EE - 304

B.E. III Semester

Examination, December 2015

Semiconductor Devices and Circuits

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
ii) All parts of each questions are to be attempted at one place.
iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.
iv) Except numericals, Derivation, Design and Drawing etc.

UNIT – I

1. a) Why FET is called a voltage controlled device?
   b) Why is zener diode is used as a voltage regulator?
   c) List the advantage and disadvantage of FET over BJT.
   d) Draw the diagram of MOSFET and explain its working with its characteristics.

OR

Draw the diagram of photodiode and explain its working with its characteristics.

UNIT – II

2. a) Define thermal run away.
   b) Write the limitation of h-parameters.
   c) Draw the h-parameter equivalent diagram of CE.

   d) A BJT has the following parameters $h_{ie}=2000\,\Omega$ $h_{re}=16\times10^{-5}$, $h_{fe}=49$ and $h_{oe}= 50\mu A/V$. Determine the current gain voltage gain, input resistance and output resistance of the CE amplifier, if the load resistance is $30k\Omega$ neglect source resistance.

OR

Find out the h-parameter of CC and draw its equivalent h-parameter circuit diagram.

UNIT – III

3. a) What are different types of feedback?
   b) Why is negative feedback employed in high gain amplifier?
   c) Explain emitter follower with circuit diagram.
   d) Draw the circuit diagram of push pull amplifier. Explain its working.

OR

Explain L-C (Hartley-Colpitts) oscillators with neat sketch diagram.

UNIT – IV

4. a) Explain the working of transistor as a switch.
   b) Define CMRR and slew rate.
   c) Define Darlington pair with diagram.
   d) Draw the circuit of monostable and explain its working.

OR

Draw the circuit diagram of multivibrator and explain its working.

UNIT – V

5. a) Explain how an op-amp can be used as voltage follower.
   b) Distinguish between inverting and non-inverting amplifier.
   c) Explain Integrator in brief.
   d) Explain differential amplifier with diagram.

OR

What do you mean by 555 timer and explain bipolar operation of 555 timer?

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