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First/Second Semester B.E. Degree Examination, June 2012
Basic Electronics

Time: 3 hrs.

Max. Marks:100

- Note:1. Answer FIVE full questions choosing at least TWO from each part.**
2. Answer all objective type questions only on OMR sheet page 5 of the Answer Booklet.
3. Answer to objective type questions on sheets other than OMR will not be valued.

PART – A

- 1 a. Choose your answers for the following : (04 Marks)**
- i) In full wave rectification, if the input frequency is 50 Hz, then output frequency is,

A) 50 Hz	B) 100 Hz
C) 150 Hz	D) None of these
 - ii) The diodes which are designed with adequate power dissipation capabilities to operate in the break down region may be employed as _____ devices.

A) Variable voltage	B) Constant current
C) Constant voltage	D) Variable current
 - iii) If the pn-junction is heavily doped, breakdown voltage will _____.

A) Decrease	B) Increase
C) Constant	D) None of these
 - iv) If the reverse voltage across the diode increases, the width of the depletion layer

A) Decreases	B) Remains constant
C) Increases	D) None of these
- b. Draw the VI-characteristics of a diode and explain with reference to the diode current equation. (08 Marks)**
- c. A full wave rectifier circuit uses a capacitor filter of 1000 μ F and provides a dc load current of 500 mA at 2% ripple. Calculate dc output voltage, peak rectified voltage, rms ripple voltage on the capacitor and % regulation. (08 Marks)**
- 2 a. Choose your answers for the following : (04 Marks)**
- i) In the saturation region, the base to collector junction is _____.

A) Reverse biased	B) Forward biased
C) Not biased	D) None of these
 - ii) The input resistance of a CE-mode transistor is much _____ than its output resistance.

A) More	B) Less
C) Larger	D) None of these
 - iii) Common collector arrangement is generally used for _____.

A) Impedance matching	B) Voltage amplification
C) Current amplifier	D) None of these
 - iv) The collector current in a transistor is 5 mA. If $\beta = 140$ and the base current is 35 μ A, then the leakage current I_{CBO} is,

A) 10 μ A	B) 0.714 μ A
C) 0.78 μ A	D) 20 μ A
- b. For a silicon transistor $\alpha = 0.995$, emitter current is 10 mA and leakage current I_{CO} is 0.5 μ A. Find I_C , I_B , β and I_{CEO} . (06 Marks)**
- c. Draw the input and output characteristics of a transistor in CB – configuration, clearly indicate the various regions and explain it. (10 Marks)**

- 3 a. Choose your answers for the following : (04 Marks)
- The process of making operating point independent of temperature changes or variations in transistor parameters is known as
 - Biasing
 - Stabilization
 - Thermal runaway
 - None of these
 - The intersection of the dc load line with given base current curve is the
 - h-point
 - D-point
 - Q-point
 - None of these
 - Lower stability factors imply lower variation in the _____ current.
 - Collector
 - Base
 - Emitter
 - Both base and emitter.
 - To forward bias the base to emitter junction, the minimum V_{BE} required is _____ for Si transistor.
 - 4V
 - 0.7V
 - 0.007V
 - None of these
- b. Define stability factor. Discuss the factors that cause instability of biasing circuits. (08 Marks)
- c. For the circuit shown in Fig. Q3 (c), determine I_C , V_E , V_C and V_{CE} . (08 Marks)

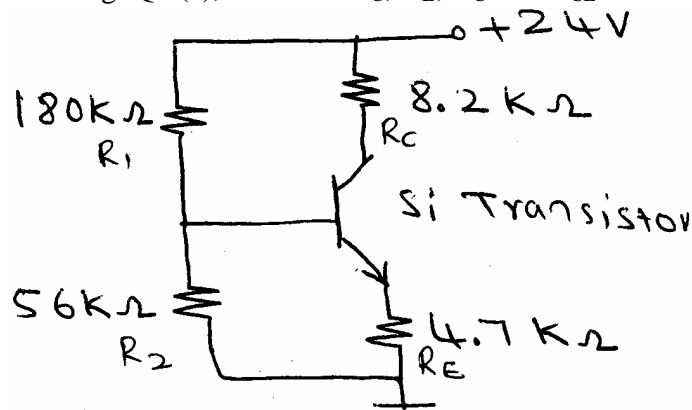


Fig. Q3 (c)

- 4 a. Choose your answers for the following : (04 Marks)
- FET is a _____ controlled device
 - Voltage
 - Current
 - Pulse
 - Power
 - The unit of transconductance g_m of an FET is _____
 - volts/ampere
 - volts
 - ampere/volts
 - None of these
 - Latching current in SCR is _____ holding current.
 - less than
 - more than
 - equal to
 - none of these
 - JFET has _____ input impedance.
 - high
 - low
 - very low
 - none of these
- b. Draw the two transistor equivalent of an SCR and explain working of SCR. (08 Marks)
- c. Draw the VI-characteristic and equivalent circuit of UJT. Explain how UJT can be used as a relaxation oscillator. (08 Marks)

PART – B

- 5 a. Choose your answers for the following : (04 Marks)
- The magnitude voltage gain at half power frequencies of an RC-coupled amplifier is _____ times maximum voltage gain

A) 0.707	B) 7.07
C) 10	D) 17.06
 - With negative feedback, output impedance of an voltage series feedback

A) Remains constant	B) Decreases
C) Increases	D) None of these
 - Without bypass capacitor across R_E , the voltage gain

A) decreases	B) increases
C) constant	D) none of these
 - The magnitude of product of open loop gain (A) and feedback factor (β) is less than one, then the output voltage _____ with frequency.

A) Remains constant	B) Decreases
C) Variable	D) None of these
- b. A crystal has $L = 0.33 \text{ H}$, $C = 0.06 \text{ pF}$, $R = 5 \text{ K}\Omega$ and $C_m = 1 \text{ PF}$. Find
- Series resonant frequency
 - Parallel resonant frequency (06 Marks)
- c. Draw the frequency response of an RC-coupled amplifier and explain it. Mention its advantages and disadvantages (10 Marks)
- 6 a. Choose your answers for the following : (04 Marks)
- If the different input signal is applied to the two inputs of op-amp, then mode is

A) Common	B) Mixed
C) Difference	D) None.
 - If a sinusoidal voltage is applied to vertical deflection plates only, then we get _____ on the screen of the CRO.

A) Vertical line	B) Horizontal line
C) Both lines	D) None
 - The unit of PSRR is _____

A) Volts	B) Amperes
C) $\mu\text{V}/\text{V}$	D) None
 - Maximum rate of change of output voltage with time is called _____

A) CMRR	B) Slew rate
C) Over rate	D) None
- b. Define the following terms with respect to op-amp:
- CMRR
 - Input offset voltage
 - Input offset current
 - Input bias current (08 Marks)
- c. Draw the three input non-inverting summer circuit using an op-amp and derive an expression for output voltage. (08 Marks)

