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Roll No.:

328353(28)

B. E. (Third Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(Electronics and Telecommunication Engineering Branch)

ELECTRONIC DEVICES and CIRCUITS

Time Allowed: Three hours

Maximum Marks: 80

Minimum Pass Marks: 28

Note: (i) Attempt all questions. Part (a) of each question is compulsory carrying 2 marks. Attempt any two parts from part (b), (c) & (d) of each question carrying 7 marks.

of the matter law Unit-I

1. (a) State and mathematically express the Einstein's relation for diffusion.

PTO

(b)	Calculate the ratio of the current for a forward biased	
	of a $0.06~\mathrm{V}$ to the current for the same value of	
	reversed biased applied to a germanium p-n junction	
	Diode at temperature 27° C.	7
(c)	Discuss the potential, electric field and charge density	
	inside depletion layer of p-n junction.	7
(d)	Explain drift current density. The electron concentration in a sample of Ge at 300° K vary linearly from 10^{17} /cm ³ at $x = 0 \mu m$ to 6×10^{16} /cm ²	
	at $x = 2 \mu\text{m}$. Find the current density in the Ge bar.	
	Assume N-type sample.	7
	Unit-II	
(a)	Explain the V-I characteristics of ideal p-n junction	
	diode.	2
(b)	Draw the circuit of centre-trapped and Bridge	
	rectifier. Compare both the rectifier ont he following	
	points I_{dc} , I_{rms} , TUF, ripple factor and η .	7

	Capacitance across depletion Layer of PN Junction
	Diode, come la tim
	(d) A full wave P-N diode rectifier uses load resistor of 1500 Ω no filter is used. Assume each diode to
	have idealized chracteristics with $R_f = 12 \Omega$ and
	$R_r = \infty$. Cut in voltage may be neglected sine wve
	voltage applied to each diode has amplitude of 32 volts and free of 50 Hz. Calculate:
	(i) D. C. current
	(ii) D. C. Voltage
	(iii) D. C. power α/p
	(iv) A. C. i/p power property and the last section of the last sec
	(v) Rectifier efficiency
	(vi) Ripple factor
	(vii) Form factor
	Unit-III
3.	(a) What is early effect?

(c) Compare diffusion capacitance and Transition

2.

(b) Draw the input and output characteristics of common

ween	D-mode	MOSFE

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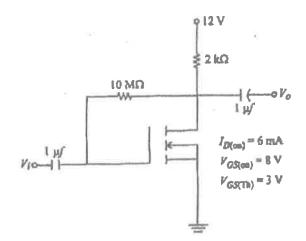
5.	(a)	Explain the difference between D-mode MOSFET
		and E-mode MOSFET.

(b) Draw the symbol of D-MOSFET and E-MOSFET and also explain the operation of E-MOSFET.

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Unit-V

- (c) Draw the circuit of CMOS 2-input NOR gate and 2-input NAND gate.
- (d) Determine I_{DO} and V_{DSO} for the enchancement type MOSFET for the given circuit.



- emitter configuration. Explain active, satruation and cut-off region.
- (c) Explain voltage divider biasing for BJT and find the value of stability factor S, and S'.
- (d) What is the relation between α and β ? Explain using transistor current equation.

_Unit-IV----

- 4. (a) Draw small signal model of JFET and explain the various parameters used in the model.
 - (b) What are the advantage of FET over BJT and why FFT is called unipolar?
 - (c) Explain VI characteristics of JFET. Prove that $g_m = \left(2/|v_p|\right) (I_D I_{DSS})^{\hat{}} \cdot 0.5.$ 7
 - (d) Explain how to bias FET in the active region to work as CS amplifier. Derive the expression for :
 - Input Impedance;
 - Output Impedance; and in all properties and the
 - (iii) Voltage Gain

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