USN | | | | | | | | | | 　　　　　　　　　　　　　　　　10CS32

Time: 3 hrs.　　　　　　　　　　　　　　　　　　　　　　　Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least 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. Explain the criteria for selecting a suitable operating point and factors affecting the stability. **(08 Marks)**

　b. Determine the operating point for a fixed bias circuit shown in Fig.Q1(b). Given $\beta = 100$ and $V_{BE} = 0.7V$. Draw the load line.
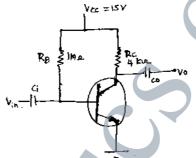

Fig.Q1(b) **(07 Marks)**

　c. Explain transistor as a switch. **(05 Marks)**

2 a. What are the differences between BJTs and FETs? **(06 Marks)**
　b. Explain the working of a CMOS inverter. **(04 Marks)**
　c. Explain the construction, working and principle of operation of an n-channel JFET. **(10 Marks)**

3 a. Explain the classification of optoelectronic devices. **(06 Marks)**
　b. Define the following terms:
　　i) Responsivity　　　　　　　　　　ii) NEP
　c. iii) Response time　　　　　　　　　iv) Quantum efficiency **(04 Marks)**
　　Explain the working of cathode ray tube with a neat diagram. What are the advantages and disadvantages of CRT? **(10 Marks)**

4 a. What is the need for cascading amplifier? Explain two stage cascaded amplifier with a block diagram. **(08 Marks)**
　b. Derive the expressions for: i) Current gain　　　ii) Input impedance
　　　　　　　　　　　　　　iii) Voltage gain　　　iv) Output admittance **(12 Marks)**

PART – B

5 a. Briefly explain the classification of amplifier based on input and output parameter of interest $[V_i, V_o, I_i$ and $I_o]$. **(12 Marks)**
　b. With a neat block diagram, explain amplifier with negative feed back. **(04 Marks)**
　c. Calculate the values of harmonic distortion components for an output signal having an amplitude of 5V at fundamental frequency, second harmonic component of 0.5V, third harmonic component of 0.2V and fourth harmonic component of 0.05V and find total harmonic distortion. **(04 Marks)**

6 a. What are necessary conditions for loop gain and phase shift for sustained oscillations according to Barkhausen criterion? **(04 Marks)**

     b. Explain the working of an Astable multivibrator using IC 555 timer with circuit diagram and relevant waveforms. **(08 Marks)**

     c. Explain the working of RC low pass RC high pass circuit. **(08 Marks)**

7 a. Explain the steps involved in custom design of mains transformer. **(06 Marks)**

     b. What are SMPS? Compare linear power supplies with SMPS. **(07 Marks)**

     c. Explain the working of three terminal voltage regulators. **(07 Marks)**

8 a. What should be the slew rate choosen for an OPAMP as an inverting amplifier configuration with gain of 10 when input is a sinusoidal signal with peak to peak value of 2V and highest frequency expected is 50 Hz? **(04 Marks)**

     b. Explain the working of an OPAMP window comparator with circuit diagram. **(08 Marks)**

     c. Explain the lead and lag type of phase shifter. **(08 Marks)**

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