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: (1) Doping (2) Clipper (3) Diffusion (4) Static Resistance (5) Drift current (6) Bulk Resistance (7) Barrier Potential	**07**
	(b)	Give the comparison between half wave rectifier, full wave rectifier and bridge rectifier with the help of following points: 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	**07**
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 β=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 ±10% without any feedback. Using negative feedback the amplifier is to be modified to yield a gain of 100 with ±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**

****