



COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)  
SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

**CERTIFICATE IV IN ELECTRICAL ENGINEERING-STAGE 4**

**EEE448- ELECTRONICS FOR ELECTRICIANS 2**

**FINAL EXAMINATION – PENSTER 4, 2013**

**DATE/DAY:** 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 a string.
5. For all sheets of paper on which rough/draft work has been done, cross it through and **ATTACH** these to your answer scripts.
6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
7. Use of a programmable calculator is prohibited.
8. Attempt **ALL** questions.
9. Attach **page 10** with the **Answer Booklet**.

**Section A****Multiple Choice****[20 marks]**

Select the best answer from the options given by circling the letter (A, B, C or D) in the matrix supplied at the end of the Question Paper and attach to your Answer Booklet.

- 1 The output voltage of a 7905 voltage regulator is:  
A -5V  
B -7V  
C +5V  
D +7V (1 mk)
  
- 2 The internal test signal from a cathode ray oscilloscope is  
A Triangular  
B Square  
C Sinusoidal  
D Pulsating (1 mk)
  
- 3 What values does a DMM measure on AC?  
A Peak  
B Average  
C Peak-to-peak  
D Rms (1 mk)
  
- 4 What circuit does a logic probe analyse?  
A Radio  
B Power  
C Digital  
D Analog (1 mk)
  
- 5 The PIV of a diode used in a half-wave rectifier cct is  
A  $V_M/\sqrt{2}$   
B  $\sqrt{2}V_M$   
C  $2V_M$   
D  $V_M$  (1 mk)
  
- 6 The AC voltage from FEA is stated as 240V, 50 Hz. This is:  
A Peak  
B Root-mean-square

- C Peak-to-peak
- D Average (1 mk)

7 An AND logic gate will produce an output of "1" if:

- A All inputs are high
- B Any input is low
- C Any input is high
- D All inputs are low (1 mk)

8 The DC Power Supplies are connected across what 2 Pins in the 741 op-amp?

- A 1 & 8
- B 2 & 3
- C 4 & 7
- D 5 & 6 (1 mk)

9 The filter capacitor to produce minimum ripple has to have what value?

- A Low
- B Medium
- C Moderately high
- D Practically high (1 mk)

10 Choose the component symbol that represents a npn BJT.



(1 mk)

11 The two important maximum ratings of a DC power supply are its output

- A Current and impedance
- B Voltage and impedance
- C Voltage and current

- D Current and frequency (1 mk)
- 12 A digital multimeter on "diode" test when connected across with the Red lead on the gate terminal and black on cathode of a good SCR will read  
A Low  
B High  
C Short  
D Infinite (1 mk)
- 13 A lamp dimmer usually uses  
A A triac and a optocoupler  
B An SCR and a diac  
C A diac and an optocoupler  
D A diac and a triac (1 mk)
- 14 A signal generator when used as a test signal source must ensure accuracy in its output in terms of:  
A Frequency and stability  
B Amplitude and drift  
C Amplitude and frequency  
D Waveform and stability (1 mk)
- 15 The forward voltage drop across an LED is typically  
A 2.5V  
B 2.0V  
C 0.7V  
D 0.3V (1 mk)
- 16 Which setting will you use to increase or decrease the amplitude on the cathode ray oscilloscope?  
A Voltage/division setting of the designated input  
B Vertical positioning.  
C Time/division settings  
D Horizontal positioning. (1 mk)
- 17 If the supply frequency of a single phase is 50 hertz, the ripple frequency of a half-wave rectifier is:  
A 50 Hz.  
B 12.5 Hz.  
C 25 Hz.  
D 100 Hz. (1 mk)

18 What is the first procedure when troubleshooting any equipment?

- A Signal injection.
- B Visualising the waveform on the CRO
- C Powering the equipment on.
- D Visual checks

(1 mk)

19 The Maximum Reverse Voltage of a circuit compared to that of the diode should be

- A More
- B less
- C Immaterial
- D Zero

(1 mk)

