Master of Laser Science and Technology Examination, 2019
(2nd Semester)
SUBJECT: Laser Electronics

Time : Three hours   Full Marks 100

Answer any *Five* questions

1. a)	Draw the basic structure of a JFET.	4
b)	Explain the principle of n-channel JFET operation.	6
c)	Discuss the static characterization of the n - channel JFET.	5
d)	How pinch-off occurs in JFET. Explain with diagram.	5
2. a)	Draw the structure of Schottky diode and discuss its operation.	10
b)	Draw V-I characterization of Schottky diode. What is the difference with p-n junction diode.	5
c)	The reverse saturation current at 300 K of a p-n junction Ge-diode is 5 μA. Find the voltage to be applied across the junction to obtain a forward current of 50 mA.	5
3. a)	Explain full-wave rectifier with a suitable diagram.	10
b)	How the DC output voltage of a full wave rectifier is improved when a capacitor filter is used. Draw waveform of the load voltage and the diode current.	10
4. a)	What is Diac? Discuss Diac operation by drawing the structure of Diac.	8
b)	Draw a symbol and V- I characteristic of a diac.	5
c)	Write some of its applications. Explain how diac can be used to trigger Triac-Draw circuit.	7
5. a)	What is a unijunction transistor (UJT)?	2
b)	Give its circuit. Draw and explain its current-voltage characterisation.	8
c)	Show how the device can be used on a relaxation oscillator.	10

6. a) What are the different types of MOSFETS? Explain with a neat sketch the structure   **10**
and the working of an n-channel depletion MOSFET. How channel depletion
results from a negative gate voltage.

   b) In the voltage divider circuit fig (a) the JFET has I_D=4 mA, and V_{DS}=8 V. Given: **10**
V_{DD} = 24 V, R_1=2 mΩ, R_2= 1 mΩ, I_{DSS}= 10 mA, and V_p=-5 V. Calculate R_S.
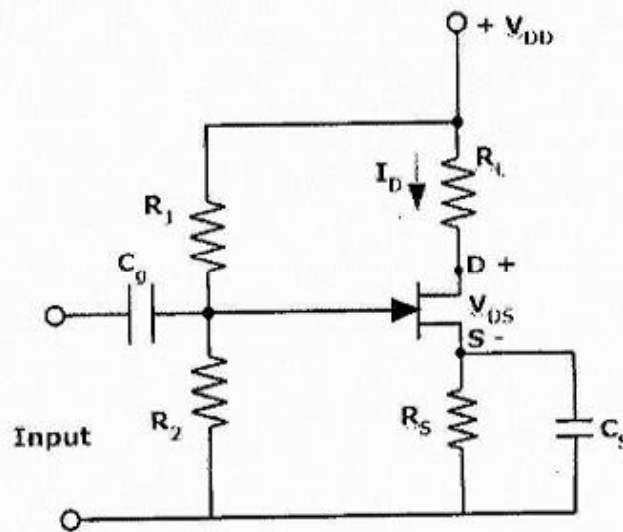What is the channel resistor.

Fig. (a)

7.   Write short notes (Answer any four)   (4×5=20)

   i.   CMOS

   ii. Chopper circuit

   iii. Class C commutation

   iv. Operation of SCR using two transitor model

   v.   Mcmurray inverter circuit