

**B.TECH. SEM -IV E & TC 2014 COURSE (CBCS) : WINTER -  
2017**

**SUBJECT : APPLIED ELECTRONIC CIRCUITS**

Day : **Tuesday**  
Date : **21/11/2017**

Time : **02.30 PM TO 05.30 PM**  
Max. Marks : **60**

**W-2017-2108**

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable **CALCULATOR** is allowed.
- 4) Draw neat and labeled diagram **WHEREVER** necessary.
- 5) Assume suitable data if necessary.

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- a) What is cascode amplifier? [05]
  - b) Derive mid frequency current and voltage gain for RC coupled amplifier. [05]

**OR**

- a) How direct coupled (d.c.) amplifiers are evolved? [05]
- b) A CE, RC coupled amplifier uses transistors with  $h_{fe} = 50$ ,  $h_{ie} = 1200\Omega$ ,  $h_{oe} = 30 \times 10^{-6} \text{ mhos}$ ,  $h_{re} = 2.5 \times 10^{-4}$ . The value of  $g_m$  at the operating point is 50 mmhos. The biasing resistor  $R_1$  between VCC and base is  $100k\Omega$  and  $R_2$  between base and ground is  $10K\Omega$ . The load resistor  $R_c = 5k\Omega$ . Let total shunt capacitance is  $C = 160 \text{ pF}$  and  $C_c = 6\mu\text{F}$ . Find lower and higher 3dB frequencies. [05]

- Q.2**
- a) Derive gain with negative feedback in amplifiers and justify it with suitable block diagram. [07]
  - b) An amplifier has an open loop gain of 1000 and a feedback ratio of 0.04. if the open loop gain changes by 10% due to temperature, find the % change in gain of the amplifier with feedback. [03]

**OR**

- a) What is desensitization of gain? [05]
- b) An amplifier has voltage gain with feedback of 100. If the gain without feedback changes by 20% and the gain with feedback should not vary more than 2%. Determine the value of open-loop gain A and feedback ratio  $\beta$ . [05]

- Q.3**
- a) Derive efficiency of class B amplifier. [06]
  - b) For a transformer coupled class A amplifier. Calculate the effective resistance  $R_{L'}$  seen looking into the primary of 10:1 transformer connected to an output load of  $16\Omega$ . [04]

**OR**

- a) Which distortions are present in power amplifier? [04]

**P.T.O.**

- b) For a class B push-pull amplifier the supply voltage  $V_{CC} = +20V$ . The amplifier is driving a loud speaker of resistance  $6\Omega$  as load. If the turns ratio of the complete primary to secondary winding of the output transformer is 3:1, calculate the following: [06]
- i) DC input power                      iii) Efficiency  
ii) AC output power                      iv) Power dissipation per transistor

- Q.4 a) What is Barkhausen criteria? Prove it with suitable block schematic. [05]
- b) A colpitts oscillator is designed with  $C_1 = 100pF$  and  $C_2 = 7500pF$ . The inductance is variable. Determine the range of inductance values, if the frequency of oscillation is to vary between 950 KHz and 2050 KHz. [05]

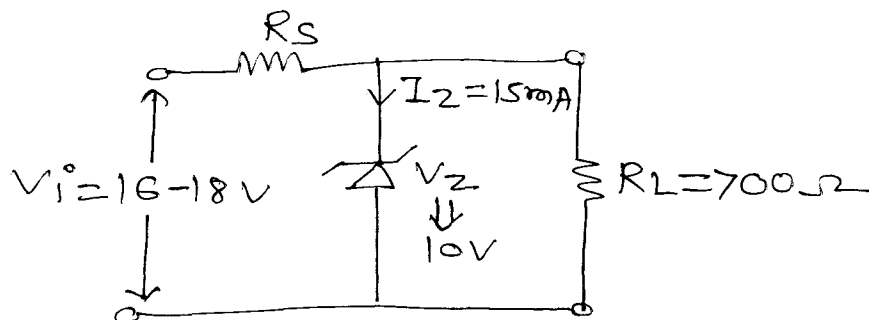
OR

- a) What is Wien bridge oscillator? Derive its frequency of oscillations. [05]
- b) In a transistorized Hartley oscillator, the two inductances are 2mH and  $20\mu H$  while the frequency is to be changed from 900 KHz to 2000 KHz. Calculate the range over which the capacitor is to be varied. [05]

- Q.5 a) What is the need of protection circuits in regulated power supplies? Enlist different types of protection circuits that can be incorporated in such power supply circuits. [05]
- b) Design an adjustable output voltage regulator circuit using IC 317 to give 5 to 12 volts at  $I_L = 1Amp$ . Given  $I_{ADJ} = 100\mu A$ ,  $V_{ref} = 1.25V$  and let  $R_1 = 240\Omega$  [05]

OR

- a) What is the effect of preregulator and Darlington series pass element on performance of series regulator circuit. [05]
- b) For zener regulator find: [05]
- i)  $R_S$                       ii)  $I_L$                       iii) Power dissipation rating of zener



- Q.6 a) What are the advantages of using hybrid  $\pi$  model for analyzing the behavior of a bipolar junction transistor at high frequencies? [04]
- b) A BJT has  $g_m = 38$  omhos,  $r_{b'c} = 5.9k\Omega$ ,  $h_{ie} = 6k\Omega$ ,  $r_{bb'}$  = 100 $\Omega$ ,  $c_{b'c} = 12pF$ ,  $c_{b'e} = 63pF$  and  $h_{fe} = 224$  at 1KHz. Calculate  $\alpha$  and  $\beta$  cut-off frequencies and  $f_T$ . [06]

OR

- a) Derive the expression for 3-dB upper cut-off frequency of emitter follower with the help of its equivalent circuit. [06]
- b) What is the effect of high frequency on BJT amplifier? [04]

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