20 Which Boolean expression represents the output of the gate shown.



- A  $H = \overline{A.B}$
- B  $H = \overline{A+B}$
- C  $H = A.B$
- D  $H = A+B$

(1 mk)

**Section B**

**Test Equipment**

**[40 marks]**

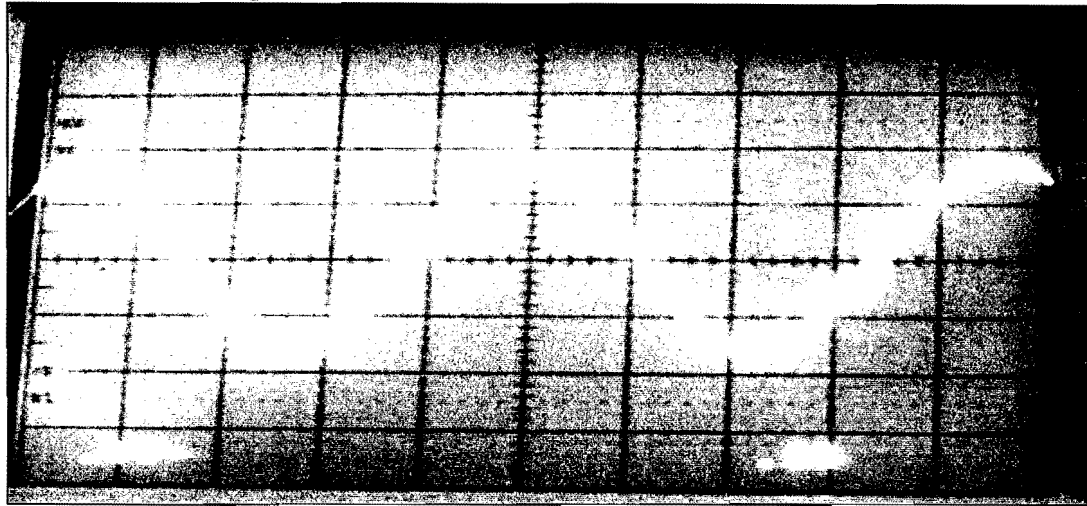
1 Supply the data in the Table shown in reference to the selection of the suitable test equipment for the required measurement.

NUMBER	MEASUREMENT	EQUIPMENT	CONNECTION
A	Resistance	(a)	(b)
B	Voltage	(a)	(b)
C	Current	(a)	(b)
D	Frequency	(a)	(b)
E	Waveform	(a)	(b)

(5 x 2 marks each) (10 mks)

- 2 This Question refers to a Cathode Ray Oscilloscope (CRO).
- A State the four (4) main sections of the CRO, indicating the function of each. (4 x 2mks each) (8 mks)

B Given a diagram:



Volts/Div = 0.5V/Div; Time/Div = 1mS/Div

Determine:

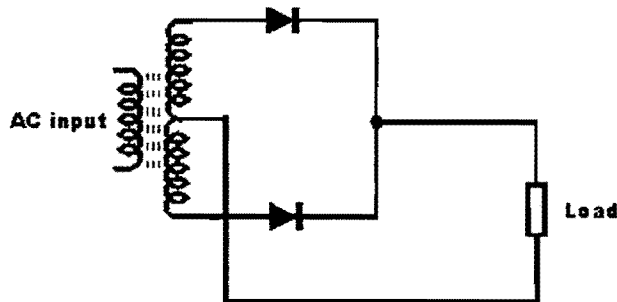
- A The amplitude (2 mks)
- B The frequency (2 mks)
- 3 Refer to Root-Mean-Square (RMS):
- A Briefly describe what it means in practice. (2mks)
- B If the peak-to-peak voltage of a sinusoidal waveform is 10V, calculate the RMS value. (2 mks)
- 4 Name the four (4) main sections of a basic DC power supply operated from an AC mains power source, stating the function of each section. (8 mks)
- 5 In Soldering, 2 important factors are heat and cleanliness. Briefly explain these. (2 mks)
- 6 List in the correct sequence four steps a technician would follow in carrying out faultfinding on a defective or faulty equipment. (4 mks)

