Reg.No.

INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

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

SUBJECT: ELECTRONIC DEVICES AND CIRCUITS (EC 241)

(BRANCH: E&C and E&E)

Thursday, 11 May 2017

Max. Marks: 100

✓ Answer ANY FIVE full Questions.

Time: 3 Hours

- ✓ Missing data, if any, may be suitably assumed
- Determine the diode current at 1V for a Silicon diode with saturation current 0.1µA at 20°C. If temperature is 30°C, i) what will be the new current? ii)
 Plot the expected characteristics of the diode iii) Calculate the value of ac and dc resistance at a forward bias voltage of 1V.
- 1B i) Compare the characteristics of Silicon and Germanium diode. Which one will be preferred for practical applications, why?

ii) Explain the different types of breakdown which can happen in a diode (12+8) during reverse bias.

- 2A A 230 V, 50 Hz voltage is applied to the primary of a 5:1 step down centre tap transformer used in a full wave rectifier having a load of 900 Ω . Draw the circuit with required waveforms and Determine 1) DC voltage across load. 2) DC Current flowing through the load. 3) PIV for each diode. 4) Calculate DC output if a capacitor 10 μ F is connected across load.
- 2B a) Calculate the value of capacitance to use in a capacitor filter connected to a full wave rectifier operating at 400Hz. Ripple factor is 10% for a load of 500 Ω . Draw the waveforms if this filter is connected to output of full wave rectifier.

b) Describe how Zener diode can be used as a voltage regulator? (12+8)

- 3A A voltage divider bias is given to CE transistor configuration. Given $R_1=56k R_2=12.2k$, $R_C=2k$, $R_E=400\Omega$, $V_{cc}=10V$, $\beta=150$. i) Find the current and voltage values at Q point ii) Draw the load line iii)Explain the significance of Q point.
- 3B A triangular wave of 20V_{pp} is given to the circuit(Fig Q3).Plot a)V_{AB}
 b) Current through 10k resistor.



- 4A i) Explain Line and Load regulation with necessary diagrams. ii) Design a Zener voltage regulator which gives constant output of 15V while in regulation. Maximum current rating I_{zmax}=45mA. a) If $R_s=300\Omega$ and $R_L=1.5k\Omega$. Find the range of values of input voltage which keeps the load regulated. b) If Input voltage varies between 20-30V and load resistance varies from 140 Ω to 4.7k Ω .Calculate the value of series resistance for the load to be in regulation.
 - i) Explain Early effect in BJT and its consequences.
 - Plot the input and output characteristics of transistor in CB ii) configuration.
- 5A A CE Amplifier, with potential divider bias with Vcc=16V, R1=40k, R2=4.7k, Re=1.2k, Rc=4k, Ce=10µF(bypass capacitor), hie=3.2k hfe=100. Draw the model. Find the current gain, Voltage gain ,Input resistance and Output resistance.
- Find the input impedance and the overall voltage gain for the following 5B circuit. C=10 μ F R_L=50 ohms



6A i) Define transconductance for an FET. ii)Calculate the voltage gain of the amplifier shown in Fig Q6A.The transconductance of the transistor is 4000µS.If Rs is bypasses by a capacitor.What is the new Voltage gain?



- 6B With required diagrams and characteristic curves explain the operation of (12+8)JFET.
- 7A A voltage divider bias is given to N channel JFET circuit, I_D=1.5mA, $V_{DS}=5V$. Given $I_{Dss}=10mA$, $V_{P}=-3.5V$, $V_{DD}=5V$, $R_{s}=0.5k$, R1+R2=120k.Find R1, R2 and R_D.

(12+8) 7B Explain how FET is used as a Voltage Variable Resistor?

- 8A What is a Differential Amplifier? Draw the circuit of a Differential Amplifier using BJT with resistive load. Find the Q point, I_B and V_C for the circuit. Given Vcc=15V, V_{EE} = -15V, Rc=65k, β =100.
- Draw the transfer characteristics of Differential Amplifier and explain its 8B salient features. (12+8)

4B

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(12+8)

(12+8)