J C Bose University of Science and Technology, YMCA, Faridabad

Subject: Analog Electronics Circuits (ESC-301)

BTech3rd SemesterCE31

Time: 90 minutes

M.M: 30

Sessional Test I

Oct, 2024

Note: All questions are compulsory.

Q1. Draw the circuit diagram of centre tap full wave rectifier and explain its working. Also determine (i) average dc output current (ii) rms output current (iii) rms value of ac component of output waveform (iv) ripple factor (v) rectification efficiency (vi) PIV. (6) (CO1) (LOCQ)

Q2. The four diodes used in a bridge rectifier circuit have forward resistance of 10Ω and load resistance of 480Ω. The alternating supply voltage is 240V (rms). Calculate (i) average dc load current (ii) rms output current (iii) power loss in each diode (iv) rectification efficiency (v) ripple factor (vi) PIV

(6) (CO2) (IOCQ)

Q3. Draw the output waveform for the following circuits: (6) (CO2) (IOCQ)

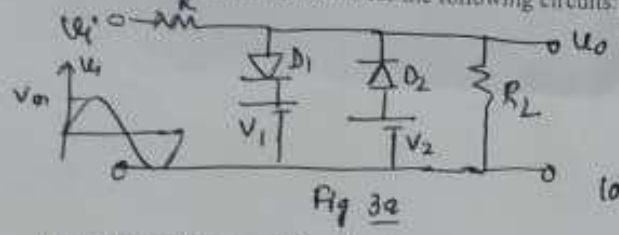


Fig 3a

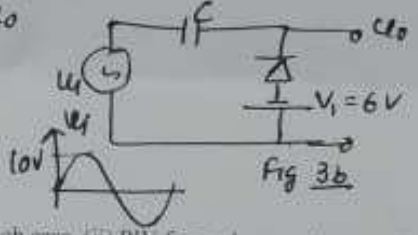
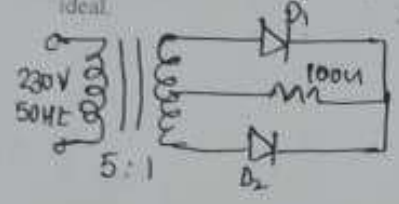
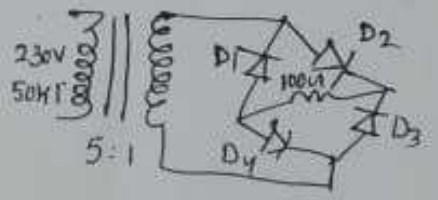


Fig 3b

Q4. For the given circuit find (i) dc output voltage in each case. (ii) PIV for each case. Assume diodes are ideal. (4)(CO2) (IOCQ)





Q5 (a) In a transistor operating in active region, although the collector junction is reversed biased, the collector current is quite large. Explain. (2) (CO2) (IOCQ)

(b) If the output voltage of a centre tap full wave rectifier and bridge rectifier is 50V. Determine the peak inverse voltage in both cases. (2) (CO2)(IOCQ)

(c)A full wave rectifier delivers 10W to a load of 1000Ω. If the ripple factor is 2%, calculate the ac ripple voltage across the load. (2) (CO2) (IOCQ)

(d) A power supply X delivers 10Vdc with a ripple of 0.5 volts rms, while the power supply Y delivers 25V dc with a ripple of 1mV rms. Which is better power supply and why? (2)(CO2) (IOCQ)

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BTech3rdSem CE32

Time: 90 minutes **Sessional Test I**

M.M: 30Oct, 2024

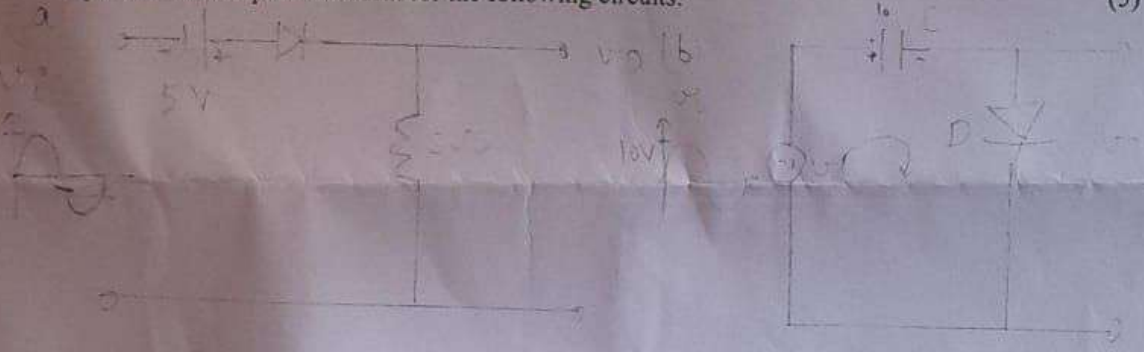
Note(i) All questions are compulsory.

Q1. Draw the circuit diagram of centre tap full wave rectifier and explain its working. Also determine (i)average dc output current (ii) rms output current (iii) ripple factor (iv) rectification efficiency (v) PIV. (5)

Q2. (a) Write down the characteristics of an ideal op amp (3)

(b) The differential voltage gain and CMRR of an op amp when expressed in decibels are 110 db and 100 db respectively. Calculate the common mode gain.(2)

Q3. Draw the output waveform for the following circuits: (5)



Q4. Draw the output characteristics of Common Emitter amplifier for a pnp transistor. Clearly indicate active, saturation and cut off region and also explain it. Also define α and β, find the relation between them. (5)

Q5 (a) In a transistor operating in active region, although the collector junction is reversed biased, the collector current is quite large. Explain, (2)

(b) Determine the value of emitter current and collector current of a transistor having α =0.98 and collector to base current I_{CBO} =4μA.The base current is 50μA. (3)

Q6.Explain the working of op amp as an inverting amplifier. (5)

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Time: 90 minutes | **Sessional Test II**

M.M: 30 | **Dec, 2024**

Note: All questions are compulsory.

Q1. Derive the expression of current gain (Ai), input impedance (Zi), voltage gain(Av) and output impedance (Zo) in terms of hi, ir, hf, ho. (6) (CO2) (IOCQ)

Q2. A NPN transistor circuit uses the voltage divider method of biasing having α =0.985 and V_{BE} = 0.3V. If V_{CC} = 15V, Calculate R_1 and R_C to place Q point at I_C = 2mA and V_{CE} =4V. The value of R_E = 2kΩ and R_2 = 20kΩ. (6) (CO2) (HOCQ)

Q3. Draw the circuit diagram of RC Phase Shift Oscillator. Explain its working. Also derive the frequency of oscillations. (6) (CO3) (IOCQ)

Q4. Draw and explain the following circuit using opamp: (6)(CO4) (IOCQ)

(i) Integrator
(ii) Schmitt trigger

Q5. Find the expression of output voltage for the circuit given below: (6)(CO4) (HOCQ)