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INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

IV SEMESTER B.S. DEGREE EXAMINATION – APRIL/ MAY 2017

SUBJECT: ELECTRONIC DEVICES AND COMPUTER INTERFACING (CS241)

(BRANCH: CS & CE)

Thursday, 27 April 2017

Time: 3 Hours **Max. Marks: 100**

- ✓ **Answer ANY FIVE full Questions.**
- ✓ **Missing data, if any, may be suitably assumed**

1A. Ideal diodes are used in a bridge rectifier with a source of 230 sin 314t. Draw the circuit diagram of it. If the load resistance is 1kΩ and turns ratio of transformer is 10:1, determine:

i) DC output voltage
ii) RMS output voltage
iii) Pulse frequency at the output
iv) PIV of the diodes required for safe operation
v) If a Capacitor filter is connected across R_L, C required for a ripple factor less than 0.001.

1B For a Zener regulator circuit the following specifications are given. Input voltage Vin = (50 ± 2) V, output voltage V_0 = 10V, R_S = 500Ω, minimum Zener current = 0.5mA and maximum power dissipation of Zener diode P_{max} = 500mW. Find the range of R_L for which regulation can be achieved. Also draw the circuit diagram of the regulator. **(10+10)**

2A Given a sinusoidal signal Vin = 10 sin ωt is applied to double clipper which clips the input waveform at a voltage of -1V and -3V. Draw the clipper circuit, input/ output waveforms and transfer characteristics. Mention the diode status in all operating regions. Assume ideal diodes.

2B With a neat block diagram explain the working of successive approximation ADC. Consider a 4 bit ADC with Vref = 0.5 V. Give the conversion table and illustrate with clock how 0.40V is converted to its digital equivalent. **(10+10)**

3A A Silicon diode carries a current of 20mA when it is forward biased with 0.7V at 27°C. Determine:

i) Reverse saturation current.
ii) Dynamic forward resistance
iii) Bias voltage required to get a current of 80 mA.

3B Draw the circuit diagram of an OPAMP integrator and noninverting amplifier. Derive the expression for output voltage for both circuits. **(10+10)**

4A With a neat circuit diagram and plots explain the input and output characteristics of a NPN common base transistor.

4B The following parameters are given for a fixed bias circuit with Si transistor. I_{CQ}=5mA, β = 70, R_C = 2 kΩ and V_{CC} = 15 V. Find R_B and V_{CEQ}. Plot the load line and locate the Q point on it. Draw the circuit diagram. **(10+10)**

5A Draw the VI characteristics of a TRIAC and explain the same.

5B With a neat circuit diagram, expression and relevant waveforms explain the working of a Monostable multivibrator using 555 timer.

(10+10)

6A With a neat circuit diagram and relevant expressions explain the working of RC phase shift oscillator circuit. Also discuss the Barkhausen Criterion required for oscillations.

6B Draw the circuit diagram of an OPAMP comparator circuit and explain its working with relevant expression. If voltage applied to inverting and noninverting terminal terminals of an OPAMP is as given below plot the output voltage with respect to input voltage. Given V_{CC} = 15V

Inverting terminal voltage	Noninverting terminal voltage
5V	10 sin ωt
10 sin ωt	-2V

(10+10)

7A Draw the circuit diagram of a self-bias circuit. Determine the expressions required to find the operating point. Mention the effect of variation of V_{CC}, I_B and R_C on the load line.

7B With a neat circuit diagram, relevant waveforms and expressions explain the working of a square wave generator.

(10+10)

8A Explain the construction and VI characteristics of an n-channel enhancement-type MOS FET.

8B Write short note on

i. LED
ii. Clamper circuit
iii. Transistor switch
iv. DIAC

(10+10)