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**B.E / B.Tech ( Full-Time ) DEGREE ARREAR EXAMINATIONS, APRIL / MAY 2014**

**ELECTRICAL AND ELECTRONICS ENGINEERING BRANCH**

**THIRD Semester**

**EC8304 ELECTRONIC DEVICES AND CIRCUITS**

(Regulation - 2012 )

Time : 3 Hours | Answer ALL Questions | Max. Marks 100

**PART-A (10 x 2 = 20 Marks)**

1. Draw the V-I characteristics of a PN junction diode under forward and reverse biased conditions.
2. Calculate the diffusion capacitance for a silicon diode with a 10mA forward current if the charge carrier transit time is 70ns.
3. Why N-channel MOSFETs are preferred over P- channel MOSFETs.
4. Compare JFET and MOSFET.
5. Draw the circuit diagram of a CC amplifier.
6. What are the advantages of source follower.
7. What are the applications of tuned amplifiers.
8. Write a short note on BiMOS cascode amplifier.
9. Draw the circuit diagram of a RC phase shift oscillator.
10. What are the advantages of using negative feedback in amplifiers.

**PART-B (5 x16 = 80 Marks)**

11 With necessary circuit diagram and characteristic curves, explain the zener diode under reverse biased condition. Explain how zener diode is used for voltage regulation. What is the difference between zener breakdown and avalanche breakdown.

12.(a) Draw and explain the principle of operation and the input and output characteristic curves of Common Base (CB) configuration. Indicate the impact of $V_{CB}$ on cut-in voltage at the input characteristics and also indicate the various regions of operation at the output characteristics.

**OR**

12.(b) Explain with neat diagram, the construction and principle of operation of a n-channel JFET. Also explain the output and transconductance characteristics.

13.(a) Draw the fixed bias and collector to base feedback bias circuits of BJT. With the circuit diagram of a CE amplifier using self bias, and with the small signal equivalent circuit, obtain the expressions for the midband voltage gain, input impedance and output impedance of a common emitter amplifier.

**OR**

13.(b). Draw the circuit diagram of a CS amplifier using MOSFET. With the small signal equivalent circuit, derive expressions for the midband voltage gain, input impedance and output impedance.

14.(a).Draw the circuit diagram of a differential amplifier. Using the small signal equivalent circuits of difference mode and common mode, obtain the expression for CMRR.

**OR**

14.(b) Draw the circuit diagram and the frequency response characteristics of a single tuned amplifier. With the small-signal equivalent circuit, derive an expression for the voltage gain $A_v(\omega)$ of single tuned amplifier.

15.(a).(i).With a block diagram of feedback amplifier, obtain the expression for the closed loop gain $A_f$ of a negative feedback amplifier, in terms of open loop gain A and feedback factor $\beta$. With the topologies compare the four types of feedback amplifiers. **(12)**

(ii)Compare the frequency response characteristics of an amplifier with and without negative feedback. **(4)**

**OR**

15.(b).(i).Explain with the circuit diagram, how Barkhausen conditions for the amplitude and phase are satisfied in a Colpitts oscillator. **(10)**

(ii) Draw the electrical equivalent circuit and the impedance characteristics of a Quartz crystal .What are the advantages of crystal oscillators. **(6)**

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