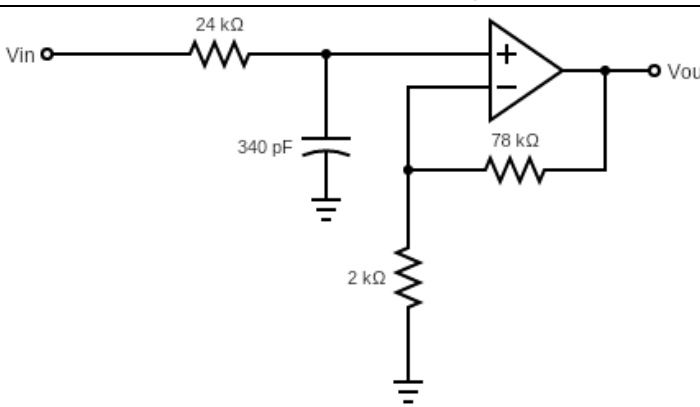


**STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.**  
**(For candidates admitted during the academic year 2023 – 2024 & thereafter)**

**M.Sc., DEGREE EXAMINATION NOVEMBER 2024**  
**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 Questions (10 x 3 = 30 marks)	CO	KL
1	Define transconductance.	CO1	K1
2	Define active filters and explain how they are better than passive filters.	CO1	K1
3	Define Z- parameter in transistor.	CO1	K1
4	What are BSR mode and I/O mode in 8255?	CO2	K1
5	Differentiate between a counter and a register.	CO2	K2
6	What is the application of JK flip flop in toggle mode?	CO2	K2
7	How does an op-amp work as an integrator?	CO2	K2
8	Describe the operation of control signals of 8255.	CO3	K2
9	Explain the purpose of using FET as common drain amplifier (or source follower).	CO3	K3
10	Discuss the function of memory READ cycle in 8085 programming.	CO3	K3
Q. No.	SECTION B (6 x 5 = 30 marks)	CO	KL
	<b>PART A</b> Answer any TWO Questions 2 x 5 = 10		
11	Determine the voltage gain, current gain and input impedance of a CE amplifier using a transistor of h parameter constants $h_{ie} = 1200 \text{ ohm}$ ; $h_{re} = 0$ and $h_{fe} = 36$ ; $h_{oe} = 2 \times 10^{-6} \text{ mho}$ and a load resistance $R_c = 2500 \text{ ohm}$ .	CO3	K3
12	 <p>From the given filter circuit, determine the voltage gain, cutoff frequency and frequency response.</p>	CO3	K3
13	Write an assembly language program to add two 32 bit numbers.	CO3	K3

<b>PART B</b>			
<b>Answer any FOUR Questions</b>		<b>4 x 5 = 20</b>	
14	Explain the working of CMOS NAND gate logic function.	<b>CO4</b>	<b>K4</b>
15	Discuss briefly the construction, working and characteristics of SCR.	<b>CO4</b>	<b>K4</b>
16	Explain the working of monostable multi-vibrator with 555 timer circuit.	<b>CO4</b>	<b>K4</b>
17	What is a flag? Discuss the functions of various flags available in $\mu$ P 8085.	<b>CO4</b>	<b>K4</b>
18	Explain the different operational modes in 8255.	<b>CO4</b>	<b>K4</b>
<b>Q. No.</b>	<b>SECTION C</b>	<b>CO</b>	<b>KL</b>
<b>Answer ALL Questions</b>		<b>(2 x 20 = 40 marks)</b>	
19 (i)	<b>A)</b> Explain the memory mapped I/O and I/O mapped I/O.	<b>CO5</b>	<b>K5</b>
	<b>B)</b> Design op-amps circuit to solve simultaneous equations, $-4x + y = 1$ and $6x - 5y = 9$	<b>CO5</b>	<b>K6</b>
<b>(OR)</b>			
19 (ii)	<b>A)</b> What are up/down counters? Discuss their working in 4-bit binary up/down counter and verify its truth table.	<b>CO5</b>	<b>K5</b>
	<b>B)</b> Explain the interfacing of DAC and ADC with Programmable peripheral interface 8255.	<b>CO5</b>	<b>K6</b>
20 (i)	<b>A)</b> Sketch and discuss the architecture of 8085.	<b>CO5</b>	<b>K5</b>
	<b>B)</b> What is race-around in JK flip-flops? Explain in detail the design of a master-slave digital circuit to avoid the race-around condition.	<b>CO5</b>	<b>K6</b>
<b>(OR)</b>			
20 (ii)	<b>A)</b> Illustrate the procedure for solving a second order differential equation. Solve the differential equation using op-amp based integrators circuit.  $\frac{d^2 v}{dt^2} = -20 \frac{dv}{dt} - 100v + 25$	<b>CO5</b>	<b>K5</b>
	<b>B)</b> Design and discuss the operation of a 4-bit shift right shift register using D flip-flops. Mention its role in serial communication.	<b>CO5</b>	<b>K6</b>

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