

GUJARAT TECHNOLOGICAL UNIVERSITY**PDDC - SEMESTER-I • EXAMINATION – WINTER • 2014****Subject Code: X11101****Date: 01-01-2015****Subject Name: Basic Electronics****Time: 10:30 am - 01:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain the formation of potential barrier in a PN junction. Why silicon is preferred to germanium in the manufacturing of semiconductor devices? **07**
- (b) Explain the concept of potential energy barrier. **07**
- Q.2** (a) Define the term rectification and describe the full wave bridge rectifier with the help of neat circuit diagram and waveforms. **07**
- (b) Explain construction and working of Tunnel diode. **07**
- OR**
- (b) State and explain Miller's theorem and its duality. **07**
- Q.3** (a) Explain the principle of operation of photodiode. List its applications. **07**
- (b) Explain CC configuration of transistor with its input and output Characteristics. **07**
- OR**
- Q.3** (a) Give the differences between clipper and clamper. And explain the positive clipping and negative clamper circuit. **07**
- (b) A transistor with $\beta = 100$ is to be used in common emitter configuration with collector to base bias. The collector circuit resistance is $R_C = 1k\Omega$ and $V_{CC} = 10\text{ V}$. Assume $V_{BE} = 0$, Choose R_B so that the quiescent collector to emitter voltage is 4 V. also find the stability factor. **07**
- Q.4** (a) What is the need of biasing in case of transistor? List different biasing method and explain any one. **07**
- (b) Explain the output characteristic of NPN transistor in CE configuration also indicate the different region. **07**
- OR**
- Q.4** (a) Explain the h-parameter model of CE amplifier with bypass resistance R_E and derive expression for A_i , A_v , R_i and R_o . **07**
- (b) Define the term voltage gain, current gain and power gain for the transistor. If a transistor have value of $\alpha = 0.96$ and emitter to base resistance $80\ \Omega$ is placed in common emitter configuration. Determine A_i , A_v and A_p . **07**
- Q.5** (a) Write a brief note on Thermal Runaway and Thermal Stability. **07**
- (b) Explain the principle of operation of JFET. Also compare FET with BJT. **07**
- OR**
- Q.5** (a) Classify the power amplifiers based on the position of Q-point on the ac load line. Also explain Class B push pull amplifier. **07**
- (b) Explain the cross section of N channel enhancement MOSFET with the help of neat sketch. Draw and explain the symbol of this device. **07**
