



COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)

SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

CERTIFICATE IV IN ELECTRICAL AND ELECTRONICS ENGINEERING  
STAGE 1

EEE301- MATHEMATICS FOR TRADE 1

FINAL EXAMINATION – PENSTER 2, 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!**

1.  $2.75 + .003 + .158 =$ 
  - A. 2.911
  - B. 4.36
  - C. 0.436
  - D. 2.938
  
2. Which of the following is the least?
  - A. 0.105
  - B. 0.015
  - C. 0.501
  - D. 0.15
  
3. A soccer team played 160 games and won 65 percent of them. How many games did it win?
  - A. 94
  - B. 114
  - C. 104
  - D. 124
  
4. What is 12% of 120?
  - A. 10
  - B. 28.8
  - C. 18.4
  - D. 14.4
  
5. A box in a college bookstore contains books, and each book in the box is a history book, an English book or a science book. If one-third of these books are history books and one-sixth are English books, what fraction of the books are science books?
  - A.  $\frac{1}{2}$
  - B.  $\frac{1}{3}$
  - C.  $\frac{2}{3}$
  - D.  $\frac{3}{4}$
  
6. The measures of two angles of a triangle are  $35^\circ$  and  $45^\circ$ . What is the measure of the third angle of the triangle?
  - A.  $95^\circ$
  - B.  $100^\circ$
  - C.  $105^\circ$
  - D.  $110^\circ$

7. Jen wants to tile the floor of her kitchen. The floor is rectangular and measures 12 feet by 8 feet. If it costs \$2.50 per square foot for the materials, what is the total cost of the materials for tiling the kitchen floor?
- A. \$160
  - B. \$200
  - C. \$240
  - D. \$220
8. In scientific notation,  $20,000 + 3,400,000 = ?$
- A.  $3.60 \times 10^6$
  - B.  $3.42 \times 10^7$
  - C.  $3.60 \times 10^7$
  - D.  $3.42 \times 10^6$
9.  $\frac{55}{13}$  is
- A. Improper Fraction
  - B. Proper fraction
  - C. Mixed Number
  - D. No of the above
10. The angle of elevation of a ladder leaning against a wall is  $60^\circ$  and the foot of the ladder is 4.6m away from the wall. The length of the ladder is:
- A. 2.3m
  - B. 9.2m
  - C. 4.6m
  - D. 7.8m
11. The cost price of 20 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x is:
- A. 15
  - B. 18
  - C. 16
  - D. 25
12. A fruit seller had some apples. He sells 40% apples and still has 420 apples. Originally, he had:
- A. 588 Apples
  - B. 600 Apples
  - C. 672 Apples
  - D. 700 Apples

13. A family consists of two grandparents, two parents and three grandchildren. The average age of the grandparents is 67 years, that of the parents is 35 years and that of the grandchildren is 6 years. What is the average age of the family?
- A.  $31\frac{5}{7}$
  - B.  $28\frac{4}{7}$
  - C.  $32\frac{1}{7}$
  - D. None of these
14. A hall is 15 m long and 12 m broad. If the sum of the areas of the floor and the ceiling is equal to the sum of the areas of four walls, the volume of the hall is:
- A. 720
  - B. 1200
  - C. 1800
  - D. 900
15.  $(112 \times 54) = ?$
- A. 67000
  - B. 76500
  - C. 70000
  - D. 77200
16. Find the greatest number that will divide 43, 91 and 183 so as to leave the same remainder in each case.
- A. 7
  - B. 9
  - C. 13
  - D. 4
17. There are two examinations rooms A and B. If 10 students are sent from A to B, then the number of students in each room is the same. If 20 candidates are sent from B to A, then the number of students in A is double the number of students in B. The number of students in room A is:
- A. 100
  - B. 200
  - C. 80
  - D. 20

18. Excluding stoppages, the speed of a bus is 54 km/h and including stoppages, it is 45 km/h. For how many minutes does the bus stop per hour?
- A. 9
  - B. 10
  - C. 12
  - D. 20
19. An error 2% in excess is made while measuring the side of a square. The percentage of error in the calculated area of the square is:
- A. 2%
  - B. 2.02%
  - C. 4.04%
  - D. 4%
20. In a mixture 60 liters, the ratio of milk and water 2 : 1. If this ratio is to be 1 : 2, then the quantity of water to be further added is:
- A. 20 liters
  - B. 30 liters
  - C. 40 liters
  - D. 60 liters

