

# BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2008 Examinations

Programme: ELECTRONICS ENGINEERING/EC/MED/IS/COMP/E/E&EE

Course/Subject: BASIC ELECTRONICS (4132)

Time Duration: 3 Hrs.

Max. Marks: 75

- INSTRUCTIONS:**
1. All Questions are compulsory.
  2. Figures to the right indicate full marks.
  3. Assume suitable additional data if required.

Q.1. Answer any FIVE:

(5x3=15)

- a. Explain the reason why the conductivity of Germanium is more than that of silicon.
- b. Define ripple factor and rectification efficiency.
- c. What is alpha of a transistor, What causes collector current to flow when the emitter current is zero? What is this current called?
- d. Explain the use of control grid in vacuum triode.
- e. Compare between tubes and transistors.
- f. Explain the basic operating principle of JFET.
- g. Compare CB and CE configurations of a transistor.

Q.2. Answer any TWO:

(2x6=12)

- a. Explain the construction and working of Bridge type full wave rectifier with necessary waveforms.
- b. A 24V, 600 mw zener diode is to be used for providing a 24V stabilized supply to a variable load. If input voltage is 32V, calculate (i) series resistance R required (ii) Diode current when load resistance is  $1.2 K\Omega$ .
- c. (i) Explain the formation of N type Extrinsic semiconductor.  
(ii) Write note on filters.

Q.3. Answer any TWO:

(2x6=12)

- a. Discuss the behaviour of a PN junction diode under forward and reverse biasing.
- b. Calculate the dc bias voltages and currents for the voltage divider biasing circuit. Given  $V_{BE} = 0.3V$ ,  $\beta = 50$ ,  $R_1 = 40 K\Omega$ ,  $R_2 = 5 K\Omega$ ,  $V_{CC} = 12V$ ,  $R_C = 4 K\Omega$ , and  $R_E = 1 K\Omega$ .
- c. Differentiate between p type & Ntype Extrinsic semiconductors. Explain the energy band diagram of solids.

Q.4. Answer any TWO:

(2x6=12)

- a. Why operating point is selected in the centre of active region of transistor characteristic in good voltage amplifier?
- b. Explain the working of transistor.
- c. Draw & explain the common base input & output characteristics of a transistor.

- Q.5. Answer any TWO: (2x6=12)
- Graphically explain the operation of a transistor as an amplifier.
  - Explain the collector to base bias circuit for a transistor. What are its advantages and disadvantages.
  - (i) Calculate  $\beta_{dc}$  of the transistor if its  $\alpha_{dc} = 0.985$ .  
(ii) The emitter current  $I_E$  in a transistor is  $2\text{mA}$ . If the leakage current is  $5\mu\text{A}$  and  $\alpha_{dc} = 0.95$ , calculate the collector and base currents.

- Q.6. Answer any TWO: (2x6=12)
- Describe the different types of Electron emissions. Explain any one type in detail.
  - Explain the construction, working and characteristics of a pentode tube.
  - Explain in detail important JFET parameters, With the help of characteristics.

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# BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

May/June, 2009 Examinations

Programme: ELECTRONICS ENGG/EC/MED/IS/EI/COMP/E/E&EE

Course/Subject: BASIC ELECTRONICS (4132)

Time Duration: 3 Hrs.

Max. Marks: 75

**INSTRUCTIONS:** 1.All Questions are compulsory.  
2.Figures to the right indicate full marks.  
3.Assume suitable additional data if required.

- Q.No.1. Answer any Five of the following:- 5x3=15
- Give two examples each for conductors, Insulators and semiconductors.
  - What is Q point ? What is the use of DC loadline.
  - Derive the relation between ' $\alpha$ ' and ' $\beta$ ' of a transistor.
  - Draw the circuit diagram of collector to base bias. Why this circuit is not used ?
  - List the advantages of FET over BJT.
  - What is thermionic emission ?
- Q.No.2. Answer any Two of the following:- 2x6=12
- Explain the working of a P-N junction diode under forward biased condition.
  - Explain with a neat circuit diagrams and waveforms, the working of a centre tapped full wave rectifier.
  - Explain the working of  $\pi$  filter. Draw the input and output waveforms from the rectifier circuit with and without filter.
- Q.No.3. Answer any Two of the following:- 2x6=12
- Explain the working of Zener diode as a voltage regulator.
  - A full wave rectifier uses 4 diodes. The internal resistance of each diode may be assumed to be  $10\Omega$ . The transformer secondary voltage is 50 volts, and load resistance is  $1000\Omega$ . Draw the circuit and find
    - Average value of load current
    - Rms value of load current and
    - Efficiency of the rectifier circuit.
  - Explain with a neat diagram crystal line structure of an N-type semiconductor.
- Q.No.4. Answer any Two of the following:- 2x6=12
- Draw the output characteristics of a transistor in CB configuration and explain different regions of operation.
  - Explain the basic functioning of an NPN transistor and show that  $I_E = I_B + I_C$ .
  - Explain the need for biasing a transistor with neat diagrams.
- Q.No.5. Answer any Two of the following:- 2x6=12
- Explain the working of C-B transistor amplifier.
  - Draw the circuit of a CE amplifier using potential divider biasing. Explain the meaning of  $Z_i, Z_o, A_v$  and  $A_i$ .

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Q.No.5.

- c) Explain thermal runaway and use of Heat Sinks.

Q.No.6. Answer any Two of the following:- 2x6=12

- a) Explain the construction and characteristics of Depletion type MOSFET.
- b) Explain working of a Vacuum tube triode with neat diagrams.
- c) Draw the input characteristics of a C - E transistor and explain.

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