



SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING

CERTIFICATE IV IN ELECTRICAL ENGINEERING – STAGE 3

EEE392 ELECTRONICS FOR ELECTRICIANS 1 FINAL EXAMINATION PAPER – 2013

DAY/DATE: *****/**_**_**** TIME: *.*_*.***** ROOM: ****

INSTRUCTIONS TO STUDENTS:

1. You are allowed 10 minutes extra reading time during which you are not allowed to write.
2. Begin each SECTION on a fresh page and use both sides of the sheet.
3. Write your candidate number at the top of each answer sheet.
4. Insert all 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 through and you must attach to the answer booklet.
6. Write clearly the number(s) of the question(s) attempted on top of each sheet.
7. **ATTEMPT ALL QUESTIONS**
8. Show all workings where necessary.
9. Programmable calculators are not allowed.

SECTION A

MULTIPLE CHOICE

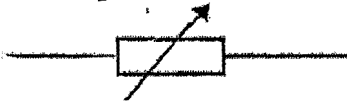
[10 MARKS]

Choose the appropriate answer from each question by writing the alphabet beside the question number in your answer booklet:

1. What many resistors are contained in the E24 series?

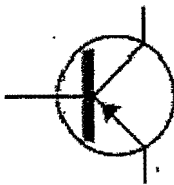
- a) 24
- b) 25
- c) 23
- d) 12

2. Identify the component.



- a) Resistor
- b) Variable resistor (rheostat)
- c) Variable resistor (potentiometer)
- d) Variable resistor (preset)

3. Name the component as pictured.



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

4. If you want to do fine adjustment in the variation of the capacitance, name the appropriate component:

- a) Trimpot.
- b) Trimmer.
- c) Variac.
- d) Potentiometer.

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



- a) Twisted stranded cable.
- b) Speaker cable.
- c) 3-core flex.
- d) Cat-5E.

6. Which tolerance value will you obtain from an E12 resistor series table?

- a) $\pm 10\%$
- b) $\pm 5\%$
- c) $\pm 1\%$
- d) $\pm 20\%$

7. How many diodes do you find in a bipolar junction transistor?

- a) 1
- b) 2
- c) 3
- d) 4

8. 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.

9. Name the switch that will ONLY make contact if you press it.

- a) Toggle switch.
- b) Push button switch.
- c) Slide switch.
- d) DIP switch.

10. Identify the best resistor in any sunset switch for any street light.

- a) VDR
- b) LDR
- c) Thermistor
- d) Rheostat

SECTION B

[20 MARKS]

Draw the symbol and state the function of each in the circuit.

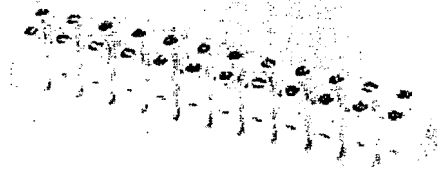
1. AC supply
2. Earth (ground)
3. Motor
4. Push to break switch
5. Relay
6. Variable resistor (rheostat)
7. Trimmer capacitor
8. Photodiode
9. Transistor PNP
10. Ammeter

SECTION C

[10 MARKS]

Identify the following connectors and cables:

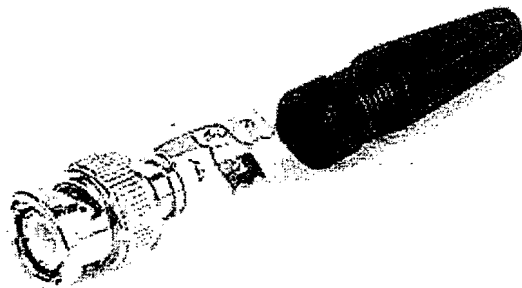
1.



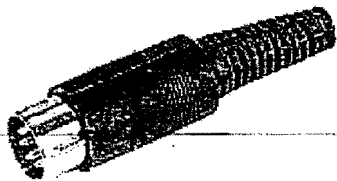
2.



