

Code No: R21026

R10**SET - 1****II B. Tech I Semester Supplementary Examinations, June - 2015****ELECTRONIC DEVICES AND CIRCUITS**

(Com. to EEE, ECE, EIE, ECC, CSE, IT, BME)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Explain in detail about Magnetic Deflection in cathode ray tube.  
b) The electron beam in a CRT is displaced vertically by a magnetic field of flux density  $2 \times 10^{-4} \text{ Wb/m}^2$ . The length of the magnetic field along the tube axis is the same as that of electrostatic deflection plates. The final anode voltage is 800V. Calculate the voltage which should be applied to the Y- deflection plates 1cm apart, to return the spot back to centre of screen. (7M+8M)
2. a) Prove that the conductivity of a semiconductor is given by  $\sigma = q(p\mu_p + n\mu_n)$   
b) Define the terms conductivity and mobility in a semiconductor. (7M+8M)
3. a) Draw the V-I Characteristic of Zener diode and explain its operation.  
b) Explain Avalanche breakdown and Zener break down. (7M+8M)
4. a) Obtain the ripple factor of a Full wave rectifier with shunt capacitor filter.  
b) Compare the performance of inductive L-section and  $\pi$ -section filters. (7M+8M)
5. a) Define  $\alpha$ ,  $\beta$  and  $\gamma$  of a transistor show how are they related to each other?  
b) Explain how a transistor is used as an amplifier. (7M+8M)
6. a) Explain the characteristic parameters of the JFET  
b) A JFET has a drain current of 4mA. If  $I_{DSS} = 8\text{mA}$  and  $V_{GS}(\text{off}) = -6\text{V}$ . find the values of  $V_{GS}$  and  $V_P$ . (10M+5M)
7. a) Explain in detail about Bias compensation method  
b) Explain in detail about collector to base bias. (7M+8M)
8. a) Derive the network parameters for Two port devices.  
b) What are salient features of Hybrid Parameters? (7M+8M)

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1. a) Explain in detail about electrostatic deflection in cathode ray tube.
b) An electrostatic CRT has a final anode voltage of 600V. The deflection plates are 3.5cm long and 0.8 cm apart. The screen is at a distance of 20cm from the center of plates. A voltage of 20V is applied to the deflection plates.
Calculate i) Velocity of electron on reaching the field.
ii) Acceleration due to deflection field.
iii) Deflection produced on the screen in cm.
iv) Deflection sensitivity in cm/v. (5M+10M)
2. a) Explain the difference between intrinsic and extrinsic semiconductor
b) What is meant by p-type impurity in a semiconductor? (8M+7M)
3. a) Draw the V-I Characteristic of PN junction diode and explain its operation.
b) Show that the Zener diode can be used as a voltage regulator. (8M+7M)
4. A Half wave rectifier has a load of 3.5k Ω , If the diode resistance and secondary coil resistance together have a resistance of 800 Ω and input voltage has a signal voltage of peak value 240V calculate i) Peak, average and rms value of current flowing ii) dc power output iii) ac power input iv) efficiency of the rectifier. (15M)
5. a) Explain the input and output Characteristic of a transistor in Common Emitter Configuration
b) Explain about punch through. (10M+5M)
6. a) With the help of suitable diagrams explain the working of different types of MOSFET.
b) Compare the MOSFET with JFET. (10M+5M)
7. a) Explain in detail about operating point and Basic stability
b) Explain in detail about compensation against variation in V_{BE} , I_{CO} . (8M+7M)
8. a) Why Hybrid parameters are called so? Define them.
b) A CE amplifier has the h-parameters given by $h_{ie} = 1000\Omega$, $h_{re} = 2 \times 10^{-4}$, $h_{fe} = 50$ and $h_{oe} = 25\mu \text{ mho}$. If both the load and source resistance are 1k Ω , Determine the
i) Current gain ii) Voltage gain (7M+8M)

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R10**SET - 3**

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1. a) Explain about in magnetic field.  
b) A charged particle having charge thrice that of an electron and mass twice that of an electron is accelerated through a potential difference of 50V before it enters a uniform magnetic field flux density of  $0.02 \text{ Wb/m}^2$  at an angle of  $25^\circ$  with field.  
Calculate i). The velocity of the charged particle before entering the field.  
ii). Radius of the helical path  
iii) Time of revolution. (5M+10M)
2. a) Explain about Fermi Level in between intrinsic and extrinsic semiconductor.  
b) define Drift and diffusion currents in semiconductor. (8M+7M)
3. a) Explain the principle behind the Varactor diode and list out its applications.  
b) Explain the Construction of a PIN diode and give the applications of PIN diode. (7M+8M)
4. a) Explain about series and shunt voltage regulators.  
b) Derive an expression for the ripple factor in a full wave rectifier using inductor filter. (7M+8M)
5. a) A transistor has  $I_B = 100\mu\text{A}$  and  $I_C = 2\mu\text{A}$  Find  
i)  $\beta$  of the transistor ii)  $\alpha$  of the transistor iii) Emitter current  $I_E$   
iv) if  $I_B$  changes by  $+25\mu\text{A}$  and  $I_C$  changes by  $+0.6\text{mA}$ . Find the new value of  $\beta$ ?  
b) Explain about Photo Transistor. (5M+10M)
6. a) Describe the working principle of an SCR with V-I Characteristics.  
b) Briefly describe some applications of JFET. (10M+5M)
7. a) Explain in detail about Stabilization factors.  
b) Explain about Thermistor and Sensistor compensation. (7M+8M)
8. a) Explain about Conversion formulas for the parameters of three transistor configuration  
b) Explain in detail about Measurement of h-parameters (7M+8M)

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1. a) Explain about Two – Dimensional motion of electron.
b) Explain in detail about Magnetic Focusing. (7M+8M)
2. a) Discuss the following with respect to semiconductor
i) doping ii) Dopant iii) donor iv) acceptor.
b) Explain “Majority and minority carriers” in semiconductors. (8M+7M)
3. a) What is tunneling? Form the energy band diagram explain the V-I characteristic of a tunnel diode.
b) List out the applications of tunnel diode and mention its advantages and disadvantages. (10M+5M)
4. a) Draw the circuit diagram of an Half wave rectifier and explain its operation
b) Show that a Full wave rectifier is twice as efficiency as a Half wave rectifier. (8M+7M)
5. a) Explain the input and output Characteristic of a transistor in Common Base Configuration.
b) The Common Base d.c current gain of a transistor is 0.967 .If emitter current is 10mA,
What is the value of base current? (10M+5M)
6. a) Describe the working principle of an UJT with V-I Characteristics.
b) Explain why an SCR is operated only in the forward biased condition. (8M+7M)
7. a) Explain about Self Bias Amplifiers.
b) Explain about Thermal runaway and Thermal stability. (8M+7M)
8. a) Explain in detail about analysis of a transistor amplifier circuit biasing h - parameters.
b) Explain about Transistor Amplifier configurations. (7M+8M)