**SECTION B:****USE OF CALCULATOR****15 MARKS**

1. If  $x = 3$  and  $y = 4$ , find the values of: (3 marks)
  - a.  $y - x$ ,
  - b.  $3y - 5$
  - c.  $\frac{9y - 6}{2x}$
2. Express  $20/8$  as decimal correct to 3 decimal places. (1 mark)
3. Erica bought  $3 \frac{1}{2}$  yards of fabric. If she uses  $\frac{2}{3}$  of the fabric to make a curtain, how much will she have left? (1 mark)
4. Find the averages of the following numbers: 45 cm, 5 m, 5.04 m, 456 cm, 89.04 cm and 34 m. (1 mark)
5. Find  $S$  when  $S = 2\pi r^2 + 2\pi rh$  where  $\pi = 3.14$ ,  $r = 4.2$  and  $h = 4.5$ . Leave answer correct to 2 decimal places. (1 mark)
6. The area of a square is  $100 \text{ m}^2$ . Calculate its length. (1 mark)
7. Add together  $40^\circ 30'$  and  $12^\circ 20'$ . (1 mark)
8. Subtract  $17^\circ 13' 30''$  from  $37^\circ 18' 15''$ . (1 mark)
9. Convert  $37.57^\circ$  into degrees, minutes and seconds. (1 mark)
10. Find the angle complementary to  $32^\circ$ . (1 mark)
11. Find the value of sine  $45^\circ$  correct to 4 decimal places. (1 mark)
12. Change  $5 \angle 60^\circ$  to rectangular form. (1 mark)
13. Evaluate  $4x^3 - 3x^2 + 2x - 8$  when  $x = 2.5$  (1 mark)

**SECTION C****CALCULATIONS****65 MARKS**

1. Work out the following fraction (2 marks)  
 $\frac{3}{4} \div \frac{2}{5}$
2. Convert the following fractions. (from an improper fraction to a mixed number or from a mixed number to an improper fraction) (2 marks)
  - a.  $\frac{75}{7}$
  - b.  $3\frac{2}{3}$
3. Simplify the following and leave the answer in index form
  - a.  $5^3 - 5^2$  (1 mark)
  - b.  $3^2 \div 3^5$  (2 marks)
4. In a school of 800 students,  $\frac{3}{20}$  of the students are involved in athletics.  $\frac{3}{10}$  of athletics were involved in track events and the rest were involved in field events.
  - a. How many students are involved in athletics (2 marks)
  - b. How many students were involved in field events (2 marks)
5. A house that was bought two years ago for \$80,000.00 was sold at a profit of 25%. Work out the selling price of the house. (4 marks)
6. If  $x = 2$  and  $y = 5$ , find the values of  $\frac{5x + 4y}{2y + 5}$  (3 marks)
7. Simply the following: (6 marks)
  - a.  $3z^2 + 10z^2 - 4z^2$
  - b.  $5a + 10b - 3a + 4b + c$
  - c.  $\frac{3q^2 \times 2p}{4q}$
8. Factorize the following expressions (4 marks)
  - a.  $6x^2 + 12x$
  - b.  $4(x-y) + 2b(x-y)$
9. Make S the subject of the formula  $T = \sqrt{\frac{2S}{S-v}}$  (3 marks)
10. Solve the following simultaneous equations: (4 marks)  
 $3x + 2y = 25$   
 $2x - 5y = 4$
11. Using quadratic equation solve the following expression:  $10k^2 + 200k + 937.5 = 0$  (4 marks)

12. When the maximum value of an alternating current is 50A, determine: (8 marks)
- Average value
  - Peak Value
  - RMS value
  - Peak – to – Peak Value
  - Draw AC Waveform and label the graph.

13. In an experiment to show how the resistance of a conductor varies with temperature, the following results were obtained. (5 marks)

<i>R(ohm)</i>	4.31	4.53	4.85	5.04	5.20	5.36	5.54	5.67
<i>T( C)</i>	18.5	30	50	60	70	80	90	100

- Draw a graph of resistance against temperature, plotting R vertically.
  - The graph is of the form represented by the equation  $R = aT + b$  where a and b are constants. From the graph find the value of the constants a and b.
14. There are two numbers whose sum is 72. One number is twice the other. What are the numbers? (3 marks)
15. Convert  $6 + j8$  to polar form. (2 marks)
16. Convert  $5 \angle 60^\circ$  to rectangular form (2 marks)
17. Solve the following equations for  $\theta$  where  $0 \leq \theta < 2\pi$  (2 marks)
- $$\sin x = \frac{-1}{2}$$
18. Sketch the following graphs (4 marks)
- $y = 2 \sin x$
  - $y = 8 \sin \left(x + \frac{\pi}{4}\right)$

The End!!