

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2024
(First Semester)

Branch - CHEMISTRY

BASIC ELECTRONICS FOR CHEMISTS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Find the primary factor affecting the performance of a semiconductor device. a) Temperature b) Color c) Size d) Weight	K1	CO1
	2	Recall the type of rectifier that allows current to flow only during one half of the AC cycle. a) Full-wave rectifier b) Half-wave rectifier c) Bridge rectifier d) Inverter	K2	CO1
2	3	Match the primary function of an operational amplifier (op-amp)? a) To generate power b) To act as a resistor c) To convert AC to DC d) To amplify voltage signals	K1	CO2
	4	What is the typical response time for an LDR to changes in light intensity? a) Instantaneous b) Milliseconds to seconds c) Minutes d) Hours	K1	CO2
3	5	Show in a digital system, what range of values can an 8-bit binary number represent? a) 0 to 255 b) -128 to 127 c) 0 to 1023 d) 1 to 256	K2	CO3
	6	Which of the following flip-flops is primarily used for counting applications? a) SR Flip-Flop b) D Flip-Flop c) T Flip-Flop d) JK Flip-Flop	K1	CO3
4	7	Tell about which type of counter counts in both directions (up and down)? a) Up counter b) Down counter c) Ring counter d) Bidirectional counter	K1	CO4
	8	Infer, which type of A/D converter uses a staircase approximation to convert analog signals to digital? a) Flash A/D converter b) Delta-Sigma A/D converter c) Successive Approximation A/D converter d) Dual-slope A/D converter	K2	CO4
5	9	Select about specification defines the smallest change in input voltage that an A/D converter can detect. a) Sampling rate b) Resolution c) Linearity d) Dynamic range	K1	CO5
	10	Which component of a flame photometer is responsible for detecting the emitted light? a) Flame b) Prism c) Photo detector d) Filter	K1	CO5

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SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Identify the concepts of intrinsic semiconductors.	K3	CO1
	(OR)			
	11.b.	Construct and explain the working principle of a full wave rectifier.		
2	12.a.	Analyze the operation of the inverting amplifier.	K4	CO2
	(OR)			
	12.b.	Categorize the working process of an astable multivibrator and its applications.		
3	13.a.	Explain the difference between binary, decimal, and hexadecimal number systems. Provide examples for each.	K2	CO1
	(OR)			
	13.b.	Show the function of the JK master slave flipflop with the truth table.		
4	14.a.	Summarize the operation of synchronous counters.	K3	CO4
	(OR)			
	14.b.	Illustrate the role of a reference voltage in an A/D converter and explain how it affects the converter's performance.		
5	15.a.	Categorize the function of a voltmeter.	K4	CO5
	(OR)			
	15.b.	Examine the effects of a flame photometer.		

SECTION - C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Discover the I-V characteristics of a PN junction diode, including forward and reverse bias regions. Explain the significance of each region.	K4	CO2
2	17	Identify the role of automatic street lights with these advantages.	K4	CO2
3	18	Construct and explain the working principle of the half adder and the full adder.	K4	CO3
4	19	Interpret the working model of a ring counter.	K4	CO3
5	20	Explain in detail the operation of a potentiometer.	K4	CO5

Z-Z-Z

END