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Reg. No. : .....

Name : .....

Third Semester B.Tech. Degree Examination, January 2016
(2013 Scheme)
13.305 : ELECTRONIC CIRCUITS (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **2** marks.

1. Draw the transfer characteristics of a positive clipping circuit with a reference voltage of 3V. Assume an ideal diode.
2. Why CB amplifier stages are not cascaded ?
3. Draw the approximate hybrid π model of a BJT at low frequency.
4. Draw the dc transfer characteristics of a differential amplifier.
5. What is active load ? Explain.
6. Obtain expression for gain with negative feedback.
7. Compare class B and AB circuits in terms of efficiency and distortion.
8. Draw the circuit of a simple regulator using zener diode.
9. Compare RC and LC oscillators.
10. Discuss the need for filters in repulated dc power supplies. **(10×2=20 Marks)**

PART – B

Answer **one** question from **each** Module. **Each** question carries **20** marks.

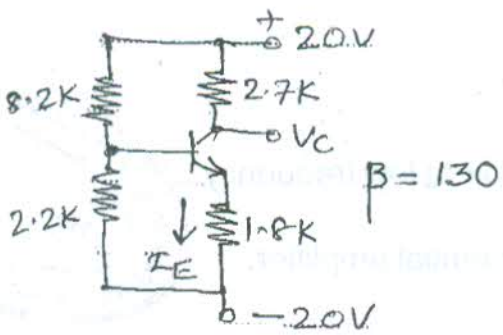
Module – I

11. a) A square wave whose peak-to-peak value is IV extends ± 0.5V with respect to ground. The duration of the positive section is 0.1 sec and of the negative section is 0.2 sec. If this waveform is impressed upon an RC differentiating circuit whose time constant is 0.2 sec., what are the steady state maximum and minimum values of the output waveform ?

    b) Draw the circuit of a CE amplifier. Analyse the circuit for midband gain.

12. a) Draw the circuit of a CB amplifier. Analyse the circuit for high frequency poles.

    b) Calculate the emitter current I_E and collector voltage V_c for the circuit shown.



Module – II

13. a) A MOS differential pair operated with a bias current of 0.8 mA employs transistors having W/L = 100 and μ_n Cox = 0.2 mA/V^2, using $R_D = 5\ k\Omega$ and $R_{SS} = 25\ \Omega$. Find the differential gain, the common mode gain and the CMRR (dB) if the output is taken single endedly and the circuit is perfectly matched.

    b) Explain the operation of a basic current mirror circuit and obtain expression for the current supplied in terms of reference current.

14. a) Draw the biasing circuit of a depletion mode MOSFET and obtain relevant expressions.

    b) Derive the expression for voltage gain of a common source MOSFET amplifier.

Module – III

15. a) Draw the circuit of a Wienbridge oscillator using BJT. Derive expressions for frequency of oscillation and condition for oscillation.

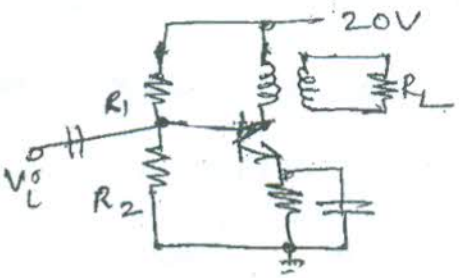
    b) Draw the frequency response of single tuned, double tuned and stagger tuned amplifiers. Compare their performance.

16. a) An amplifier with open loop gain of 100 delivers 1W of output power at 10% harmonic distortion for an input of 10 mV. If 20 dB negative voltage series feedback is applied and the output power to remain at the same value, calculate the required input voltage and the resulting harmonic distortion.

    b) Draw the circuit of a shunt-shunt feedback amplifier. Obtain expression for transresistance of the configuration.

Module – IV

17. a) A power transistor operating in class A, in the circuit shown is to deliver a maximum of 5W to a 4Ω load. The Q point is adjusted for symmetrical clipping. With V_{cc} = 20V, calculate the transformer turns ratio, quiescent operating points and efficiency.



    b) Derive expression for conversion efficiency a transformer coupled power amplifier operating in Class A.

18. a) Draw the circuit of a Bootstrap sweep circuit and explain its operation with relevant waveforms.

    b) Obtain the design considerations of the above circuit. **(4×20=80 Marks)**
