



COLLEGE: COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)

SCHOOL: SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

PROGRAMME: CERTIFICATE IV IN ELECTRICAL ENGINEERING-STAGE 3

UNIT CODE: EEE392

TITLE: ELECTRONICS FOR ELECTRICIANS 1

## FINAL EXAMINATION – PENSTER 5, 2015

ROOM: AS PER TIMETABLE  
TIME: 2 HOURS & 10 MINUTES

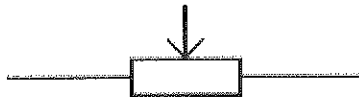
### INSTRUCTIONS TO STUDENTS'

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 does the conversions of number systems.*
10. **ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE ROOM!**

**SECTION A:****MULTIPLE CHOICE****[20 MARKS]****Instructions:**

Choose the appropriate answer from each question and write it alongside the question number in your answer sheet. Each Multiple Choices is worth 1 mark.

1. What is the reference designator for an integrated circuit component?
  - a) C
  - b) Q
  - c) U
  - d) R
2. Name the diode that has a gate.
  - a) Diac
  - b) Rectifier diode
  - c) SCR
  - d) Light emitting diode
3. Choose the resistor that corresponds to the Brown, Black, black, Brown, Red resistor:
  - a)  $1000 \Omega \pm 2\%$
  - b)  $10000 \Omega \pm 2\%$
  - c)  $10 \text{ M}\Omega \pm 2\%$
  - d)  $102 \Omega \pm 1\%$
4. Identify the component shown below?



- a) Variable Resistor (Preset)
  - b) Variable Resistor ( Potentiometer)
  - c) Variable Resistor ( Rheostat)
  - d) Resistor
5. A choke in the fluorescent light is an example of:
    - a) Capacitor
    - b) Inductor
    - c) LDR
    - d) Resistor

6. Identify the component symbol as in the given diagram.



- a) Variable Capacitor
- b) Polarized Capacitor
- c) Trimmer Capacitor
- d) Capacitor

7. What quantity reflects the size of any resistor?

- a) Its resistance ratings
- b) Its voltage ratings
- c) Its Power ratings
- d) Its current ratings

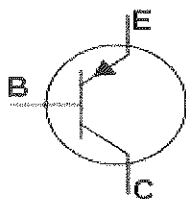
8. Which type of connectors is common on electronics test equipment such as oscilloscopes?

- a) UHF connectors
- b) Co-ax connectors
- c) D.I.N connectors
- d) B.N.C connectors

9. How many resistors are contained in the E12 series?

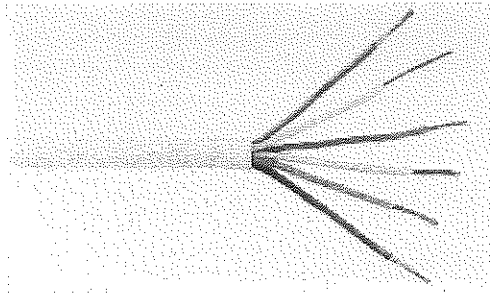
- a) 24
- b) 25
- c) 23
- d) 12

10. Name the component as pictured.



- a) NPN transistor
- b) Light dependent transistor
- c) Phototransistor
- d) PNP transistor

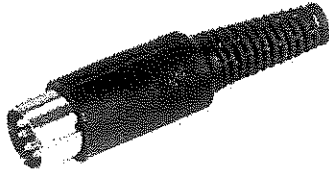
11. Name the cable as shown that is used as extension cord:



- a) Twisted stranded cable
  - b) Speaker cable
  - c) Screened Cable
  - d) Signal Cable
12. Which tolerance value will you obtain from an E24 resistor series table?
- a)  $\pm 10\%$
  - b)  $\pm 5\%$
  - c)  $\pm 1\%$
  - d)  $\pm 20\%$
13. Identify the best resistor in any sunset switch for any street light.
- a) VDR
  - b) Thermistor
  - c) LDR
  - d) Rheostat
14. In which colour band will you find the range for either the resistance or capacitance?
- a) First band
  - b) Second band
  - c) Multiplier band
  - d) Tolerance band
15. Name the switch that returns to its normally closed (on) position when the button is released.
- a) Push-to-make switch
  - b) Push-to-break switch
  - c) DPDT slide switch
  - d) DIP switch

