



**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 3, 2017**

**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:

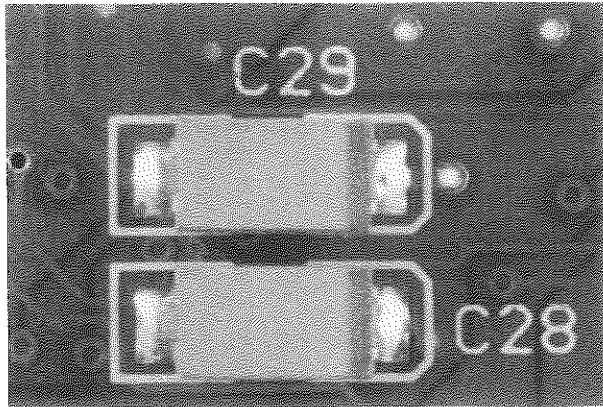
## MULTIPLE CHOICE

**[30 MARKS]**

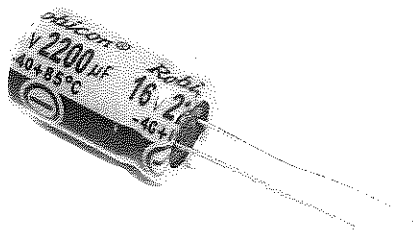
### Instructions:

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

1. What does C29 surface mounted device mean on the printed circuit board shown below?

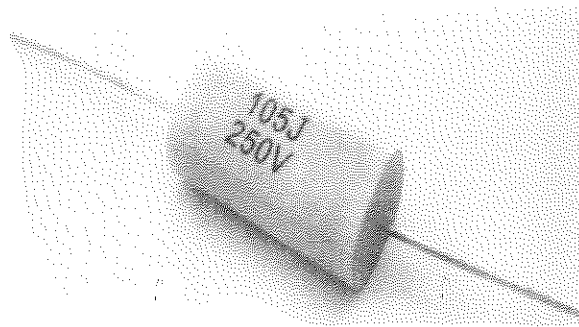


- a) Circuit 29
  - b) 29<sup>th</sup> capacity
  - c) 29<sup>th</sup> capacitor
  - d) 29<sup>th</sup> printed circuit
2. Name the diode that can be used as an indicator.
- a) Diac
  - b) Rectifier diode
  - c) SCR
  - d) Light emitting diode
3. Calculate the resistor that corresponds to the Brown, Black, Black, Green, 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 capacitor as shown below:



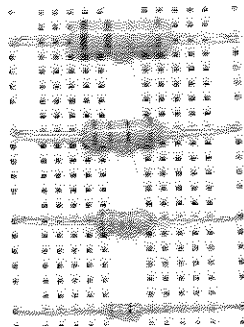
- a) Polarised Capacitor
- b) Electrolytic Capacitor
- c) Ceramic Capacitor
- d) Both a) and b)

5. Select the best capacitance value that is written on the capacitor as illustrated below:



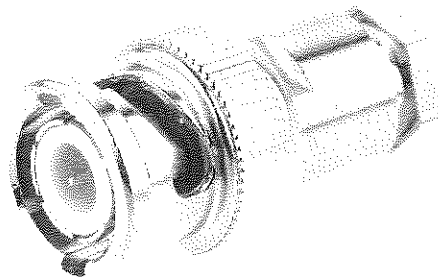
- a) 105 pF  $\pm$  5%
- b) 1000,000 pF  $\pm$  5 %
- c) 1000,000 pF  $\pm$  5% 250V
- d) 250V

6. Which parameter relates to the size of the resistor on the breadboard shown below?



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

7. Name the connector shown below:

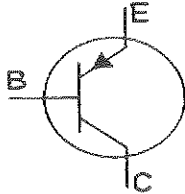


- a) UHF connectors
- b) Co-ax connectors
- c) D.I.N connectors
- d) B.N.C connectors

8. How many resistors are contained in the E24 series?

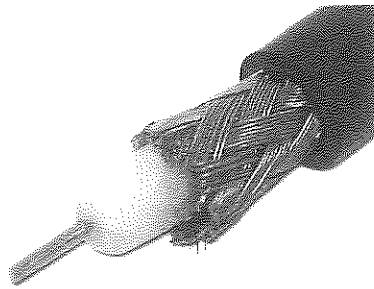
- a) 24
- b) 25
- c) 23
- d) 12

10. Identify the terminals of the PNP bipolar junction transistor shown below:



- a) Bias, Collector, Emitter
- b) Bias, Collector, Electrons
- c) Base, Collector, Emitter
- d) Base, collector, electrons

