University of Dhaka
Affiliated Engineering Colleges
Department of Computer Science and Engineering
2nd Year 1st Semester B.Sc. in CSE Final Examination, 2022
Course Code: CSE-2103   Course Name: Digital Electronics & Pulse Technique
Total Marks: 70   Time: 3 Hours

Answer any 5 (Five) of the following Questions

1. a) Define leakage current and Knee voltage. Implement universal gate by diode.   2+3
    b) Show that Transistor acts as a switch.   4
    c) Implement Exclusive NOR gate by transistor.   5

2. a) Describe Bipolar logic family; Explain NOR gate using TTL   3+3
    b) Define Digital IC; Describe the Implementation of NAND gate using RTL   2+3
    c) Describe the implementation of NAND gate using DTL   3

3. a) What is counter modulus? Design a 4 bit synchronous counter circuit with counting sequence.   5
    b) Differentiate between latches and flip flop. Describe Clocked SR flip-flop.   2+3
    c) Implement Right shift register circuit with working procedure.   4

4. a) Prove that, Transistor works as a switch   4
    b) Draw the internal circuit diagram of 555 timer circuit and describe the functionality of each pin.   5
    c) Mention the difference between Clipping and Clamping circuit with example.   5

5. a) What is PLA? Implement the circuit with PLA having the following functions: 5

    F1 (A, B, C) = $\sum$ (3, 5, 6, 7)

    F2 (A, B, C) = $\sum$ (0, 2, 4, 7)

    b) Describe the pulse transformer circuit and its equivalent circuit.   5
    c) Explain pulse transmission with input and output waveforms in different media.   4

6. a) Draw the block diagram of a D/A converter and explain its operation   5
    b) Describe negative clipping circuit.   4
    c) Write down the usages of a clipping circuit   3
    d) Define LED & LCD   2

7. a) Explain the memory Read and Write operation.   4
    b) Explain pulse generator block diagram.   5
    c) Implement mono-stable multivibrator circuit.   5

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EEE 2104 : Electronic Devices and Circuits

Time: 3 Hours   Total Marks: 70

Answer any 5 (Five) set of the following Questions

1. a) What is semiconductor? Why do we use semiconductors?   1+2
    b) Differentiate between extrinsic and intrinsic semiconductor.   3
    c) Explain the volt-ampere (V-1) characteristics of PN junction.   5
    d) What is doping? Why it is done?   1+2

2. a) Explain working principle of a full wave bridge rectifier with a neat sketch.   4
    b) What is LED? Explain the working principle of LED.   1+3
    c) Write down advantage and disadvantage of full wave rectifier.   03
    d) An a.c supply of 230 V is applied to a half wave rectifier circuit through a transformer of   3
       turn ratio 10: 1 Find (i) the output d.c voltage and (ii) the peak inverse voltage. Assume
   the diode to be ideal.

3. a) What is Zener diode? Explain how does zener diode regulate voltage?   1+4
    b) For the Zener diode regulator, Determine: (i) V_L (ii) V_R (iii) I_Z (iv) P_Z 5
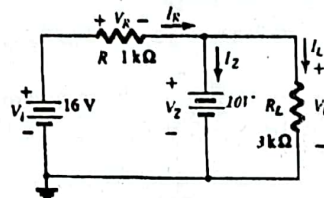

    c) Discuss working principle of JFET with necessary diagram.   4

4. a) How does transistor work as a switch?   3
    b) Why does the transistor need biasing?   3
    c) What is stability factor? For a transistor, Prove that $\beta = \frac{\alpha}{1-\alpha}$.   1+3
    d) What is clipper circuit? Determine the output waveform for network of the following   1+3
       figure [Assume the diode to be Silicon].
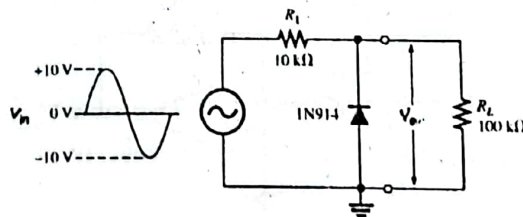
5.
a) What is SCR? Explain operating principle of SCR.   05
b) What is TRIAC? Explain operating principle of TRIAC.   05
c) For the following Zener diode network, determine V_L, V_R, I_Z, and P_Z.   04
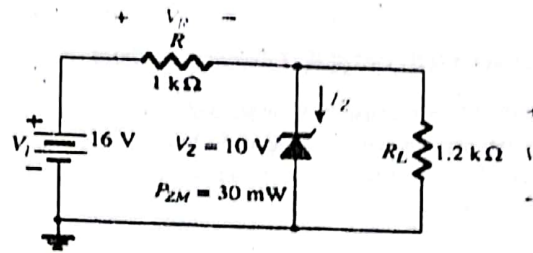
6.
a) What is FET? Describe the operating principle of D-MOSFET.   06
b) Discuss the operation of summing amplifier.   03
c) Determine R_B, R_C, I_C, V_B and V_{CE} for the following fixed-bias configuration.   05
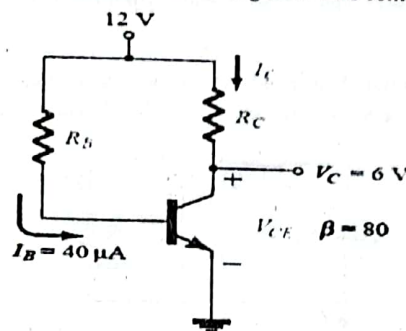
7.
a) What is the importance of power electronics?   2
b) What is non-inverting amplifier? Derive the output voltage equation of non-inverting amplifier   05
c) What is an op-amp ? What is the need of negative feedback in an op-amp?   1+2
d) Determine the output voltage for the circuit of Figure with a sinusoidal input of 2.5 mV. Where Rf =10 KΩ and Rin= 470 Ω.   04