16. The purpose of the braided metal screen outside the inner insulation of coaxial cable is to:
- Stop the interference from wanted signals
  - Receive the interference from unwanted signals
  - Stop the interference from unwanted signals
  - Receive the interference from wanted signals

17. The diagram shows



- D socket
  - DIN socket
  - DIN plug
  - D plug
18. The three terminals of a thyristor are called:
- SCR
  - NPN
  - Cathode, Anode, Gate
  - Base, Emitter, Collector
19. The advantage of using a ribbon cable in digital communication is that digital information can be transmitted:
- Very slowly
  - Very quickly
  - At a moderate rate
  - Long distances
20. What you understand by  $h_{FE}$  ?
- Voltage gain
  - AC Current gain
  - DC Current gain
  - AC voltage gain

**SECTION B: FILL IN THE BLANKS [20 MARKS]**  
**Component symbols & functions**

**Instructions:**

*Fill in the Blanks by drawing the circuit symbol and the function of the component in the Circuit.*

<i>COMPONENT</i>	<i>CIRCUIT SYMBOL</i>	<i>FUNCTION IN THE CIRCUIT</i>
a). LDR		
b). Inductor		
c). Relay		
d). SPST switch		
e). Diode		
f). Triac		
g). Diac		
h). NPN Transistor		
i). SCR		
j). Capacitor		

**SECTION C:**

**[10 MARKS]**

**Component, connector & cable identification**

**Instructions:**

*Short answer questions:*

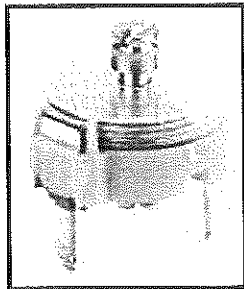
1. Identify the following connectors, cables and components:

(a)



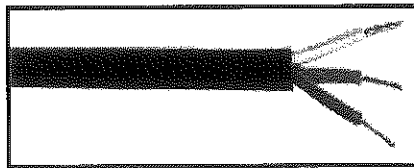
(1 mark)

(b)



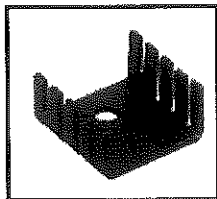
(1 mark)

(c)



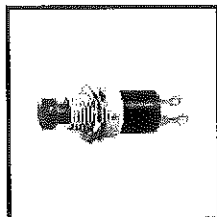
(1 mark)

(d)



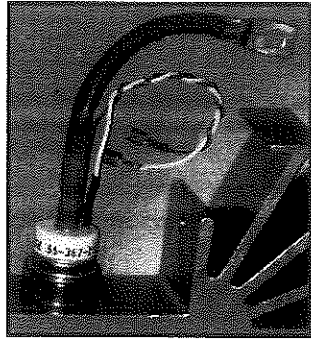
(1 mark)

(e)



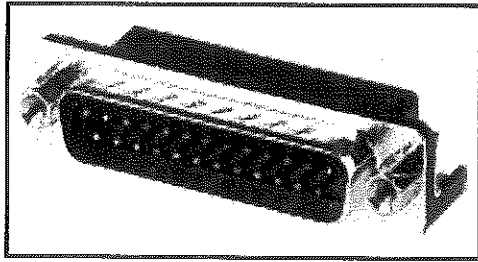
(1 mark)

(f)



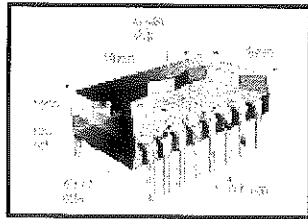
(1 mark)

(g)



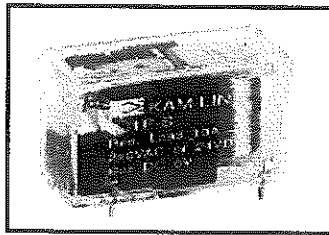
(1 mark)

(h)



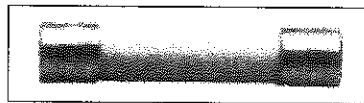
(1 mark)

(i)



(1 mark)

(j)



(1 mark)



**SECTION D:**

**[50 marks]**

**Data sheets, operations & calculations**

**Instructions:**

Use the attached data sheets to assist you.

