FIJI NATIONAL UNIVERSITY

**SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING**

**CERTIFICATE IV IN ELECTRICAL ENGINEERING**
**STAGE 3**

**EEE392 –ELECTRONICS FOR ELECTRICIANS 1**

**FINAL EXAMINATION – PENSTER 1 - 2016**

**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.*

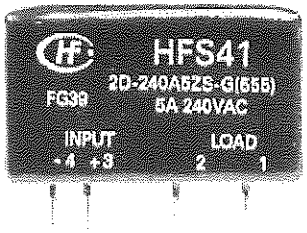
*10. **ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE EXAM ROOM!***

**SECTION A:** **Multiple Choice** **(20 marks)**

**Instructions:**

*Choose the correct answer by circling the correct letter(A, B, C, or D) in the matrix provided at the end of the Question Paper. Attach this sheet to your Answer Booklet. Each Question is worth 1 mark.*

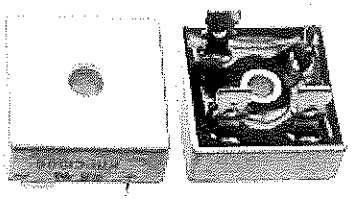
1. Choose the component that is pictured below:




A. Bridge Rectifier
B. Capacitor
C. Relay
D. Thermistor

2. Which connector is widely used for test instruments like the CRO?
   A DIN
   B BNC
   C UHF
   D AF

3 Choose the name of the component as seen:



A. Integrated circuit
B. Bridge Rectifier
C. DIP Switch
D. Relay.

4 Name the cable shown:

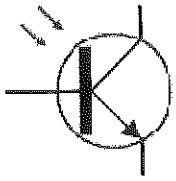
A Screened cable (mono)
B Power
C Coaxial
D Screened cable (Stereo)

5 Which diode has a gate?

A Light emitting.
B Rectifier diode.
C Diac
D SCR

6 Identify the component symbol below:

A Photo Transistor
B PNP Transistor
C Power Transistor
D Silicon Controlled Rectifier

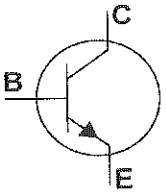


7 An antenna in a domestic radio receiver is an example of

A Inductor
B Resistor
C LDR.
D Capacitor

8 The device shown has a DMM on "diode" test with the Red lead connected to B and the Black to C. What would be the reading? Assume a good device.

A High
B O/C
C Low
D S/C




9 What rating reflects the physical size of a resistor?

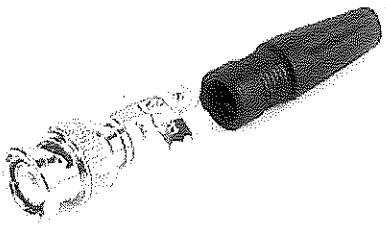
A Voltage
B Temperature
C Current
D Power

10 What many resistors are contained in the E24 series?

A. 24
B. 25
C. 23
D. 12

11 **The diagram shows a**

A D plug
B **BNC Socket**
C BNC Plug
D D socket



12 The purpose of the braided metal screen on a TV cable is to

A Stop interference from unwanted signals
B Stop interference from wanted signals
C Receive interference from unwanted signals
D Receive interference from wanted signals

13 Which switch returns to its normally open (off) position when the button is released?

A DIP
B DPDT
C Push-to-break
D Push-to-make

14 A power transformer may be used in:

A Voltage transformation and dc working
B Current transformation and filtering
C Voltage transformation and isolation
D Current transformation and dc working

15 A resistor marked 2k7J means:

a) 2700Ω ±5%
b) 2.7 k Ω ±5%
c) 0.0027 MΩ ±5%
d) All of the above.

16 Identify the cable shown.

A Main flex
B Speaker
C Co-axial cable
D Twisted strand

17 The parameter $h_{FE}$ refers to which gain in a BJT?

A DC current
B AC current
C DC voltage
D AC voltage

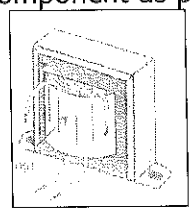
18 3 things that determine capacitance in a capacitor are:

A Permittivity, distance between plates and temperature
B Distance between plates, permittivity and temperature
C Temperature, distance between plates and area of plates
D Area of plates, distance between plates, and permittivity

19 A DMM ""diode" test on a good SCR with Red lead on the Gate and Black lead on the Cathode would show

A S/C
B Low
C O/C
D High

20 Name the component as pictured:



A. Coil
B. Inductor
C. Transformer
D. All of the above

**SECTION B: Fill In the Blanks – Component Symbols & Functions**
**(20 marks)**
**Instructions:**

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

| ***COMPONENT*** | ***CIRCUIT SYMBOL*** | ***FUNCTION IN THE CIRCUIT*** |
|---|---|---|
| (a) Zener Diode | | |
| (b) Thermistor | | |
| (c) Electro-magnetic relay | | |
| (d) Transformer | | |
| (e) Light-dependent resistor(LDR) | | |
| (f) Triac | | |
| (g) Polarised Capacitor | | |
| (h) NPN bipolar junction transistor | | |
| (i) Silicon-controlled rectifier(SCR) | | |
| (j) Light-emitting Diode (LED) | | |

