

# International Islamic University Chittagong (IIUC)

## Department of Computer and Communication Engineering

### Final Examination

Program: **B.sc (Engg.)**  
 Course Code: **CCE-1203**  
 Total Marks: **50**

Semester: **Autumn 2022**  
 Course Title: **Basic Electronics**  
 Time: **2 Hours 30 Minutes**

(i) Figures in the right margin indicate full marks. Answer should be relevant and clearly written. All the parts of a question must be answered serially.

(ii) Course Learning Outcomes (CLOs) and Bloom's Levels are mentioned in additional Columns.

#### Course Learning Outcomes (CLOs) of the Questions

<b>CLO1</b>	Apply knowledge of Basic Electronics to Distinguish schematic symbol and recognize basic concepts of electronic components and circuits.
<b>CLO2</b>	To analyze the functionality of various devices including several types of Diodes, BJT and FET through problem analysis.

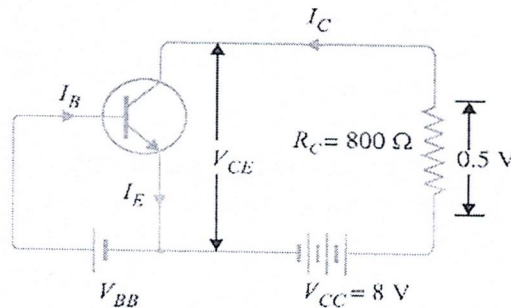
#### Bloom's Levels of the Questions

Letter Symbols Meaning	R	U	Ap	An	E	C
	Remember	Understand	Apply	Analyze	Evaluate	Create

#### Part A

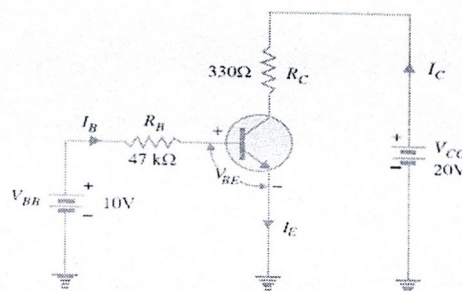
Answer Two of the following Questions.

- Q1.**
- |    |   |             |           |          |
|----|---|-------------|-----------|----------|
| a) | Describe with a proper diagram how you would identify transistor operating conditions.  | <b>CLO1</b> | <b>U</b>  | <b>3</b> |
| b) | Express the relation between the Current Amplification Factor ( $\alpha$ ) & Base Amplification Factor ( $\beta$ ).   | <b>CLO1</b> | <b>R</b>  | <b>3</b> |
| c) | A transistor is connected in common emitter (CE) configuration in which collector supply is <b>8 V</b> and the voltage drop across resistance $R_C$ connected in the collector circuit is <b>0.5 V</b> . The value of $R_C = 800 \Omega$ . If $\alpha = 0.96$ , determine: (i) collector-emitter voltage (ii) base current. | <b>CLO2</b> | <b>Ap</b> | <b>4</b> |



**Figure 1**

- Q2.**
- |    |  |             |           |          |
|----|--|-------------|-----------|----------|
| a) | I. Using the characteristics of Appendix 1, determine $I_C$ at $I_B = 30 \text{ mA}$ and $V_{CE} = 10 \text{ V}$ .<br>II. Using the characteristics of Appendix 1, determine $I_C$ at $V_{BE} = 0.7 \text{ V}$ and $V_{CE} = 15 \text{ V}$ . | <b>CLO2</b> | <b>Ap</b> | <b>4</b> |
| b) | Determine the Q point of the transistor circuit shown in Fig. 2. Also draw the d.c. load line. Given $\beta = 200$ and $V_{BE} = 0.7 \text{ V}$ .  | <b>CLO2</b> | <b>An</b> | <b>6</b> |



**Figure 2**

OR

- Q2. a) Determine the dc bias voltage  $V_{CE}$  and the current  $I_C$  for the voltage divider configuration of Fig. 3. CLO2 Ap 4

