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10CS32

Third Semester B.E. Degree Examination, Dec.2017/Jan.2018
Electronic Circuits

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. Draw the fixed bias circuit using BJT and derive the expressions for operating point. Mention its advantages and disadvantages. **(08 Marks)**

   b. For the circuit shown in Fig. Q1(b) determine the operating point. Given $\beta = 100$, $V_{BE} = 0.7V$ **(04 Marks)**
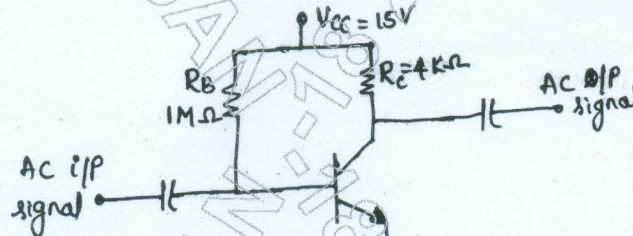

Fig. Q1(b)

   c. Explain the working of transistor as a switch and define delay time, rise time, storage time and fall time with respect to transistor switching. **(08 Marks)**

2 a. Explain the construction, operation and characteristics of N-channel E-MOSFET with sketches. **(10 Marks)**

   b. Briefly discuss the basic operation of CMOS inverter with a neat diagram. Mention two advantages of CMOS. **(06 Marks)**

   c. List the difference between JFET's and MOSFETS (any four). **(04 Marks)**

3 a. What is an optocouplers? Explain the parameters of optocouplers in brief. **(06 Marks)**

   b. Explain any six characteristics parameters of photo sensors. **(06 Marks)**

   c. Explain the basic operation and construction of LED and also discuss the different LED characteristics. **(08 Marks)**

4 a. Draw the generalized h-parameter model of a transistor based amplifier and derive the expression for :
   i)   Current gain
   ii) Input Impedance
   iii) Voltage gain
   iv) Output admittance. **(10 Marks)**

   b. Discuss the effect of coupling and bypass capacitors on the low frequency response of the voltage divider BJT amplifier with relevant sketches. **(10 Marks)**

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PART – B

5 a. Derive the expression for voltage gain, Input resistances and output resistance in case of voltage series feedback with a neat diagram. **(10 Marks)**

   b. What are the advantages of negative feedback? **(06 Marks)**

   c. An amplifier without feedback has a voltage gain of 100.
   i) Determine the gain of the amplifier with an introduction of 10% negative feedback.
   ii) Also find the feedback factor, if the gain required with feedback is 50. **(04 Marks)**

6 a. Explain the operation of monostable multi-vibrator with a neat diagram. (using BJT). **(08 Marks)**

   b. Explain RC low pass circuit and discuss the behavior of this circuit for step and pulse inputs. **(08 Marks)**

   c. Write a note on Barkhausen criterion. **(04 Marks)**

7 a. Explain the operation of buck regulator with relevant diagrams. **(10 Marks)**

   b. Design mains transformer with the following specifications,
   Assume B = 60,000 lines/sq.inch.
   Primary voltage : 220V, 50Hz
   Secondary voltage : i) 5V at 1 A and efficiency is 90%
   ii) 12 – 0 – 12V at 100mA efficiency is 90% **(06 Marks)**

   c. Define line regulation and load regulation for a regulated power supply. **(04 Marks)**

8 a. Define the following as referred to op-amp
   i)   Bandwidth
   ii)   CMRR
   iii) PSRR
   iv) Slew rate
   v)   Open loop gain
   vi) Setting time **(06 Marks)**

   b. Give a comparison between ideal op-amp with practical op-amp. **(06 Marks)**

   c. With neat figure and relevant waveform, explain the working of relaxation oscillator circuit using op-amp. **(08 Marks)**

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