11. Name the RF cable used to connect the Television display to the aerial:

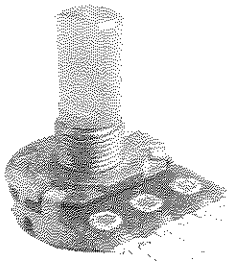


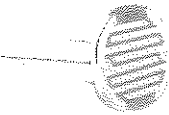


- a) Twisted stranded cable
- b) Speaker cable
- c) Coaxial Cable
- d) Signal Cable

12. Which tolerance value will you obtain from an E12 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)	
b)	
c)	
d)	

14. In which colour band will you find the range for either the resistance or capacitance or inductance?

- a) First band
- b) Second band
- c) Multiplier band
- d) Tolerance band

15. Name the component shown below that functions to close or open a circuit when the button is pushed down to make contacts:

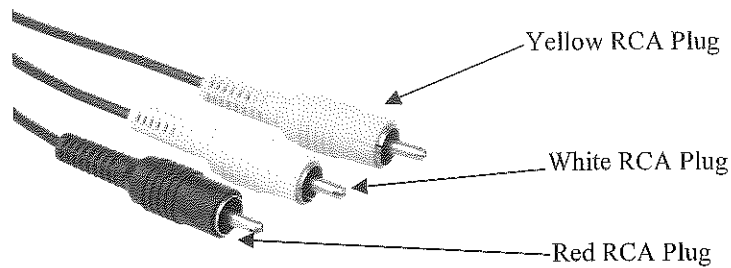


- a) Push Button
- b) Toggle Switch
- c) DPDT slide switch
- d) DIP switch

16. The purpose of the braided metal screen outside the inner insulation of coaxial cable is to:

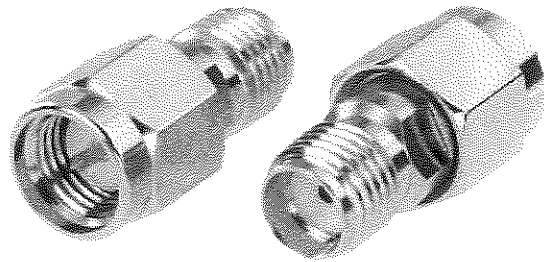
- a) Stop the interference from wanted signals
- b) Receive the interference from unwanted signals
- c) Prevent the interference from unwanted signals
- d) Receive the interference from wanted signals

17. The diagram shows



- a) Video cable used to connect the DVD player to the TV
- b) Audio & video cable used to connect the DVD player to the TV
- c) Picture cable used to connect the DVD player to the computer
- d) All of the above

18. Name this connector and plug used in digital Television decoder to connect the decoder to the antenna:



- a) SMA connector & plug
- b) VHF connector & plug
- c) N-Type connector & plug
- d) UHF connector & plug

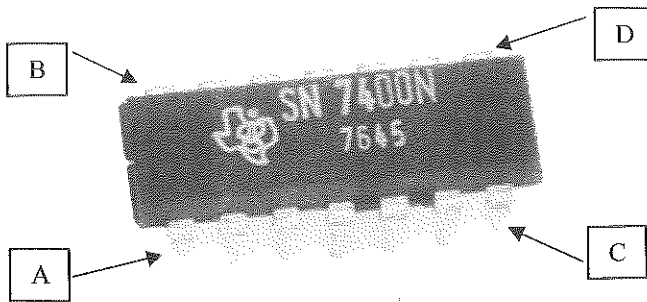
19. Name the cable used for long distances or for applications requiring high data bandwidth or electrical isolation:

- a) Optical fiber cable
- b) Copper cable
- c) Coaxial cable
- d) Twisted cable

20. How does the pn diode allow current to flow in a circuit?

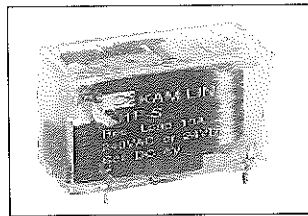
- a) When the pn diode is connected in reverse bias mode connection
- b) If a pn diode is connected in forward bias mode connection
- c) When the pn diode is connected to a switch
- d) None of the above

