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10CS32

Third Semester B.E. Degree Examination, Jan./Feb. 2021
Electronic Circuits

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. Define operating point. With a neat sketch explain how to select a suitable operating point. **(07 Marks)**

b. With a neat circuit diagram, explain common Emitter configuration in fixed – bias and derive the expression for V_{BE}, V_{CE}, I_B, I_{CQ} and V_{CEQ}. **(08 Marks)**

c. An input pulse is applied to the transistor switch shown in Fig. Q1(c). What is the minimum input voltage required to make the LED glow? Also, find out the minimum input voltage required to put the transistor in saturation. It is given that the minimum current required by the LED to glow is 10mA, Voltage drop across the LED is 1.5V, base – emitter voltage of the transistor is 0.7V, collector – emitter voltage of the transistor in saturation is 0.5V.

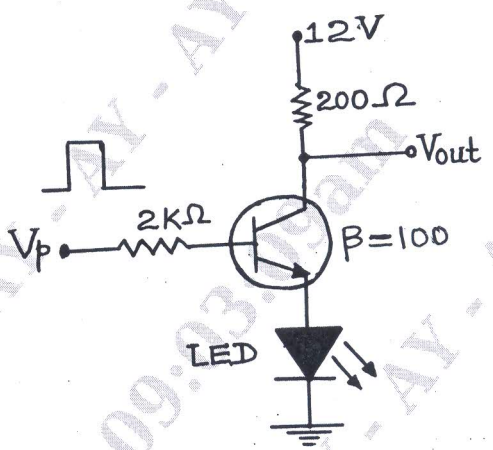

Fig Q1(c) **(05 Marks)**

2 a. Explain the construction and principle of operation of an n-channel JFET. **(08 Marks)**

b. Give any six applications of FET. **(06 Marks)**

c. With the help of simplified equivalent circuit and output characteristics, explain an N-channel IGBT. **(06 Marks)**

3 a. What is photosensors? Explain seven characteristic parameters of photosensors. **(08 Marks)**

b. Explain the classification of optoelectronic devices. **(06 Marks)**

c. What is an optocoupler? Explain five optocoupler parameters. **(06 Marks)**

4 a. Explain a transistor amplifier using complete h-parameter model and derive the expression for :
i) Current gain (A_i) ii) input impedance (Z_i)
iii) Voltage gain (A_V) iv) Output admittance (Y_o) **(10 Marks)**

b. With a neat circuit diagram, explain Low frequency response of BJT amplifiers. Determine the effect of input coupling capacitor, output coupling capacitor and bypass capacitor. **(10 Marks)**

PART – B

5 a. Explain the classification of large signal amplifiers as class A, class B, class C and class AB amplifiers. **(06 Marks)**

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

c. Draw the schematic arrangement and equivalent circuit of current shunt (shunt-series) Feedback. Derive the expression for :
i) Gain ii) Input Resistance iii) Output Resistance. **(08 Marks)**

6 a. Explain Barkhausen Criterion. **(04 Marks)**

b. A quartz crystal is characterized by L = 2.5H, R = 1kΩ, C_S = 0.01pF and C_M = 10pF. Determine the series and parallel resonant frequencies of the crystal. **(04 Marks)**

c. With a neat circuit diagram and relevant wave forms, explain the operation of astable multivibrator. Using IC555 timer. Also prove that the output waveform frequency $(f) = \frac{1}{1.38 \times R \times C}$. **(12 Marks)**

7 a. Define : i) Load Regulation ii) Line Regulation
iii) Output Impedance iv) Ripple Rejection Factor.
With reference to regulated power supplies. **(04 Marks)**

b. With a block diagram, explain the working of three-terminal regulators as a constant current source. **(06 Marks)**

c. Explain the operation of boost regulator with a neat circuit diagram and relevant waveforms. **(10 Marks)**

8 a. With a neat circuit diagram, explain a peak detector circuit. **(05 Marks)**

b. Explain the Instrumentation amplifier with a neat circuit diagram. **(07 Marks)**

c. With the help of neat circuit diagram, explain current to voltage converter and voltage to current converter. **(08 Marks)**

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