

Code: CS2T5, IT2T5

I B.Tech - II Semester-Regular / Supplementary Examinations – May 2017

BASIC ELECTRONICS ENGINEERING
(Common for CSE & IT)

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1.

- a) What is the effect of junction temperature on cut-in voltage of a PN diode?
- b) What is break down? What are its types?
- c) Define rectifier efficiency.
- d) What is the function of rectifier?
- e) A transistor connected in common base configuration has a - _____ input resistance and a _____ output resistance.
- f) What are the regions used when BJT is used as a switch ?
- g) Why IC 741 is not used for high frequency applications ?
- h) Define input offset current. State the reasons for the offset currents at the input of the op-amp.
- i) Draw the circuit of basic integrator using op-amp.
- j) Mention some of the linear applications of op-amps.
- k) Write down the equation for average DC voltage across the load in a half-wave rectifier and full wave rectifier circuit.

PART – B

Answer any **THREE** questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) The current flowing in a certain silicon PN junction at room temperature is 2×10^{-7} A, when a large reverse bias voltage is applied. Calculate the current when a forward voltage of 0.1 V is applied across the junction. 8 M
- b) Sketch V-I characteristics of a zener diode. How are they determined in the laboratory? 8 M
3. a) Describe the working principle of full wave rectifier with centre tapped transformer and derive the expressions for the ripple factor, efficiency, V_{dc} , I_{rms} , I_{dc} and V_{rms} . 12 M
- b) Assume that the total voltage across the high-voltage secondary of a transformer used to supply a full-wave rectifier is 300 volts. Find the average load voltage (ignore the drop across the diode). 4 M
4. a) With necessary circuit and waveform, explain the switching characteristics of a transistor in detail. 8 M
- b) Derive the expression for Input resistance, output resistance and voltage gain for 8 M
- i) Common emitter amplifier
 - ii) Common collector amplifier

5. a) Draw 8 pin diagram of IC 741. State function of each pin. 4 M
- b) List electrical characteristics of an ideal op-Amp. 4 M
- c) Explain the following parameters of an op-amp and state their typical values for IC 741 op-amp. 8 M
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|-----------------------|------------------------------|
| i) Input bias current | ii) PSRR |
| iii) CMRR | iv) Slew rate |
| v) Input Impedance | vi) Output Impedance |
| vii) Bandwidth | viii) Open loop Voltage Gain |
6. a) Explain how Op-Amp can be used as
- | | |
|-----------------|--------------------|
| i) Integrator | ii) Differentiator |
| iii) Comparator | 10 M |
- b) Explain the operation of inverting & non inverting amplifier. 6 M