the process, determine the height of conical portion if diameter is to be 12cm (5mks)

c) Solve the equation

$$4x + 2y = 14$$

$$3x + 5y = 21 \quad (4mks)$$

d) Evaluate $2x^2 - 11x + 3 = 0$ (6mks)

Question FIVE

a) Solve the simultaneous equation (6 marks)

$$\frac{a}{2} - 7 = -2b$$

$$12 = 5a + \frac{2}{3}b$$

b) Evaluate

$$i) \frac{\sqrt{3}+1}{\sqrt{3}-4}$$

ii) $\frac{4e^{2.23} \log 2.23}{\ln 2.23}$ to (3 decimal places) (3mks)

c) Three numbers are in arithmetic progression. Their sum is 15 and their product is 80. Determine the three numbers (7marks)