BTIN – II - 05 – 030

B.Tech. Degree II Semester Examination in Instrumentation, June 2005

IN 202 ANALOG ELECTRONICS

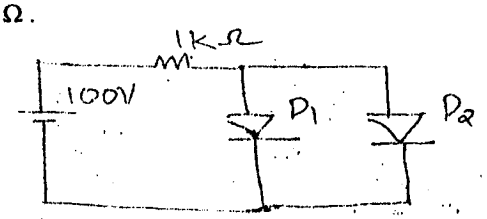
Time: 3 Hours Maximum Marks:100

PART – A

(Answer ***any five*** questions)

(5 x 5 = 25 marks)

I a) For the circuit given below, calculate the diode currents. Assume that the diodes can be described by a linearised volt-ampere characteristics, with incremental forward resistance r and offset voltage V_r. For diode D_1, $V_r = 0.6V$ and $r = 15\,\Omega$ and for D_2, $V_r = 0.2V$ and $r = 20\,\Omega$.



b) List out the major features of ideal voltage amplifier, ideal current amplifier, ideal trans resistance amplifier and ideal trans conductance amplifier.

c) Compare the characteristics of CB, CE and CC transistor amplifiers.

d) Explain how even harmonics can be eliminated from power amplifier output waveforms.

e) What are the merits and demerits of transformer coupled amplifier over amplifiers employing other methods of coupling?

f) If a circuit with parabolic transfer characteristics is excited with $\vartheta = V_m Cos(Wt + \pi/4)$, what frequencies will be present in the output?

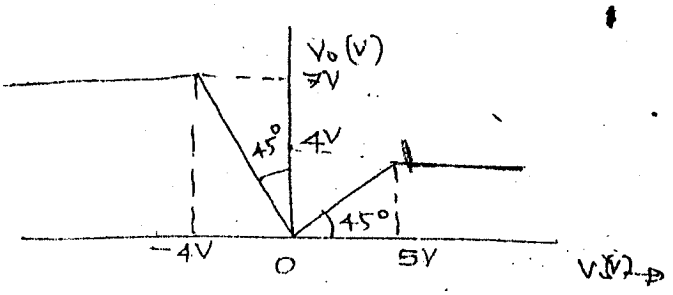
g) What factors affect the output voltage of a voltage regulator? What device is used for getting reference voltages less than 2V?

PART – B

(Answer ***all*** questions)

(15x5=75)

II a) Implement a circuit which realizes the following transfer characteristics:



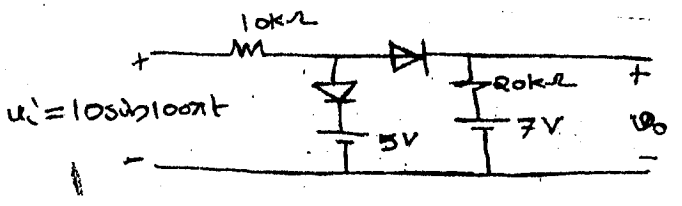
b) With a neat circuit and necessary equations explain the working of a transistor series regulator. Assume that the output voltage required is 5V.

OR

(***Turn Over***)

III a) Derive an expression for the ripple factor of a full wave rectifier with capacitor filter.

b) Explain the working of the circuit shown below and plot the output waveforms. Also draw the transfer characteristics. The diode forward drop may be taken as 0.7V.



IV a) A voltage amplifier when excited with 2V, 2 Ω source gives output voltages of 8V and 9V respectively with load resistances of 8 Ω and 18 Ω. If the short circuit current gain is 5, calculate the open circuit voltage gain, input impedance and output impedance.

b) Draw and explain the hybrid - π equivalent circuit of a BJT.

OR

V a) Explain different types of distortion present in amplifiers.

b) Derive an expression for the bandwidth of a series RC circuit with output taken across the capacitor.

VI a) Draw and explain the working of a class C power amplifier. Also compare the amplifier with other types of power amplifiers.

b) A voltage amplifier is characterized by the following parameters: Input impedance = 1k Ω Output impedance = 2 Ω. Open loop voltage gain = 20dB.
The amplifier is to feed an 8 Ω load. Calculate the output power, if the input is 1V. Also give complete specifications of the element to be used for perfect impedance matching. What is the maximum possible power output?

OR

VII a) With a neat circuit explain the working of a transformer less class AB push pull power amplifier.

b) Derive an expression for the conversion efficiency of a class B power amplifier.

VIII a) What are the characteristics required for an ideal buffer and why?

b) Draw and explain the frequency response of a direct coupled amplifier. What are the limitation of multistage direct coupled amplifiers?

OR

IX a) With neat diagrams explain any two very high input impedance amplifier circuits.

b) What are the different methods adopted for suppressing electromagnetic interference.

X With neat schematics explain how a transistor is fabricated in an IC.

OR

XI a) Explain how resistors and capacitors are fabricated in ICs,.

b) Explain any one method of introducing impurity ions into the intrinsic semiconductor.

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