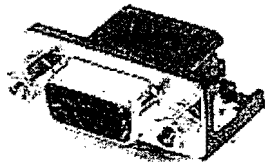
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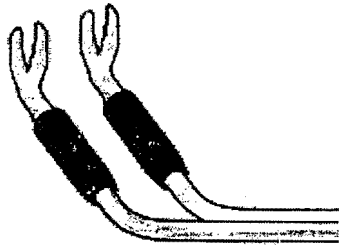
4.



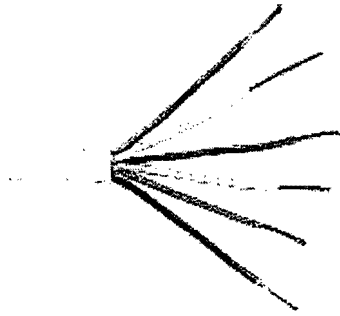
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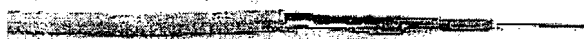
6.



7.



8.



9.



10.



SECTION D TRUE AND FALSE [10 MARKS]

1. The standard crocodile clip has no cover and a screw contact.
2. Plugs may have a screw or solder terminal to hold the cable.
3. BNC plugs are connected with a push and twist action.
4. IDC communication connectors are used in computer and telecommunication equipment.
5. The coaxial RF connector is an electrical connector designed to work at radio frequencies in the multi megahertz range.
6. A flex is an assembly of one or more conductors with some flexibility.
7. A cable is the proper name for the flexible cable fitted to mains electrical appliances.
8. A lead is a single conductor which may have an outer layer of insulation.
9. A wire is a complete assembly of cable and connectors.
10. A power cable is an assembly of two or more electrical conductors, usually held together with an overall sheath.

SECTION E

[50 MARKS]

1. A 470 ohms resistor with 10 V across it. Calculate the power rating. (2 marks)

2. Determine the values from the following colour-coded 4-band resistors:
 - a) Brown, black, red, none (2 marks)
 - b) blue, grey, black, silver (2 marks)
 - c) Brown, black, red, gold (2 marks)
 - d) brown, green, black, none (2 marks)
 - e) orange, orange, orange, gold (2 marks)

3. If a particular 4-band resistor has its upper range as 49.35Ω and lower range as 44.65Ω Calculate the following :
 - a) Range (2 marks)
 - b) Tolerance (2 marks)
 - c) Preferred value (2 marks)
 - d) Color code (2 marks)

4. What is the preferred value and colour codes of the 4-band resistor if the upper range = 110Ω and the lower range = 90Ω ? (10 marks)

5. Determine the capacitance values:
 - a) $\mu 47$ B (1.5 marks)
 - b) 2n2 D (1.5 marks)
 - c) p68J (1.5 marks)
 - d) 2n2C (1.5 marks)

6. **Data sheets:**

From the transistor data sheet shown below, determine the:

TYPE	CASE	POL MAT	V_{CE}	V_{CB}	I_{CMA}	$V_{CES} @ I_{CMA}$	$H_{fe} @ I_{CMA}$	P(TOT) mW	USE	EQUIVALENT
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? (2 marks)
- b) Material used in the MJE 3055? (1 mark)
- c) Abbreviation of G.P. power from the table. (1 mark)
- d) Power dissipation of BDY 20? (1 mark)
- e) Package of 2N3055? (1 mark)
- f) Polarity of the TIP 3055 transistor? (1 mark)
7. Name the component that corresponds to it's operation:
- a) Makes before break. (1 mark)
- b) Resists the flow of current. (1 mark)
- c) Stores electrical charge. (1 mark)
- d) Transforms one voltage to another value. (1 mark)
- e) Contains a coil and switches contact when the coil is energized. (1 mark)
- f) Converts AC to pulsating DC. (1 mark)
- g) Used as an electronic switch when the bias is across base and emitter. (1 mark)

End of examination paper