

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III • EXAMINATION – WINTER • 2014

Subject Code: 2131006

Date: 18-12-2014

Subject Name: Electronics Devices and Circuits

Time: 02.30 pm - 05.00 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) Define the following terms: **07**
(1) Doping (2) Clipper (3) Diffusion (4) Static Resistance
(5) Drift current (6) Bulk Resistance (7) Barrier Potential
- (b) Give the comparison between half wave rectifier, full wave rectifier and bridge rectifier with the help of following points: **07**
a) No of diodes b) Transformer necessity c) PIV ratings
d) Average dc current e) Average dc voltage f) rms current
g) Ripple factor h) Rectifier efficiency
- Q.2** (a) Draw and explain the input and output characteristics of common emitter configuration. **07**
- (b) What is voltage multiplier? Draw and explain full wave voltage doubler. **07**
- OR**
- (b) Describe the construction, the symbol, V-I characteristics and application of varactor diode. **07**
- Q.3** (a) What is multistage amplifier? Explain in detail with neat diagram two stages RC coupled amplifier. **07**
- (b) What is the need of biasing the transistor? Describe the voltage divider bias circuit. **07**
- OR**
- Q.3** (a) What is voltage regulation? Explain the working of two transistor regulator. **07**
- (b) Design a fixed bias circuit biased using NPN transistor which has $\beta=150$. The dc biasing point at $V_{CE}=5V$ and $I_C=5mA$. Supply voltage (V_{CC}) is 10V. **07**
- Q.4** (a) Define positive and negative feedback. Also derive the expression of transfer gain with negative feedback with the use of block diagram. **07**
- (b) Compare :(1) BJT with FET (2) Small signal amplifier and large signal amplifier **07**
- OR**
- Q.4** (a) Derive input resistance for voltage shunt feedback amplifier and current series feedback amplifier. **07**
- (b) Classify amplifiers based on position of Q-point. Show the efficiency of class-A transformer coupled amplifier is 50%. **07**
- Q.5** (a) Draw and explain the construction, operation and drain characteristic of N-channel JFET. **07**
- (b) Explain the working of emitter follower. Draw the ac equivalent circuit and determine the AC emitter resistance, voltage gain and input impedance. **07**
- OR**
- Q.5** (a) An amplifier gain changes by $\pm 10\%$ without any feedback. Using negative feedback the amplifier is to be modified to yield a gain of 100 with $\pm 0.1\%$ variation. Find the required open loop gain of the amplifier and the amount of negative feedback. **07**
- (b) What is MOSFET? Compare depletion type and enhancement type MOSFET. **07**