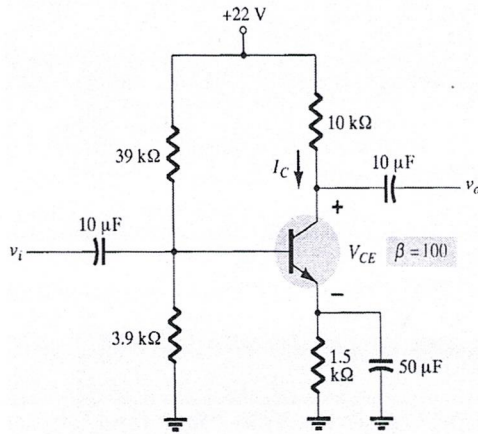


Figure 3

- b) What will be the circuit behaviour in each case shown in Fig. 4?

CLO2 An 6

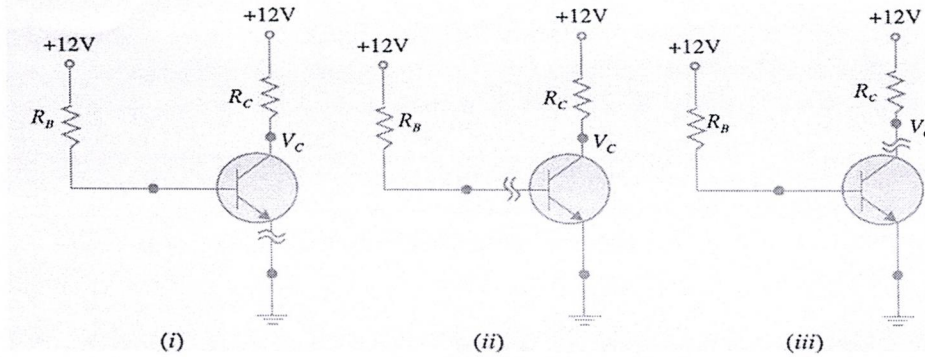


Figure 4

Part B

Answer Three of the following Questions.

- Q3. a) Determine the following for the common-gate configuration of Fig. 5:  
 a.  $V_{GSQ}$  and  $I_{DQ}$       b.  $V_D$       c.  $V_G$       d.  $V_S$       e.  $V_{DS}$  CLO2 Ap 6

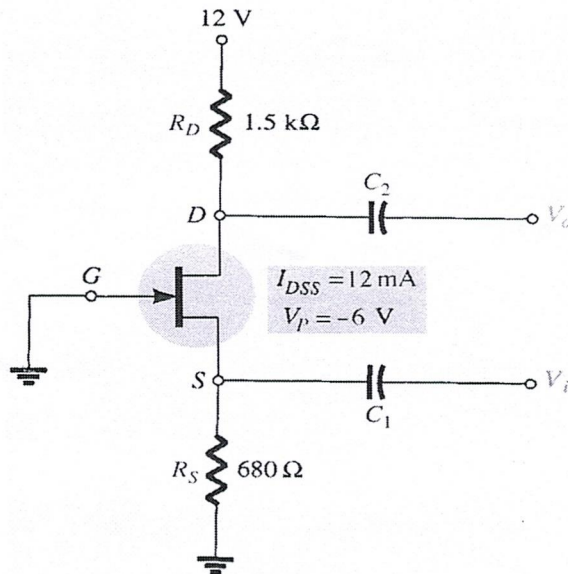


Figure 5

b) Determine the following for the network of Fig. 6:

- a.  $I_{DQ}$  and  $V_{GSQ}$       b.  $V_D$       c.  $V_S$       d.  $V_{DS}$       e.  $V_{DG}$

CLO2 Ap 4

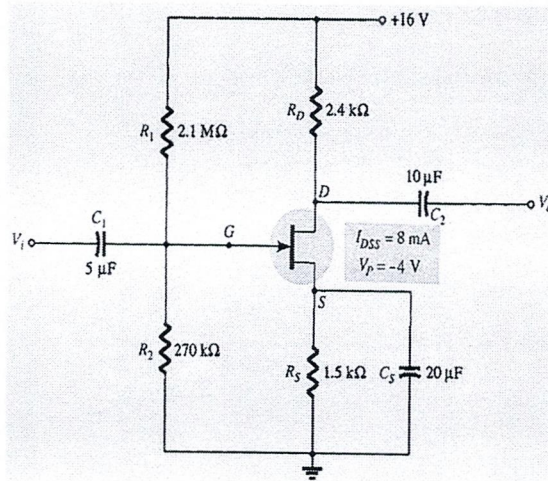


Figure 6

Q4. a) For the network of Fig. 7, the levels of  $V_{DQ}$  and  $I_{DQ}$  are specified. Determine the required values of  $R_D$  and  $R_S$ . What is the closest standard commercial values?

