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

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, B.E. - Semester End Examination; May / June - 2019

Basic Electronics

(Common to All Branches)

Time: 3 hrs *Max. Marks: 100*

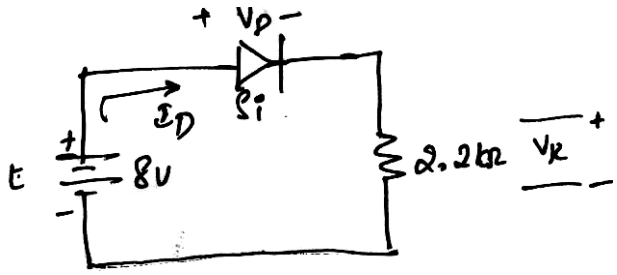
***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

a. With the help of a neat circuit diagram and appropriate waveform, explain the operation of a half wave rectifier circuit. 6

b. Define Q-point. For a series diode configuration, explain the construction of DC load line analysis and optimum Q-point selection using circuit diagram and characteristics. 9

c. For the series diode configuration shown in below figure, determine V_D, V_R and I_D. 5



a. Explain the basic block diagram of a power supply. 6

b. Analyze the working of Zener diode as voltage regulator with fixed V_I and fixed R_L. 6

c. Explain the operation of a capacitor filter using centre tapped full wave rectifier circuit. Calculate the ripple of a capacitor filter for a peak rectified voltage of 30 V. If capacitor C = 50 μF and a load current of 50 mA. 8

UNIT - II

a. Describe the construction of *n*-channel depletion type MOSFET. 6

b. Illustrate the working of CMOS inverter along with circuit diagram. 6

c. Explain the following in brief : 8

i) MOSFET handling

ii) V-MOS

a. With neat circuit diagram, explain the working of FET phase shift oscillator. Write the equation for frequency of oscillation. 6

b. Explain E-MOSFET voltage divider configuration along with equivalent circuits. 6

c. Describe the operation and characteristics of *p*-channel enhancement MOSFET with necessary diagrams. 8

Contd…2

UNIT - III

a. With the help of neat circuit diagram, derive the expression for output voltage and gain of an inverting Op-amp. Write the equivalent diagram. 8

b. Explain input offset voltage with necessary diagrams. 6

c. Design an Op-amp summing amplifier for the following set of votage and resistor : 6

V_1= 1 V, V_2 = 2 V, V_3 = 3 V; R_1 = 500 kΩ, R_2 = 1 MΩ, R_3 = 1 MΩ. Use R_f = 1 MΩ.

a. Describe following types of Op-amp controlled sources : 8

i) Voltage controlled voltage source

ii) Current controlled voltage source

b. Explain the following Frequency parameters : 12

i) Gain Bandwidth ii) Slew rate iii) Maximum signal frequency

UNIT - IV

a. Realize the following circuits / gates : 6

i) AND gate using NOR gate

ii) XOR gate using NAND gate

b. Prove De-Morgan's theorem with an example. 6

c. Compute the following : 8

$(57345)_{10} = (\ )_{16} = (\ )_2$

$(47.5434)_{16} = (\ )_{10} = (\ )_8$

$(11010101.11)_2 = (\ )_{10} = (\ )_{16}$

a. With the help of circuit diagram and truth table, explain the working of a full adder. 8

b. Explain the operation of 8:1 MUX. 6

c. Compute the following : 6

i) $(110.101)_2 - (100.101)_2$ using 1's complement method

ii) $(101.101)_2 - (100.100)_2$ using 2's complement method

UNIT - V

a. With neat diagram, explain the elements of a communication sytem. 6

b. Explain the operation of super hetrodyne receiver with necessary block diagram . 8

c. Describe the working of monochrome cathode ray tube with neat figure. 6

a. Distinguish between Amplitude Modulation and Frequency Modulation . 8

b. Describe the working of Piezoelectric transducer . 6

c. Describe the working of Hall-effect transducer with neat figure. 6

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