

**B.TECH SEM – IV (2007 COURSE) (ELECTRONICS) :**

**WINTER - 2017**

**SUBJECT : ELECTRONIC CIRCUITS**

**02.30 PM TO 05.30 PM**

Day : **Monday**  
Date : **20/11/2017**

**W-2017-2415**

Time :  
Max. Marks : 80

**N.B.**

- 1) Q.1 and Q.5 are **COMPULSORY**. Out of the remaining attempt any **TWO** questions from each section.
- 2) Answers to both the sections should be written in **SEPARATE** answer book.
- 3) Assume suitable data if necessary.
- 4) Draw neat and labeled diagrams wherever necessary.

**SECTION – I**

- Q.1**
- a) Explain the selection of configuration for multistage amplifier. **(04)**
  - b) Discuss advantages and disadvantages of negative feedback. **(05)**
  - c) Draw the circuit diagram of inverting amplifier using op-amp and derive the equation for its gain. **(05)**
- Q.2**
- a) Explain various methods of cascading LF small signal amplifiers with relevant circuit diagram. **(06)**
  - b) Give reasons: **(07)**
    - i) Bootstrapping technique is used with emitter follower.
    - ii) Low frequency response of a CE amplifier is affected due to imperfect by passing of emitter resistance.
- Q.3**
- a) Give step-by step procedure for identifying topology of feedback in amplifier. **(06)**
  - b) An amplifier has mid-band voltage gain ( $A_{vmid}$ ) of 1000 with  $f_L = 50\text{Hz}$  and  $f_H = 50\text{KHz}$ , if 5% feedback is applied then calculate gain,  $f_L$  and  $f_H$  with feedback. **(07)**
- Q.4**
- a) Draw internal block diagram of op-amp. Explain function of each block. **(06)**
  - b) Design an op-amp circuit to give the following output. **(07)**  
$$V_o = \frac{1}{2}V_1 - \frac{2}{3}V_2 + \frac{4}{5}V_3$$
 where  $V_1, V_2, V_3$  are three d.c. voltage inputs. Use practical values of resistance in your design.

**SECTION – II**

- Q.5**
- a) Explain how even harmonics gets eliminated in Class A push-pull amplifier. **(05)**
  - b) Draw and explain block diagram of voltage series regulator. **(05)**
  - c) Write a short note on insertion loss. **(04)**
- Q.6**
- a) Derive expressions for efficiency of Class A power amplifier with:  
i) Resistive load (series fed) ii) Transformer coupled load. **(07)**
  - b) Draw circuit diagram of a Class B push-pull amplifier and explain its operation with the help of waveforms. **(06)**
- Q.7**
- a) Explain the working of Heartley oscillator. Derive the formula for the frequency. **(07)**
  - b) A simple zener diode regulator uses a 12 V zener diode with series resistance of 100  $\Omega$ . The unregulated supply is 15V. Determine : **(06)**
    - i) The necessary power rating of the zener.
    - ii) The highest load current that can be supplied with diode if  $R_z$  is 10  $\Omega$  and  $I_{zmin} = 5\text{mA}$ .
- Q.8**
- a) Draw and explain the working of single turned amplifier. **(06)**
  - b) A BJT has the following parameters measured at  $I_c = 1\text{ mA}$ ,  $h_{ie} = 3\text{ k}\Omega$ ,  $h_{fe} = 100$ ,  $f_T = 4\text{MHz}$ ,  $C_c = 2\text{pF}$  and  $C_e = 18\text{ pF}$ . Find  $r_{b'e}$ ,  $r_{bb'}$ ,  $g_m$  and  $f_H$  for  $R_L = 1\text{k}\Omega$ . **(07)**

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