TED (21) 2041 | 2106220058 | Reg.No.....

(Revision-2021) | Signature.....

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, APRIL - 2022**

## BASIC ELECTRONICS

[Maximum marks: 75] (Time: 3 Hours)

### PART A

**I. Answer all the following questions in one word or one sentence. Each question carries 1 mark**

**(9 x 1 = 9 Marks)**

| | | Module outcome | Cognitive level |
|---|---|---|---|
| 1 | Define doping | M1.01 | R |
| 2 | What is the value of knee voltage of a silicon diode? | M1.03 | R |
| 3 | Draw the symbol of an NPN transistor and mark the terminals. | M2.01 | R |
| 4 | Define the current amplification facor γ of a transistor. | M2.03 | R |
| 5 | Which mode of operation of a transistor makes it equivalent to an open switch? | M2.04 | R |
| 6 | Draw the symbol of UJT and mark the terminals. | M3.01 | R |
| 7 | Why JFET is considered as a voltage controlled device? | M3.02 | R |
| 8 | What is the function of filter circuits in a rectifier? | M4.02 | R |
| 9 | Relate the time constant RC of the circuit and the time period of the input wave for a good differentiation. | M4.03 | R |

### PART B

**II. Answer any eight questions from the following. Each question carries 3 marks**

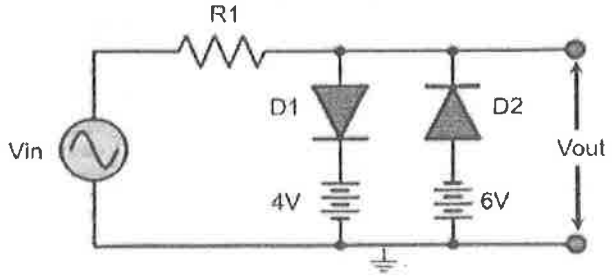
**(8 x 3 = 24 Marks)**

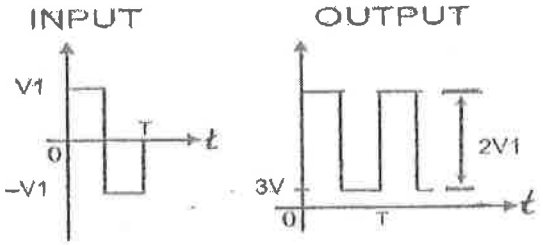
| | | Module outcome | Cognitive level |
|---|---|---|---|
| 1 | Explain the formation of P type semiconductor from an intrinsic semiconductor with diagram. | M1.01 | U |
| 2 | List the difference between drift and diffusion currents | M1.02 | R |
| 3 | With diagram, explain the formation of barrier potential in a PN junction | M1.02 | U |
| 4 | Draw the forward VI characteristics and the corresponding junction biasing of a PN junction diode. | M1.03 | U |
| 5 | Explain active, saturation and cut off modes of operation of a transistor w.r.t.biasing | M2.04 | U |
| 6 | Outline the CB, CE and CC configurations of NPN transistor. | M2.03 | U |
| 7 | Outline the output characteristics of CE configuration of NPN transistor and mark active, saturation and cut off regions. | M2.04 | U |
| 8 | Explain transistor action as an amplifier with a diagram | M2.05 | U |
| 9 | Draw the equivalent circuit of UJT and define intrinsic stand-off ratio. | M3.03 | R |
| 10 | Outline an RC circuit to obtain a triangular waveform from a square wave input. Relate output wave with input wave diagrammatically | M4.03 | U |

## PART C

**III. Answer all questions. Each question carries seven marks**

**(6 x 7 = 42 Marks)**

| | | Module outcome | Cognitive level |
|---|---|---|---|
| 1. | Demonstrate how static and dynamic resistance of PN junction diode can be calculated from VI characteristics. | M1.03 | U |
| | **OR** | | |
| 2. | Explain the energy band diagrams of a conductor, semiconductor and insulator and with a diagrams. | M1.01 | U |
| 3. | Outline the physical structure of an NPN transistor and explain the working principle. | M2.02 | U |
| | **OR** | | |
| 4. | Explain the terms $\alpha$ and $\beta$ of a transistor. Derive the relation between $\alpha$ and $\beta$ | M2.03 | U |
| 5. | Illustrate the structure of N channel JFET and explain the working principle. | M3.02 | U |
| | **OR** | | |
| 6. | Outline the drain characteristics of N channel depletion type MOSFET and explain the operating modes. | M3.03 | U |
| 7. | Compare the features of BJT with FET. | M3.04 | U |
| | **OR** | | |
| 8 | Explain the negative resistance property exhibited by UJT in its V-I characteristics. | M3.03 | U |
| 9. | Illustrate the operation of a shunt capacitor filter with diagram and waveform | M4.02 | U |
| | **OR** | | |
| 10 | Demonstrate the operation of a voltage tripler with a circuit diagram | M4.05 | U |
| 11 | Model the output waveform for the given circuit if the input Vin is a 20Vpp sine wave. Explain the working of the circuit and outline the input and output waveforms. (Assume that the diode is ideal)   | M4.04 | A |

| | | | |
|---|---|---|---|
| | OR | | |
| 12 | Construct a diode circuit to realise the given output waveform from the given input. Explain the working of the circuit. (Assume that the diode is ideal)<br>  | M4.04 | A |

**********