STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2023 – 2024)

M.Sc., DEGREE EXAMINATION NOVEMBER 2023
PHYSICS
FIRST SEMESTER

COURSE   : MAJOR CORE
PAPER   : ELECTRONICS
SUBJECT CODE : 23PH/PC/EL14
TIME   : 3 HOURS   **MAX. MARKS : 100**

Q. No.	SECTION A Answer ALL the questions: (10x 3=30 marks)	CO	KL
1	Define the current gains β and α_F and write the relation connecting them.	CO1	K1
2	What is a race-around problem of a JK flip-flop? How is it eliminated in JK master slave flip flop?	CO1	K1
3	Define the terms: (i) input offset voltage and (ii) CMRR	CO1	K1
4	Illustrate how MOSFET acts as a switch.	CO2	K2
5	Outline the difference between machine cycle and instruction cycle.	CO2	K2
6	List the control signals in PPI 8255.	CO2	K2
7	Draw the circuit diagram of a monostable multivibrator using a 555 timer.	CO2	K2
8	Model a DTL type of positive logic AND gate and describe its working briefly.	CO3	K3
9	Compare the instructions SUB B and CMP B.	CO3	K3
10	Distinguish between programmable and non-programmable I/O ports.	CO3	K3
Q. No.	SECTION B (30 marks)	CO	KL
	PART A (PROBLEM SECTION) Answer any TWO questions: (2x 5 = 10 marks)		
11	The data sheet of a JFET gives the following information: I_{DSS}=3mA, $V_{GS(off)}$=-6V and $g_{m(max)}$=5000 μS. Apply these data to find the transconductance for V_{GS}=-4V and drain current I_D at this point.	CO3	K3
12	Construct a second-order low-pass filter with a cutoff frequency of 2 kHz.	CO3	K3
13	Organize the port in PPI 8255 for the control word 89_H and explain.	CO3	K3
	PART - B Answer any FOUR questions: (4x 5 = 20 marks)		
14	Explain the function of SCR full wave rectifier.	CO4	K4
15	Compare some important parameters of TTL and CMOS circuits.	CO4	K4
16	Draw the timing diagram for memory read cycle and explain it.	CO4	K4
17	Analyze the different addressing modes with one example in each mode.	CO4	K4

18	Examine the BSR mode function with the necessary control register.	CO4	K4
Q. No.	**SECTION C** **Answer the following: (2 x20=40 marks)**	**CO**	**KL**
19.	(a) Draw the circuit diagram of a single-stage CE transistor amplifier. Explain the biasing and function of each component. (10 marks) (b) Discuss the d.c and a.c equivalent circuits of a CE transistor amplifier and derive an expression for the voltage gain from its a.c equivalent circuit. (10 marks)	**CO5**	**K5** **K6**
	(OR)		

	(c) Draw the circuit of a 4-bit binary ripple counter using JK flip flops and explain its working.
	                                 (10 marks)
	(d) Construct a serial shift register using D flip flops and explain its working.
	                                 (10 marks)
		CO5	**K5**
			K6

20.	(a) Design a circuit for an analog computer to solve the given simultaneous equations: x-2y=3 and 2x+3y=-1.
	                                 (10 marks)
	(b) Build the internal block diagram for different I/O modes in 8255, Discuss in detail.
	                                 (10 marks)
		CO5	**K5**
			K6

	(OR)		

	(c) Write an assembly level language program to convert any given BCD number to binary number.
	                                 (10 marks)
	(d) Design a circuit diagram to explain the interfacing of stepper motor with PPI 8255.
	                                 (10 marks)
		CO5	**K5**
			K6

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