A

B. Tech. Degree II Semester Regular and Supplementary/ I Semester Supplementary Examination April 2018

CE/EE/ME/SE GE 15-1205 A & CS/EC/IT GE 15-1105 B
BASIC ELECTRONICS ENGINEERING
(2015 Scheme)

Time: 3 Hours   Maximum Marks: 60

PART A
(Answer *ALL* questions)

(10 × 2 = 20)

I. (a) Draw the energy band diagram of a PN junction at equilibrium, forward bias and reverse bias conditions.

(b) Determine the output voltage for the zener limiting circuit in the figure shown. R = 1KΩ, D_{Z1} = 3.3 V, D_{Z2} = 5.1 V. Assume a sinusoidal signal of 10 V peak to peak and forward-biased voltage of zener diode as 0.7 V.

(c) A 50 mV signal is applied to the base of a properly biased transistor with internal ac emitter resistance equal to 10 Ω and collector resistance R_C = 560 Ω. Determine the signal voltage at the collector.

(d) Compare the characteristics of different types of amplifiers.

(e) Explain the advantages of crystal oscillators.

(f) Implement OR logic function using NAND gates and NOR gates.

(g) Give the differences between combination logic circuits and sequential logic circuits.

(h) Explain the working of a sensor used for temperature measurement.

(i) A 400 W carrier is modulated to a depth of 75% by a sinusoidal signal. Find out the total power in the amplitude modulated wave.

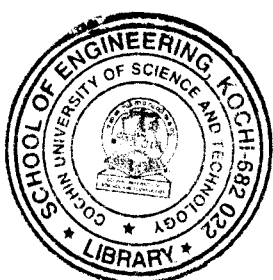(j) What are time varying systems and time invariant systems?
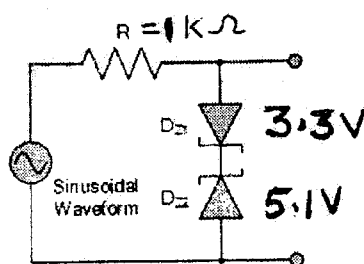
PART B

(4 × 10 = 40)

II. (a) Differentiate between drift and diffusion currents.

(b) Determine I_B, I_C, I_E, V_{CE}, V_{CB} in the figure shown below. Assume β_{DC} = 150 and forward bias voltage drop = 0.7 V.


OR
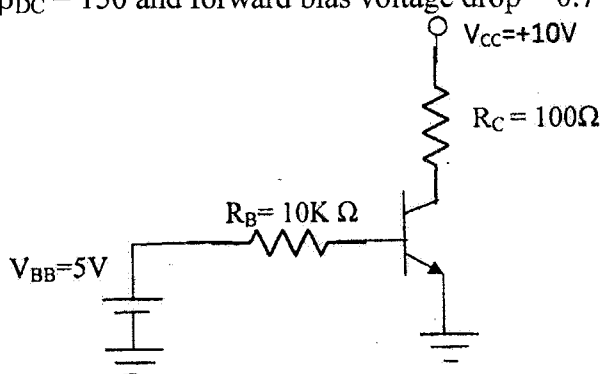
III. (a) With neat sketches, explain the working of full wave bridge rectifier. What is the peak inverse voltage across the diodes?

    (b) A certain rectifier with capacitor filter produces a DC output voltage of 75 V with a peak-to-peak ripple voltage of 0.5 V. Calculate ripple factor.

IV. (a) Explain the principle of amplification in a common emitter amplifier. When the emitter resistor is bypassed with a capacitor how is the gain of the amplifier affected.

    (b) Determine the total input resistance of the emitter-follower circuit shown below. Assume $\beta_{ac} = 175$
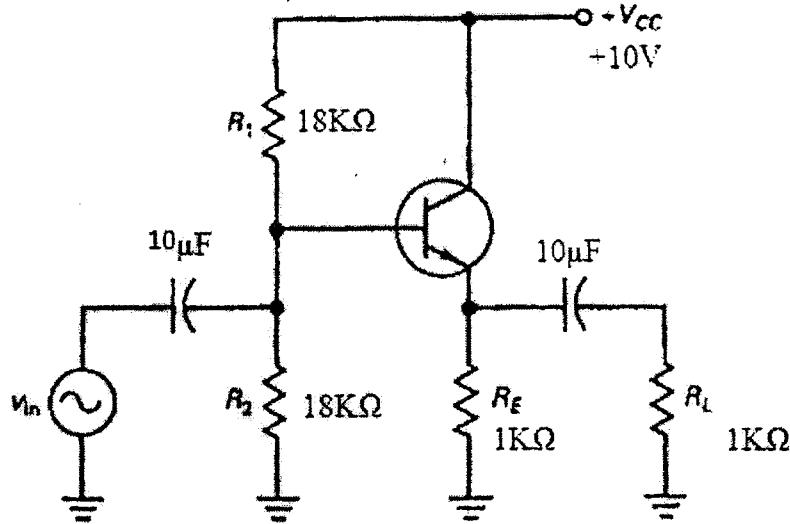
OR

V. (a) Explain the Barkhausen criteria for oscillation. Draw the circuit of an LC oscillator and write down the expression for the frequency of oscillation.

    (b) Explain the working of Switched Mode Power Supply.

VI. (a) What is a microprocessor? Draw the architecture of a microprocessor.

    (b) Convert (i) decimal 34.625 into binary number (ii) octal 256 into hexadecimal number.

    (c) Using Boolean law, prove the following $A + \overline{A}B = A + B$.

OR

VII. (a) With help of block schematic, explain the working of CRO.

    (b) Explain the principle of operation of actuators.

VIII. (a) State and explain sampling theorem.

    (b) Explain the properties of transforms.

OR

IX. (a) Determine the spectrum of an amplitude modulated wave if the carrier signal of frequency f_c is amplitude modulated by a sinusoidal signal of frequency f_m. What is the bandwidth of the amplitude modulated wave?

    (b) Give the concept of angle modulation. What is modulation index for FM?

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