

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID: 2024	Roll No.										
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B. Tech.

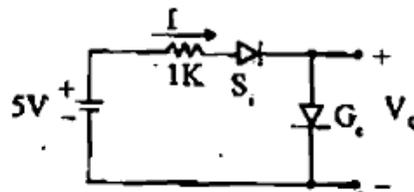
(SEM II) THEORY EXAMINATION 2010-11
ELECTRONICS ENGINEERING

Time : 3 Hours**Total Marks : 100****Note :** (1) Attempt all questions.

(2) Be precise in your answer. No second answer book will be provided.

1. Attempt any four parts of the following : (5×4=20)

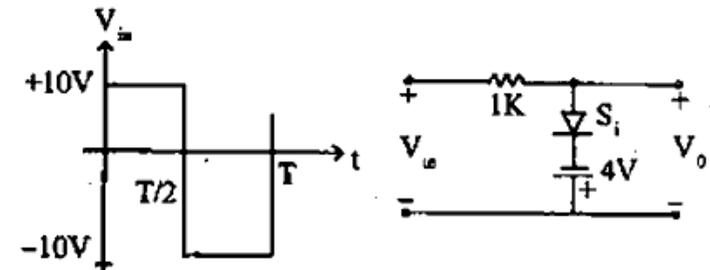
- (a) On the basis of Energy band diagram explain Insulator, Metals and Semiconductors.
- (b) Explain Static and Dynamic Resistance of diode.
- (c) Describe the characteristics of ideal diode. Determine the on and off state of the device.
- (d) Define the terms conductivity, intrinsic concentration and energy gap of semiconductors.
- (e) Determine the voltage V_o and I for the given configuration :

**(f) Differentiate between :**

- (i) Donor and Acceptor impurities
- (ii) Intrinsic and Extrinsic semiconductors..

2. Attempt any two parts of the following : (10×2=20)

- (a) Draw circuit diagrams to show two methods of producing a negative output voltage from a half wave rectifier. Explain briefly the circuit operations.
- (b) (i) Explain the working of full-wave bridge rectifier and show that $PIV \geq V_m$.
- (ii) What is clipper circuit ? Sketch the output voltage waveform for the circuit shown :



- (c) (i) Discuss the different types of junction break-down that can occur in a reverse biased diode. Explain the shape of the break-down diode characteristics. What will be their thermal coefficient ?
- (ii) Draw and explain the circuit operation of voltage Tripler circuit.

3. Attempt any two parts of the following : (10×2=20)

- (a) (i) How must the two transistor junction be biased for proper transistor amplifier operation ? What is the source of leakage current in a transistor ?
- (ii) Draw the output characteristics of a transistor in C_E configuration. Also indicate all the region of operation.
- (b) Draw and describe the h-parameter equivalent circuit for a common emitter transistor amplifier. Show how the values of h-parameters are obtained from the common emitter input characteristic curves and common emitter output characteristic curves.
- (c) (i) Draw the small signal equivalent circuit of a BJT and explain each component.
- (ii) Sketch a emitter bias circuit using an npn transistor. Show all voltage polarities and current directions. Explain the operation of the circuit and write the equations for V_B , I_E , I_C and V_{CE} .

4. Attempt any two parts of the following : (10×2=20)

- (a) Sketch the structure of a p-type channel depletion type MOSFET and explain its principle of operation with neat diagrams. Also sketch its V-I characteristics and circuit symbols for it.
- (b) Describe the construction and operation of a JFET. How does it differ from a MOSFET ? Draw the equivalent circuit for a JFET amplifier and explain its biasing.

- (c) (i) Define pinch-off voltage and its significance. Also mention the parameters that control the pinch-off voltage of a JFET.
- (ii) In a JFET the drain current is changed by 0.25 mA when the gate-source voltage is changed by 0.125V, keeping drain source voltage constant. Calculate the transconductance of the given JFET.

5. Attempt any two parts of the following : (10×2=20)

- (a) What is Karnaugh map ? Explain how it helps in simplifying a given Boolean expression. Draw K-map for four-number of variables. Minimise the given Boolean function using K-map. $F(w,x,y,z) = \sum m(1,0,4,7,9,11) + d(2,3,8,12)$.
- (b) (i) Convert the following numbers as indicated :
 $(1221.12)_2 = ()_7$, $(1221.12)_{10} = ()_{16}$.
- (ii) Implement XNOR gate using universal gates.
- (c) (i) Express $F = AB + A'C$ in Sum of the Products and also in Product of the Sums form.
- (ii) What are the characteristics of an ideal operational amplifier ? Explain the working of an inverting amplifier with neat sketch.