



COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY
SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING
CERTIFICATE IV IN ELECTRICAL ENGINEERING-STAGE 2
EEE327 – MATHEMATICS FOR TRADE 2

FINAL EXAMINATION – PENSTER 2, 2016

TIME: 2 HOURS 10MINUTES
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!**

SECTION A:**Multiple Choice****(20 marks)****Instruction:***Write the appropriate alphabet beside each question number on your attached sheet.*

1. Transpose I the subject of $P = VI$

A. $I = \frac{P}{V}$

B. $I = \frac{V}{P}$

C. $I = VP$

D. All of the above

2. The circumference of a circle is equal to:

A. πr^2

B. $4\pi r$

C. $4\pi r^2$

D. $2\pi r$

3. Which of the following is a Pythagorean Triad?

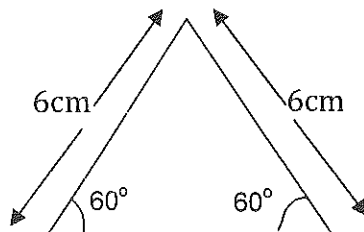
A. 8, 15, 16

B. 6, 8, 10

C. 12, 14, 15

D. 6, 12, 13

4. The triangle shown below is:



- A. Isosceles
B. Equilateral
C. Right-angled
D. Scalene

5. Which of the following is correct?

- A. 1 revolution = 360 degrees
B. 1 minute = 60 degrees
C. 1 second = 60 minutes
D. 1 revolution = 60 degrees

6. Which of the following are supplementary angles?

- A. 36° and 54°
B. 0° and 90°
C. 89.1° and 90.9°
D. 160° and 200°

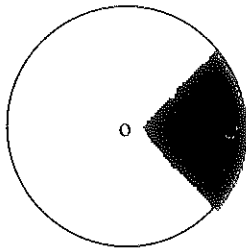
7.



If the length of the above figure is 50cm then its diameter is:

- A. 25 cm
- B. 15.915 cm
- C. 31.830 cm
- D. 47.746 cm

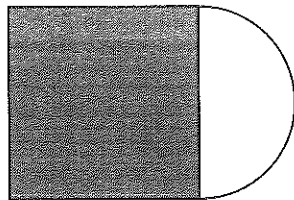
8.



The shaded part of the circle is called the:

- A. segment
- B. sector
- C. chord
- D. semi-circle

9. What is the radius of the circle shown below if the area of the square 40mm²?



- A. 6.32 mm
- B. 12.4 mm
- C. 20mm
- D. 3.16 mm

10. State the general term for the angle of 89.99°

- A. Acute angle
- B. Obtuse angle
- C. Reflex angle
- D. Straight angle

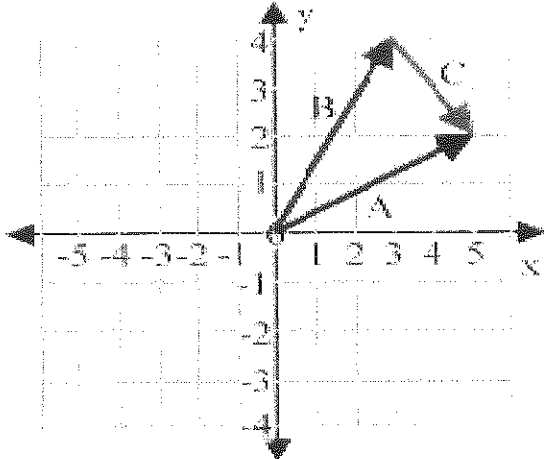
11. Choose the number that is not a binary number:

- A. 110012₂
- B. 11100111₂
- C. 110111₂
- D. 1010₂

12. Identify the angle to the addition of $88^\circ + 92^\circ$:

- A. Straight angle
- B. Right angle
- C. Obtuse angle
- D. Acute angle

13. Which of the following is a resultant vector?



- A. \vec{A}
- B. \vec{B}
- C. \vec{C}
- D. \vec{A} and \vec{B}

14. Add $15^\circ 32'$ and $17^\circ 19'$

- A. $32^\circ 51'$
- B. $34^\circ 51'$
- C. $10^\circ 32'$
- D. $13^\circ 52'$

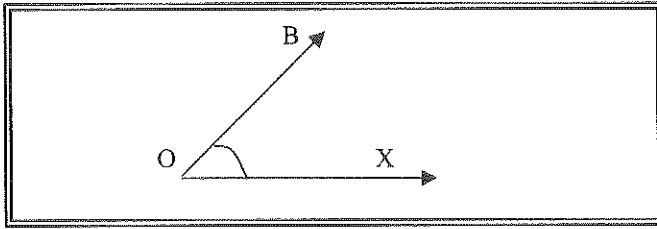
15. Determine a if $a = \frac{g^2 + h}{k}$ when $g = 2$, $h = 1$ & $k = 2$

- A. 2.5
- B. $\frac{5}{2}$
- C. $2\frac{1}{2}$
- D. All of the above

16. $X^2 - 9$ is equivalent to

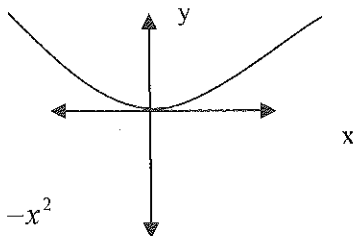
- A. $(X - 3)^2$
- B. $(X - 3)(X + 3)$
- C. $(X - 3)(X - 3)$
- D. $-3 \cdot X^2$

17.



