



COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)
SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING
CERTIFICATE IV IN ELECTRICAL AND ELECTRONICS ENGINEERING
STAGE 1

EEE327- MATHEMATICS FOR TRADE 2

FINAL EXAMINATION – PENSTER 3, 2017
DURATION – 2 HOURS AND 10 MINUTES
TOTAL MARKS - 100

Day/Date: As per timetable Time: As per timetable Room: As per timetable

INSTRUCTIONS TO STUDENTS

1. You are allowed 10 minutes Extra reading time during which you are NOT to write.
2. Begin each answer on a fresh page and use both sides of the sheet.
3. Write your candidate-number at the top of each attached sheet
4. Insert all written foolscaps, graph paper, drawing paper, etc. in their correct sequence and secure with string
5. For all sheets of paper on which rough/draft work has been done, cross it though and you MUST ATTACH to your answer scripts.
6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
7. ANSWER ALL QUESTIONS.
8. Show all workings where necessary.
9. Do not use programmable calculators, especially the ones that do the conversions of number systems.
10. **ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE ROOM!**

Instruction:

Write the appropriate alphabet beside each question number on your attached sheet.

1. Make w the subject of $e = w^2 + ft y^2$
 - a) $w = \sqrt{(e - f y^2)}$
 - b) $w = \sqrt{(e - t y^2)}$
 - c) $w = \sqrt{(e - ft y^2)}$
 - d) $w = \sqrt{(e - ft)}$

2. If the general equation for a linear graph is given by $y = mx + c$; which component determines the slope?
 - a) y
 - b) m
 - c) x
 - d) c

3. How many minutes do you find in a degree?
 - a) 30
 - b) 600
 - c) 3600
 - d) 60

4. In the general sinusoidal equation $y = A\sin(\omega t \pm \alpha)$; the leading phase shift is represented as:
 - a) $+\alpha$
 - b) $-\alpha$
 - c) $-$
 - d) $+$

5. What is the surface area formula of a cube if the volume of the cube is l^3 ?
 - a) l^2
 - b) l_2
 - c) l_3
 - d) l^5

6. $\sin^{-1} 0.5 =$
 - a) 30°
 - b) 60°
 - c) 1.57°
 - d) 45°

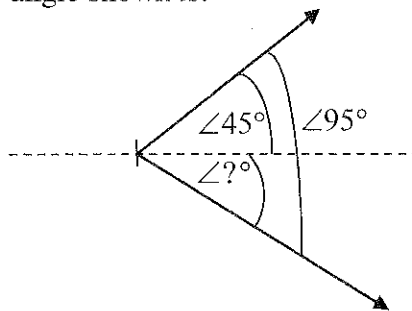
7. Which of the following is not Pythagorean Triad?

- a) 8, 15, 17
- b) 6, 8, 10
- c) 13, 14, 15
- d) 5, 12, 13

8. To convert radians to degrees is:

- a) *Divide* $\frac{\pi}{180}$
- b) *Multiply* $\frac{\pi}{180}$
- c) *Divide* $\frac{180}{\pi}$
- d) *Multiply* $\frac{180}{\pi}$

9. The angle shown is:



- a) $\angle 50^\circ$
- b) $\angle -50^\circ$
- c) $\angle 85^\circ$
- d) $\angle -85^\circ$

10. Name the quantity that has magnitude and direction:

- a) Scalar
- b) Vector
- c) Mass
- d) Litre

SECTION B

SHOW ALL NECESSARY WORKING

[45 MARKS]

1. Transpose the following:

a. $S = \frac{a}{1-r}$ [make 'r' the subject of formula] (2 marks)

b. $k = \frac{1}{2}mv^2$ [make 'v' the subject of formula] (2 marks)

2. Given that 50 foot ladder rest against a window ledge that is 40 feet above the ground, find out how far is the ladder from the edge of the building (2 marks)

