

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	Ohm's Law states that: a) Current is proportional to power b) Voltage is proportional to current c) Resistance is proportional to current d) Power is proportional to resistance	K1	CO1
	2	In a series circuit, the total resistance is: a) Sum of all resistances b) Product of all resistances c) Less than the smallest resistance d) Equal to the largest resistance	K2	CO1
2	3	In a differential amplifier, the output is proportional to: a) Sum of two inputs b) Product of two inputs c) Difference of two inputs d) Ratio of two inputs	K1	CO2
	4	The input impedance of an ideal op-amp is: a) Zero b) Very low c) Infinite d) Depends on feedback	K2	CO2
3	5	A potentiometer used as a displacement sensor works on the principle of: a) Variation of inductance b) Variation of resistance c) Variation of capacitance d) Piezoelectric effect	K1	CO3
	6	A strain-gauge sensor measures displacement by detecting changes in: a) Voltage b) Capacitance c) Resistance due to strain d) Magnetic field	K2	CO3
4	7	Which device converts electrical energy into rotational mechanical motion? a) Linear actuator b) Control valve c) Electric motor d) Pneumatic cylinder	K1	CO4
	8	Hydraulic systems are especially suitable for applications requiring: a) High speed and low force b) Low speed and high force c) Clean operation d) Electrical isolation	K2	CO4
5	9	Oscilloscope displays input signals in the form of: a) Numbers b) Letters c) Waveforms d) Digital codes	K1	CO5
	10	The airflow rate in a duct can be measured using a: a) pH meter b) Anemometer c) Ammeter d) Oscilloscope	K2	CO5

Cont...

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.	Enumerate the types of passive components with suitable examples.	K1	CO1
	(OR)			
	11.b.	What is an LED? State its working principle and two common applications		
2	12.a.	Draw the block diagram of an ADC and explain the steps in analog-to-digital conversion.	K3	CO2
	(OR)			
	12.b.	Investigate the operation of low-pass and high-pass filters using op-amps.		
3	13.a.	Construct the block diagram of an instrumentation system and explain each element briefly.	K3	CO3
	(OR)			
	13.b.	Determine fluid flow rate using a differential pressure sensor method.		
4	14.a.	Analyze the working of Proportional (P) control and Derivative (D) control in a control system.	K4	CO4
	(OR)			
	14.b.	Explain the working principles of embedded systems in control applications with suitable examples.		
5	15.a.	Interpret the working of a digital thermometer with suitable examples.	K5	CO5
	(OR)			
	15.b.	Predict the parts of an oscilloscope and explain their functions.		

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	Outline the mechanism of charge conduction in n-type and p-type semiconductors using diagrams	K1	CO1
2	17	Demonstrate with circuit diagrams the working of integrator and differentiator op-amp circuits.	K2	CO2
3	18	Construct a data presentation model using illuminative displays and graphical user interfaces.	K3	CO3
4	19	Explain the basic structure and functions of a control system with neat diagrams.	K4	CO4
5	20	Evaluate the design, operation, and applications of ammeters, voltmeters, and multimeters with neat diagrams.	K5	CO5