The angle shown above is:

- A. $\angle OBX$
 - B. $\angle OXB$
 - C. $\angle X$
 - D. $\angle BOX$
18. When solving simultaneous equation, which method is used to remove one unknown and then solving the other unknown?
- A. Substitution method
 - B. Factor method
 - C. Elimination method
 - D. Square method
19. Which quantity has both magnitude and direction?
- A. Scalar quantity
 - B. Scale quantity
 - C. Vector quantity
 - D. size
20. Identify the given graph:



- A. $y = -x^2$
- B. $y = x^2$
- C. $y = x^2 + 1$
- D. $y = -x^2 - 1$

SECTION B:

(30 marks)

Instruction:

Show working where necessary.

1. Solve $4x^2 + 7x + 2 = 0$ giving the roots correct to 2 decimals. (5 marks)

2. Solve for the unknowns: (5 marks)

$$4x - 3y = 100$$

$$3y + 5x = 50$$

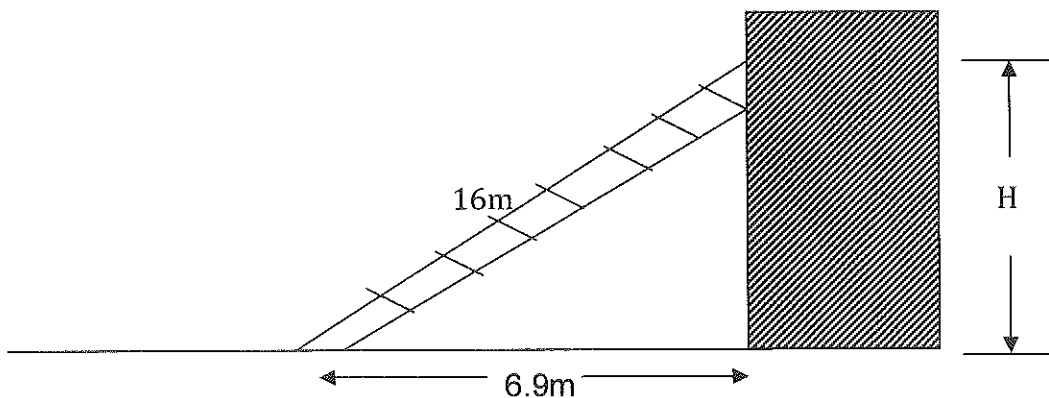
3. A ladder 60.0 ft long reaches to the top of a building when its foot stands 30.0 ft from the building. How high is the building? (5 marks)

4. Transpose the formula to make the given quantity in the brackets the subject.

$$2\pi fL = \frac{1}{2\pi fC} \quad [f]$$

(6 marks)

5. A ladder 16m long is placed against a wall with its foot 6.9m away from the wall. How far up the wall does the ladder reach? (5 marks)



6. Given that $X = p \left[1 + \frac{at}{100} \right]$; determine X when $p = 854$, $a = 6$ and $t = 20$. (4 marks)

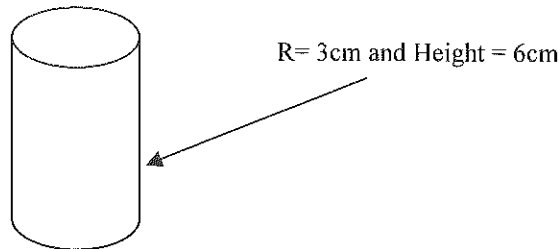
SECTION C:

(30 marks)

Instruction:

Show working where necessary.

1. What is the surface area of the cylinder shown in the figure (lateral surface plus it's both base areas)? (5 marks)

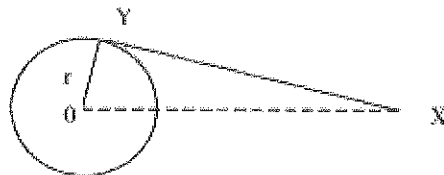


2. Tank was full at odometer reading 35000 and is refilled with 12 gallons at an odometer reading of 60000.

Cost per gallon of regular fuel is \$2.73

Cost per gallon of premium fuel is \$3.10

- A. How many miles were travelled on one tank of fuel? (3 marks)
B. What was the MPG? (2 marks)
C. If the cost of fuel was \$32.76. What type of fuel was purchased? (3 marks)
D. How many miles could this car is driven on 15 gallons of fuel? (2 marks)
3. Figure below shows a tangent XY touching a circle at Y. If the radius of the circle is 50mm and the distance XY is 152mm, find the distance OX in centimeters. (3 marks)



4. Solve $3x^2 - 11x - 4 = 0$ by using quadratic formula: (4 marks)
5. Sketch the graphs of:
a. $y = x^2$ (2mark)
b. $v = 3 \sin(\omega t - 56^\circ)$ (2 marks)
6. Determine the gradient of the straight line graph passing through the co-ordinates
a. (-2, 5) and (3, 4) (2 mark)
b. (-2, -3) and (-1, 3) (2 mark)

SECTION D:**(20 marks)****Instruction:***Show working where necessary.*

1. The following values of resistance R ohms and corresponding voltage V volts are obtained from a test on a filament lamp.

R ohms	30	48.5	73	107	128
V volts	16	29	52	76	94

Choose suitable scales and plot a graph with R representing the vertical axis and V the horizontal axis. Determine

- The gradient of the graph. (2 marks)
 - The R axis intercepts value. (2 mark)
 - The equation of the graph. (2 marks)
 - The value of resistance when the voltage is 60 V. (1mark)
 - The value of the voltage when the resistance is 40 ohms (1 mark)
2. Convert the following binary numbers to decimal:
- 11011_2 (3 marks)
 - 1011_2 (3 marks)
3. Convert the following decimal numbers 47_{10} to a binary number:
- 47_{10} (3 marks)
 - 29_{10} (3 marks)

-----THE END-----