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

(An Autonomous Institution affiliated to VTU, Belgaum)

First Semester, B.E. - Make-up Examination; Jan / Feb - 2017

Electronic Devices and Communication

(Common to all Branches)

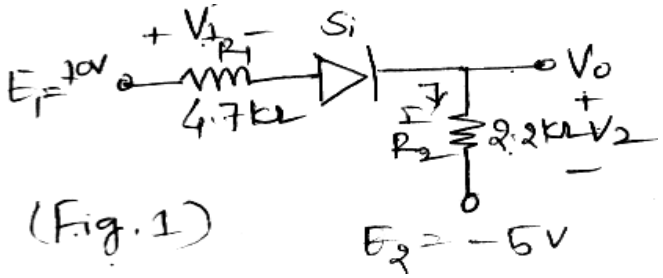
Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a. Explain the operation of full-wave bridge rectifier with neat diagram and also derive the PIV across diode. 8

b. Determine I, V_1, V_2, and V_0 for the series dc configuration of a Fig. 1 shown below. 6



(Fig. 1)

c. Define Q point. Explain DC load line analysis of a series diode configuration with circuit diagram and its characteristics. 6

2 a. With neat cross section of solar cell, discuss its working. 6

b. (i) Sketch the output V_0 and determine the dc level of the output for circuit shown in Fig. 3

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

(iii) Repeat (i) and (ii) if V_m is increased to 200 V. 7

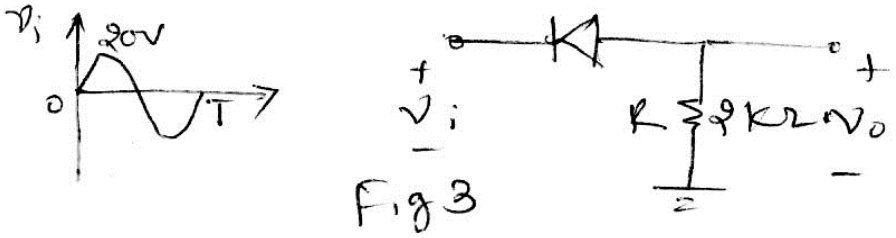


Fig 3

c. Explain photo conductive cell. Discuss one of the applications of photo conductive cell. 7

UNIT - II

3 a. Explain the operation of P-channel enhancement type MOSFET and draw the V-I characteristic. 7

b. With neat diagram, explain the operation of phase shift oscillator (FET). 7

c. Describe the construction and working of VMOS. 6

4 a. With a neat diagram explain the construction and V-I characteristics of N-MESFET. 6

Contd.....2

b. Determine the following for the network of Fig.5, if $V_{GSQ} = 0.35$ V and $I_{dQ} = 7.6$ mA

i) g_m and compare to g_{mo} ii) r_d

iii) sketch ac equivalent circuit iv) Z_i

v) Z_0 vi) A_v

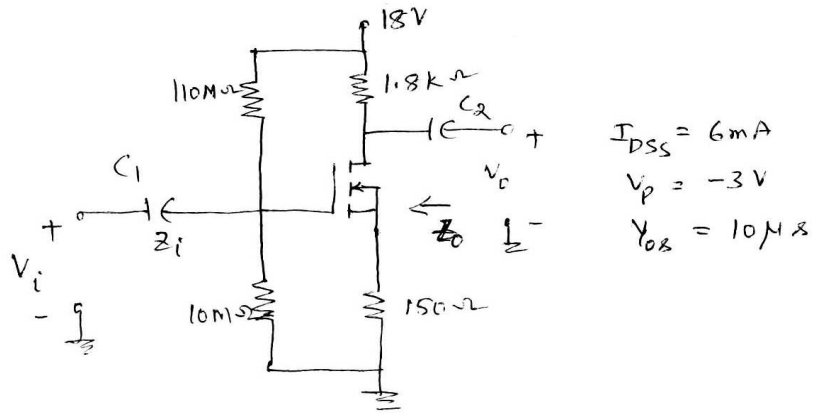


Fig. 5

8

c. Explain the Barkhausen criteria for oscillation. 6

UNIT - III

5 a. Explain the concept of virtual short and offset nulling. 7

b. Calculate the output voltage of an Op-Amp inverting summering amplifier for the following set of voltage and resistor;

i) $V_1 = +1$ V, $V_2 = +2$ V, $V_3 = +3$ V, $R_1 = 500$ kΩ, $R_2 = 1$ MΩ, $R_3 = 1$ MΩ. 7

ii) $V_1 = -2$ V, $V_2 = +3$ V, $V_3 = +1$ V, $R_1 = 200$ kΩ, $R_2 = 500$ kΩ, $R_3 = 1$ MΩ .

Use $R_f = 1$ MΩ in all cases.

c. Define slew rate of an Op-Amp. For an Op-Amp having a slew rate of 2 V/μs. What is the maximum closed loop gain that can be used when input voltage varies by 0.5 V in 10 μs? 6

6 a. i) Discuss the operation of voltage controlled voltage source and write an expression for V_0. 6

ii) Discuss the operation of current controlled current source and write an expression for I_0.

b. Show the connection of an LM124 quad Op-Amp as a three stage amplifier with gain of +10, -18, and -27. Use 270 kΩ feedback resistor for all three circuits. What output voltage will result for an input of 150 μV? 7

c. With neat diagrams, explain the operation of first order low pass and high pass filters. 7

UNIT - IV

7 a. Briefly explain the features of 8 bit, 16 bit and 32 bit Microcontroller. 8

b. Briefly discuss PSW of 8051 with frame format. 6

c. Calculate the equivalent for following; 6

$(9EAB.6FC)_{16} = (\quad)_{10} = (\quad)_8 = (\quad)_2$

Contd.....3

8 a. With neat block diagram, explain the architectural features of 8051. 7

b. Discuss the need for stack memory in Microcontroller. Explain the stack operation in 8051 with example. 7

c. Compute the following using 1's and 2's compliment : 6

i) $(1111)_2$-$(1000)_2$ ii) $(0101)_2$-$(1010)_2$

UNIT - V

9 a. With neat block diagram, explain the paging system. 6

b. Write and explain the block schematic of Basic cellular networks. 7

c. Briefly explain the handoff strategies and also practical handoff considerations. 7

10 a. With a neat block diagram, explain the first generation cellular radio network. 6

b. If a total of 33 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25 kHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell, if a system uses i) four cell reuse, ii) seven cell reuse, iii) twelve cell reuse. If a 1 MHz of the allocated spectrum is dedicated to control channels, determine an equitable distribution of control channels and voice channels in each cell for each of three systems. 8

c. Compare the common wireless communication system for a base Station. 6

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