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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

First Semester, B.E. - Semester End Examination; Dec. - 2019

Basic Electronics

(Common to all Branches)

Time: 3 hrs *Max. Marks: 100*

Note: i) PART - A is compulsory. **Two** marks for each question.
ii) PART - B: Answer any **Two** sub questions (from a, b, c) for Maximum of **18 marks** from each unit.

Q. No.	Questions	Marks
	I : PART - A	**10**
I a.	What is DC load line? Write the diode circuit equation.	2
b.	Write the structure of an n-channel depletion type MOSFET.	2
c.	List the ideal characteristics of Op-Amp.	2
d.	Write the 1's and 2's compliment of $(10110)_2$.	2
e.	Define amplitude modulation and draw modulated signal.	2
	II : PART - B	**90**
	UNIT - I	**18**
1 a.	Write a neat circuit diagram and waveform, explain the working of center tapped full wave rectifier and write the expression for average DC output voltage V_{dc}.	9
b.	Explain the DC load line analysis for series diode configuration with neat circuit diagram and characteristic.	9
c.	Solve the following :	
	i) Sketch the output V_o and determine the average DC level of the output for the network of Fig.Q.1(c).	9

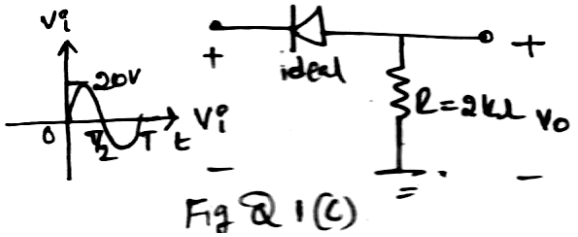

Fig Q 1(c)

ii) Repeat part (i) if the ideal diode is replaced by a silicon diode

iii) Repeat part (i) and (i) if V_m is increased to 200 V and compare solutions using equations

	UNIT - II	**18**
2 a.	With neat diagram, explain the construction and operation of a CMOS inverter.	9
b.	Explain the construction and characteristics of an *n*-channel enhancement type MOSFET with a necessary diagram.	9
c.	Write the MOSFET amplifier circuit with voltage divider bias. Obtain the equation for Z_i , Z_o and A_v using AC equivalent model. Use n-channel D-type MOSFET.	9

Contd…2

UNIT - III **18**

3 a. Explain the following controlled source:
i) Voltage Controlled Voltage Source
ii) Voltage Controlled Current source
iii) Current Controlled Current source — 9

b. What are active filters? Explain the types in detail with necessary diagram. — 9

c. Explain how Op-Amp can be used as?
i) Integrator
ii) Inverting summing amplifier
iii) Voltage follower — 9

UNIT - IV **18**

4 a. Convert the following:
i) $(725.25)_{10} = (?)_2 = (?)_{16}$
ii) $(111100111110001)_2 = (?)_{10} = (?)_{16}$
iii) Binary subtraction using 2's complement of $(22-17)_{10}$ — 9

b. Simplify and realize the following using basic gates only:
i) $Y = AC + ABC + \overline{A}BC + AB + D$
ii) $Y = (B + CA)(C + \overline{A}B)$ — 9

c. Realize the following:
i) OR using NAND only
ii) AND using NOR only
iii) XOR using NAND only — 9

UNIT - V **18**

5 a. Define AM. Draw an AM signal and its spectrum. Derive an expression for total power in an AM signal. — 9

b. Explain super hetero dyne receiver used in radio receivers with neat diagram. — 9

c. Write a short note:
i) Resistive transducer — 9
ii) Thermo electrical transducer

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