1. Determine the values from the following colour-coded 4-band resistors:
  - i. Red, black, red, none (2 marks)
  - ii. blue, brown, black, silver (2 marks)
  - iii. Green, black, red, gold (2 marks)
  - iv. brown, blue, black, red (2 marks)
  - v. Red, orange, orange, brown (2 marks)
  
2. If a particular 4-band resistor has its upper range as 110Ω and lower range as 90Ω Calculate the following :
  - a) Range
  - b) Tolerance
  - c) Preferred value
  - d) Color code

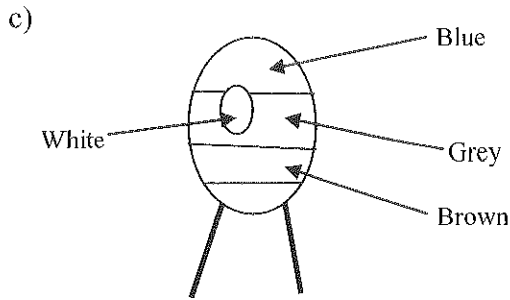
(8 marks)

**3. Data sheets:**

From the transistor data sheet shown below, determine the:

TYPE	CASE	POL MAT	V <sub>CE</sub>	V <sub>CB</sub>	I <sub>C mA</sub>	V <sub>CES @I<sub>C mA</sub></sub>	H <sub>fe @ I<sub>C mA</sub></sub>	P(TOT) mW	USE	EQUIVALENT
BD140	TO-126	PS	80	100	1.5A	0.5@500	40@250	8W	G.P. o/p	40410
BC107	TO-18	NS	45	50	100	0.25@10	110@450	300	G.P.S.S. amp	BC207, BC147, BC182
BC559	TO-92 VAR 1	PS	30	30	100	0.65@100	125@800	500	G.P.S.S. amp	BC159
2N3055	TO-3	NS	60	70	15 A	1.1@4A	20@70 4A	115W	G.P. power	BDY 20
TIP 3055	TOP-3	NS	70	100	15 A	1.1@4A	20@ 4A	90W	Power output	MJE 3055

- a) Current gain of BDY 20 and what current can this transistor operate from? (2marks)
  - b) Material used in all MJE 3055? (1 mark)
  - c) Abbreviation of G.P.S.S from the table. (1 mark)
  - d) Power dissipation of BC182? (1 mark)
  - e) Package of 2N3055? (1 mark)
  - f) Polarity of the TIP 3055 transistor? (1 mark)
- 
4. Determine the capacitance values:
    - a) 151 K (1 mark)
    - b) 2n2 D (1 mark)



- (2 marks)
- (4 marks)
- (5 marks)
5. Give two advantages and two disadvantages of a relay.
6. What are the five uses of an audio transformer?
7. A current of 8mA flows through a 22000 ohm resistor. Determine the following:
- a) Power dissipated (2 marks)
- b) The required nominal power rating of the resistor if the derating factor is 2. (2 marks)
8. The arrangement of contacts on a switch is often abbreviated mPnT. Explain what each letter signifies. (4 marks).
9. Draw the circuit symbol for the NPN and PNP transistors and explain the test with DMM to check if both transistors are in working condition? (4 marks)

\*\*\*\*\*THE END\*\*\*\*\*

## Data Sheets:

### Figure & letter coding table

<b>Tolerance</b>	±0.1%	±0.25%	±0.5%	±1%	±2%	±5%	±10%	±20%	±30%
<b>Code</b>	B	C	D	F	G	J	K	M	N

### Capacitor Colour Coded table

Colour of band or dot	Colour abbr.	1 <sup>st</sup> digit of value	2 <sup>nd</sup> digit of value	Multiplier if capac. expressed		Tolerance %	Nomin. Voltage if capac. expressed		Temp. Coeff.
				in pF	in μF		in pF	in μF	
Black	bk	0	0	1	1	±20%		10	NP0
Brown	bn	1	1	10	10	±1%	100	1.6	N033
Red	rd	2	2	100	100	±2%	250	4	N075
Orange	og	3	3	1000				40	N150
Yellow	ye	4	4	10000			400	6.3	N220
Green	gn	5	5	100000		±5%		16	N330
Blue	bu	6	6				630		N470
Violet	vt	7	7		0.001				N750
Grey	gy	8	8	0.01	0.01			25	P033
White	wh	9	9	0.1	0.1	±10%		2.5	P470
Red/violet	rd/vt								P100
Orange/orange	og/og								N1500