CLO2 Ap 4

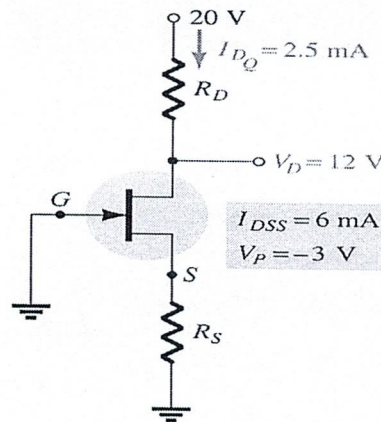


Figure 7

b) For the n-channel depletion-type MOSFET of Fig. 8, determine  $I_{DQ}$ ,  $V_{GSQ}$  and  $V_{DS}$

CLO2 Ap 6

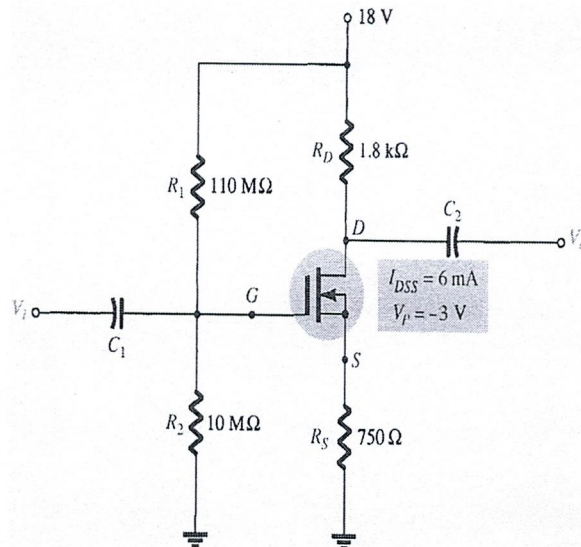


Figure 8

- Q5. a) Illustrate the working of JEFT with V-I Characteristics using the neat diagram.  
 b) Find  $V_{DS}$  and  $V_{GS}$  in Fig. 5a, given that  $I_D = 5 \text{ mA}$ .

CLO2 U 5  
 CLO2 Ap 5

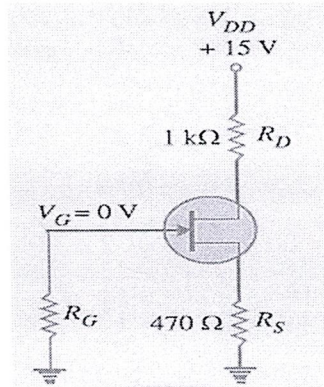


Figure 5a

OR

- Q5. a) Clarify with a neat diagram how you would identify MOSFETs Enhancement mode and Depletion mode.  
 b) The levels of  $V_{DS}$  and  $I_D$  are specified as  $V_{DS} = \frac{1}{2} V_{DD}$  and  $I_D = I_{D(on)}$  for the network of Fig. 5b. Determine the levels of  $V_{DD}$  and  $R_D$ .

CLO2 U 5  
 CLO2 Ap 5

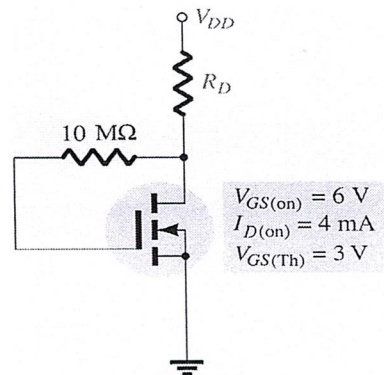


Figure 5b

Appendix – 1