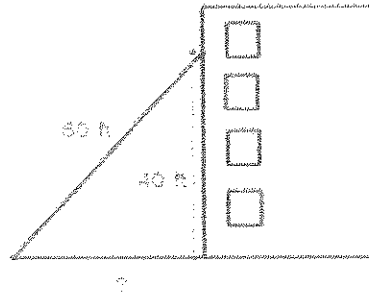


Figure 1

3. Use the diagram below to find x. (3 marks)

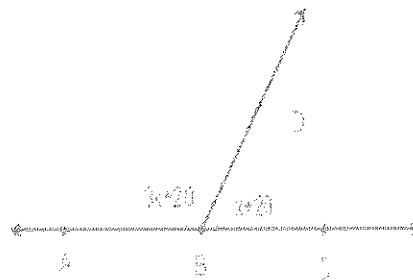


Figure 2

4. Mr. Waqa wants to put down hardwood floors in his living room which is 3.0m by 2.0m. If the cost of hardwood flooring is \$5.00 per square foot, find the approximate cost not including labor to put down hardwood flooring in his living room.

(4 marks)

5. Find the volume of the cone below.

(3 marks)

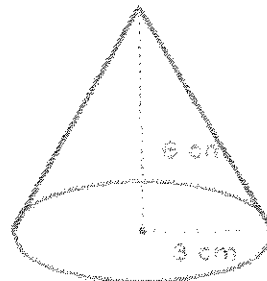


Figure 3

6. Add the following angular values: (4 marks)
- $120^{\circ}55'50''$ and $20^{\circ}10'15''$
 - $18^{\circ}45'12''$ and $82^{\circ}5'15''$
7. Convert the following angles to degrees and decimals of a degree, to 3 decimal places: (4 marks)
- $20^{\circ}55'50''$
 - $12^{\circ}25'30''$
8. Find the angle supplementary to the following: (4 marks)
- 120°
 - $128^{\circ}45'50''$
9. If an angle of 135° is subtended by an arc of a circle of radius 8cm, find the length of: (4 marks)
- The minor arc
 - The major arc, correct to 3 significant figures
10. A fish aquarium shaped like a rectangular solid is 20 inches wide, 25 inches long and 15 inches tall. How much volume could the fish aquarium hold in cubic inches and gallons?
Hint: 1 foot = 0.134 gallons (3 marks)
11. Tank was full at odometer reading 45000 and is refilled with 10 gallons at an odometer reading of 50000.

Cost per gallon of regular fuel is \$2.73

Cost per gallon of premium fuel is \$3.10

- How many miles were travelled on one tank of fuel? (3 marks)
- What was the MPG? (2 marks)
- If the cost of fuel was \$31.00. What type of fuel was purchased? (3 marks)
- How many miles could this car is driven on 15 gallons of fuel? (2 marks)

SECTION C

CALCULATIONS

[45 MARKS]

1. Using elimination method, solve the following simultaneous equations: (3 marks)
 $3x + 4y = 5$
 $2x - 5y = -12$
2. The equation of a straight line, of gradient m and intercept on the y -axis c , is given by $y=mx+c$. If a straight line passes through the point where $x=2$ and $y=-2$, and also through the point where $x=2.5$ and $y=8.5$, find the values of the gradient and the y -axis intercept. (4 marks)
3. Solve the following quadratic equations by factorizing: (4 marks)
a. $4x^2 + 8x + 3 = 0$
b. $x^2 + 2x - 8 = 0$
4. Solve the following equation using Quadratic Formula (2 marks)
a. $15x^2 + 2x - 8 = 0$
5. Plot the graph of the followings:
a. $2y = 4x + 6$ (3 marks)
b. $f(x) = 2x^2 + 6x + 4$ (3 marks)
6. Find the gradient, co-ordinates of x -intercept, y -intercept and draw the graph for the following equations:
a. $y = 3x + 2$ (5 marks)
b. $y = -2x + 4$ (5 marks)
7. If $I_1 = 5 \sin \theta$ and $I_2 = 7 \sin (\theta - \frac{\pi}{4})$.
Find, by calculation, an expression for the resultant current represented by $i_1 + i_2$ and draw the waveform diagram for I_1 , I_2 and I_R . (7 marks)
8. Convert the following: (6 marks)
a. 11011_2 (Binary to Decimal)
b. 29_{10} (Decimal to Binary)
c. $A6_{16}$ (Hexadecimal to binary)
9. Convert 3714_{10} to a binary number, via octal (3 marks)

*****THE END*****

