MANIPAL
ACADEMY of HIGHER EDUCATION
(Institution of Eminence Deemed to be University)

Reg. No.									

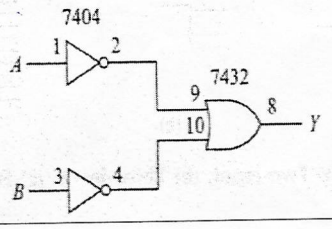
DEPARTMENT OF SCIENCES
I SEMESTER M.Sc. (PHYSICS)
END SEMESTER REGULAR EXAMINATIONS, NOVEMBER & DECEMBER 2023
FUNDAMENTALS OF ELECTRONICS [PHY 5154]
(CHOICE BASED CREDIT SYSTEM - 2020)

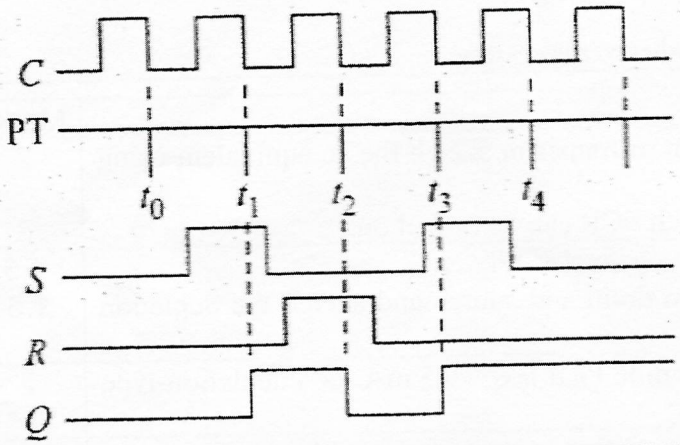
Time: 3 Hours Date: 06-12-2023 MAX. MARKS: 50

Note (i) Answer ALL questions
(ii) Draw diagrams, and write equations wherever necessary

		Marks	CO	BL
1A	(a) For a given CE base configuration of transistor sketch the ac equivalent using r_e model by replacing transistor. (b) Explain different methods by which SCR can be turned on.	2 3	1	1
1B	(a) Draw the basic construction of a *n*-channel JFET. (b) Apply the proper biasing between drain and source and sketch the depletion region for $V_{GS} = 0$ V.	1.5 1.5	1	3
1C	Given I_D =14 mA and V_{GS}=1 V, determine V_P if I_{DSS} = 9.5 mA for a depletion-type MOSFET.	2	1	3
2A	Explain the working of inverting amplifier using opamp with proper circuit diagram and arrive to the expressions of closed loop gain, bandwidth with feedback and output resistance with feedback	5	1	1
2B	Obtain frequency response data as shown below: for the first order low pass filter with a cutoff frequency 2kHz and pass band gain 1. Construct the frequency response plot from the following data.	3	1	3
2C	What are the two basic modes in which the 555 Times operates.	2	1	2
3A	**(a)** What is the NAND-NAND circuit for Y= AB+AC+AD+BCD. **(b)** Write down truth table and timing diagram for the following gate circuit.	2 2	2	3

Frequency	Gain Magnitude	Magnitude (dB)
10		
100		
500		
1000		
2000		
5000		
10000		



3B	**(a)** Draw Karnaugh map for F(A, B, C, D) = 1 (1,3,8,9, 10, 14.15) and write the simplifed Booleam equantion for the same. **(b)** Convert decimal 108.364 to a binary number. - Convert the following hexadecimal numbersto binary numbers: i. E5 ii. B4D	2 2	2	3
3C	Mention different types of instructions used in 8085 microprocessor	2	2	2
4A	Using the followin negative edge triggering at RS FF, explain the changes in output Q at different instant of time.  	3	2	4
4B	Design 4 to 1 line multiplexer (MUX) with truth table & logical circuit diagram.	4	2	6
4C	**(a)** Load 63H in memory location 2001H and increment the contents of memory location. **(b)** Load 48H in 2000H and increment the contents of memory location along with status of registers. Assume the contents of accumulator are 4CH ans CY=1. Illustrate the accumulator contents after the execution of the instruction RAL.	1 2	2	6
5A	Explain briefly architecture of 8085 µp with diagram.	5	2	1
5B	A count 35H is loaded in register C & loop is executed until count reaches zero. Write flowchart and program to set up the loop. Calculate time delay in the loop with clocl frequency 4MHz. (Total T-states for loop are 14)	2	2	5
5C	Load hexadecimal numbers 7CH and B2H in registers B and C. If sum is greater than FFH display 02H at output port 2 otherwise display the sum on o/p port 1 along with flowchart mention the number of memory locations occupied by this program.	3	2	6

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