**Section C**

**Electronic Circuits**

**[ 40 Marks]**

1 A certain circuit is shown:

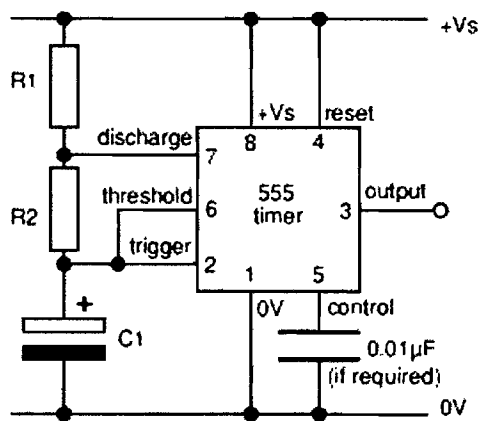


- A Identify the application. (1 mk)
- B Summarize the operation of the circuit using suitable waveforms. (4 mks)
- C State one advantage of this circuit compared to the bridge rectifier. (1 mk)
- D What two disadvantages does the above circuit have in relation to the bridge version? (2 mks)

2 Summarise the operation of the logic gates:

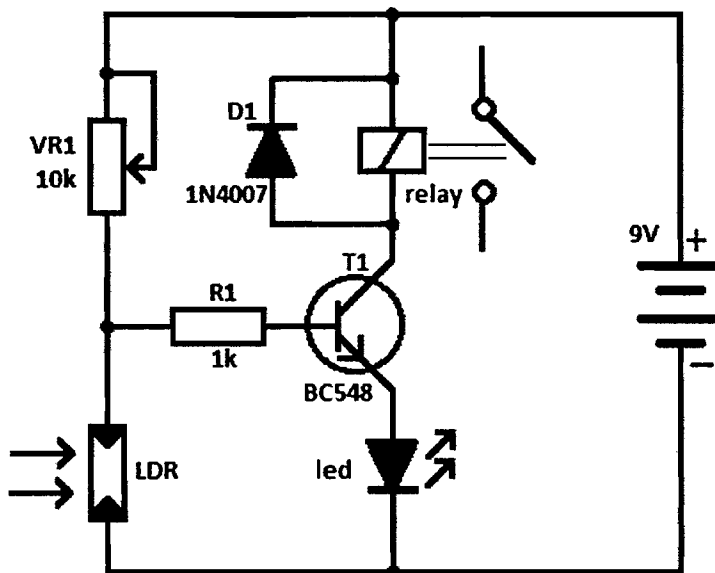
- A NAND and
  - B NOR by supplying the following respective:
    - 1 Symbols (2mks)
    - 2 Truth Tables for 2 inputs A & B (4 mks)
    - 3 Logic Equations for O/Ps P (2 mks)
- (8 mks)

3 A certain circuit is given:



- A Identify the application. (1 mk)  
 B State the shape of the waveform at the output. (1 mk)  
 C What is the frequency of the O/P signal if  $R1 = 1 \text{ k}\Omega$ ,  
 $R2 = 220\Omega$  and  $C1 = 0.1 \mu\text{F}$ ? (3 mks)

4 Analyse the switching circuit given.



- A Identify the application. (1 mk)  
 B State the property of the LDR. (1 mk)  
 C Name the functions of the following components:  
 (a) 9V battery (1 mk)  
 (b) LED (1 mk)  
 (c) T1 (1 mk)  
 (d) R1 (1 mk)  
 (e) D1 (1 mk)



- (f) relay (1 mk)
- D Summarize the action of the circuit when:
- (a) The LDR is in "darkness". (2 mks)
- (b) Light shines on the LDR. (2 mks)
- 5 Refer to Transformers as important devices in circuits.
- A Name the four main parts of a transformer. (4 mks)
- B State the three uses of transformers. (3 mks)

.....**End of Examination Paper**.....