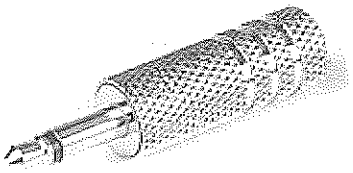
## SECTION C: Componenst and devices identification (10 marks)

**Instructions:**

*Short answer questions:*

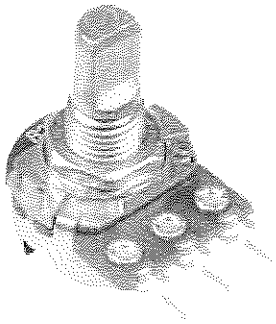
1. Identify the following devices and components:

(a)



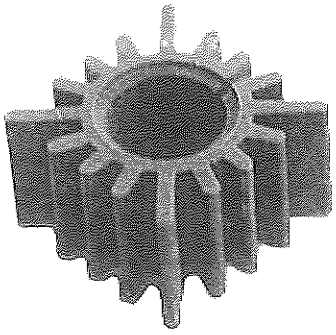
(1 mark)

(b)



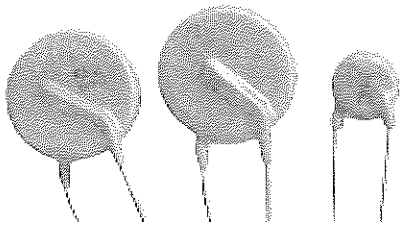
(1 mark)

(c)



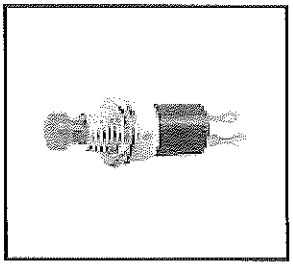
(1 mark)

(d)



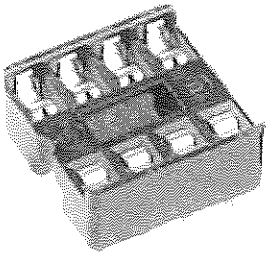
(1 mark)

(e)



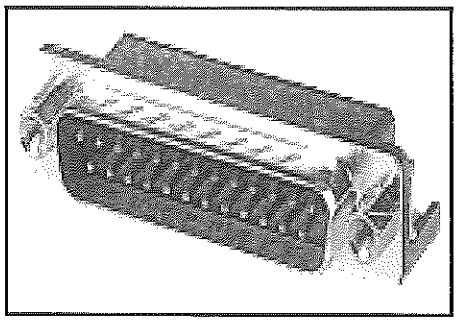
(1 mark)

(f)



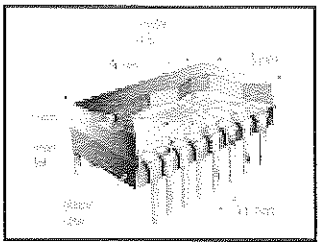
(1 mark)

(g)



(1 mark)

(h)

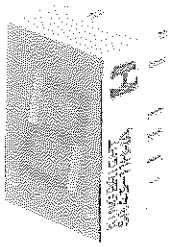


(1 mark)

(i)

(1 mark)

(j)



(1 mark))

## SECTION D: Data sheets, operations & calculations (50 marks)

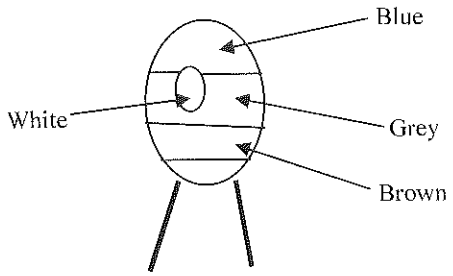
**Instructions:**
*Use the attached data sheets to assist you.*

1. Determine the actual resistor values from the following colour-coded resistors:
   (a) Brown, orange, red (2 marks)
   (b) Yellow, grey, brown, silver (2 marks)

2. Determine the capacitance values:
   a) 352 K (2 marks)

a) 352 K (2 marks)
b) 6n8 D (2 marks)

c)




(2 marks)

3. If a particular 4-band resistor has its Upper value as 9,020Ω and Lower value as 7,380Ω. Calculate the following :

(a) Range (2 marks)
(b) Preferred value (2 marks)
(c) Tolerance value, using the Upper Value (2 marks)
(d) Colour code (2 mark)

4. Use the BJT Data Sheet provided to answer the questions asked.

| TYPE | CASE | POL MAT | $V_{CE}$ | $V_{CB}$ | $I_{C\ mA}$ | $V_{CES}$ @$I_C$ mA | $H_{fe}$ @ $I_C$ mA | 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@704A | 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? (2 marks)
b) Material used in all transistors? (1 mark)
c) Abbreviation of G.P.S.S. from the table. (2 marks)
d) Power dissipation of BC147? (1 mark)
e) Package of BDY20? (1 mark)
f) Polarity of the BC182 transistor? (1 mark)

5 (a) Identify 2 types of seven segment display (2 marks)
(b) Draw the diagram of the 2 types of seven segment display. Label the terminals and segments clearly. (7 marks)
(c) State 2 applications of seven segment display (2 marks)

6 With aid of sketches, explain how you can test for the following devices using a multimeter.

a. Diode (2 marks)
b. Transistor (3 marks)
c. Capacitor (2 marks)

7 State the 5 uses of an audio transformer. (5 marks)

********** THE END **********