21. Which pin is taken as pin 1 of the Integrated circuit (IC) component shown below?



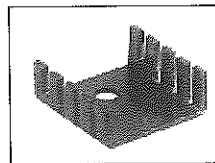
- a) A
- b) B
- c) C
- d) D

22. Choose the component as seen:



- a) Relay
- b) Coil
- c) Inductor
- d) Choke

23. Name the part as seen:

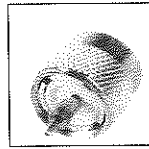


- a) Heat shrink
- b) Heat fins
- c) Heat sink
- d) Diode

24. A plug fits into a \_\_\_\_\_.

- a) Male socket.
- b) Socket
- c) Plug
- d) Both a) and b)

25. Identify the connector seen in the given diagram:



- a) UHF
- b) VHF
- c) BNC
- d) RF

26. List the parameters that determines the physical size of the capacitor:

- a) Power rating
- b) Voltage rating
- c) Temperature rating
- d) Current rating

27. Choose the best component to improvise a 250uF/250V polarised capacitor if this capacitor is NOT in the vendors store:

- a) 250uF/300V polarised capacitor
- b) 250uF/250V non-polarised capacitor
- c) 250uF/200V polarised capacitor
- d) 150uF/200V polarised capacitor

28. Identify one precaution when handling polarised capacitor before one tests or measure the parameters of the capacitor during faultfinding:

- a) Remove the capacitor carefully
- b) Shorting the terminal to fully discharge the capacitor
- c) Using gloves before touching the capacitor
- d) All of the above

29. What is the impedance of the coaxial cable used with televisions displays?

- a) 50  $\Omega$
- b) 500  $\Omega$
- c) 75  $\Omega$
- d) 300  $\Omega$



30. Determine the resistance value of the surface-mounted-device resistor as shown below:



- a) 472  $\Omega$
- b) 4700  $\Omega$
- c) 47000  $\Omega$
- d) 4.7  $\Omega$

**SECTION B: Matching**  
**Component symbols**

[20 MARKS]

**Instructions:**

Match the diagrams to the appropriate answer by write the correct alphabet against the question number in your answer booklet:

a)	Toggle switch	i)	
b)	NPN transistor	ii)	
c)	Speaker	iii)	
d)	Fuse	iv)	
e)	Oscilloscope	v)	
f)	SCR	vi)	
g)	Earth	vii)	
h)	Light emitting diode	viii)	
i)	DC supply	ix)	
j)	Step up transformer	x)	

k)	Centre-tapped transformer	xi)	
l)	Trimmer	xii)	
m)	Diac	xiii)	
n)	PNP transistor	xiv)	
o)	Diode	xv)	
p)	Polarized capacitor	xvi)	
q)	Terminal	xvii)	
r)	Push button switch	xviii)	
s)	Variable resistor (potentiometer)	xix)	
t)	Battery	xx)	

**SECTION C:**  
**Data sheets, operations & calculations**

[50 marks]

**Instructions:**

Use the attached data sheets to assist you.

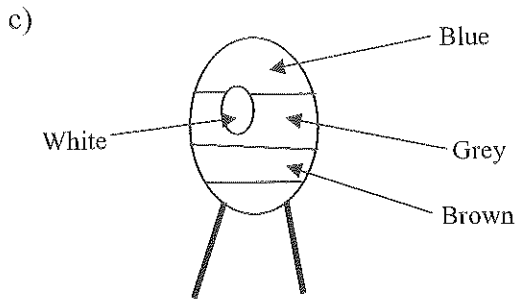
1. Determine the values from the following colour-coded 4-band resistors:
  - i. Red, violet, red, none (2 marks)
  - ii. blue, grey, yellow, silver (2 marks)
  - iii. Green, blue, red, gold (2marks)
  - iv. brown, green, black, red (2 marks)
  - v. Red, red, orange, brown (2 marks)
  
2. If a capacitor has its upper range as 110uF and lower range as 90uF, calculate the following:
  - a) Range (2 marks)
  - b) Tolerance (2 marks)
  - c) Preferred value (2 marks)
  - d) Color code (2 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	EQUIVALEN T
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 BC159 and what current can this transistor operate from? (2marks)
  - b) Material used in all TIP 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)



5. What do CMOS and TTL stand for? (2 marks)
6. Explain what is Darlington pair? (2 marks)
7. Give two advantages and two disadvantages of a relay. (4 marks)
8. What are the five uses of an audio transformer? (5 marks)
9. 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)
10. The arrangement of contacts on a switch is often abbreviated mPnT. Explain what each letter signifies. (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