

Enroll No

K.E.Society's  
**Rajarambapu Institute of Technology, Rajaramnagar**  
 (An Empowered Autonomous Institute, Affiliated to SUK)  
 End Semester Examination (Nov./Dec. 2025)  
 S.Y.B.Tech. Robotics & Automation III

Q.P.Code
E 1245

**Course Code:** RA207

**Course Name:** Analog and Digital Electronic

Day & Date: Monday 10/11/2025  
 Time : 20130 To 5:30

Max Marks: 100

- Instructions:**
- 1) All questions are compulsory.
  - 2) Figures in rounded ( ) brackets within the question, indicate the scheme of marking for respective part of the question, whereas, figures in the first right column indicate total marks for that whole question.
  - 3) CO is the index number of the Course Outcome statement.
  - 4) The Bloom's taxonomy level (BL) for 1,2,3,4,5 and 6 is remember, understand, apply, analyze, evaluate and create respectively.
  - 5) Assume suitable data if necessary.
  - 6) Use of non-programmable calculators is allowed

Q.1	Marks	COs	BT Level
(a) Draw the V-I Characteristics of a PN junction diode (2 Marks) and explain the working in following condition.	6	CO1	4
i. Forward bias (2 Marks).			
ii. Reverse bias (2 marks).			
(b) Explain Following with suitable waveform and diagram	9	CO1	4
i. Positive Bias Diode Clipping Circuits (3 Marks).			
ii. Negative Bias Diode Clipping Circuits (3 Marks).			
iii. Negative Diode Clipping Circuits (3 Marks).			
OR			
(b) Develop following rectifier circuit and plot output voltage waveforms.	9	CO1	4
i. Half wave rectifier with capacitive filter (4 Marks).			
ii. Centre tapped full wave rectifier (5 Marks).			

Q.2	(a) Elaborate P-Channel JFET with suitable diagram.	6	CO1	4
	(b) Explain Common Collector (CC) configuration of a BJT (6 Marks) and plot input characteristics ( 3 Marks).	9	CO1	4

Q.3	(a) Elaborate the Block Diagram of Operational Amplifier	7	CO2	4
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	(b) Explain following.	8	CO2	3
	i. Operational Amplifier in Closed Loop configuration (4 marks) ii. Inverting Operational Amplifier (4 marks)			
	OR			
	(b) Explain following	8	CO2	3
	i. Summing amplifier (4 marks) ii. Differentiator (4 marks)			
Q.4				
	(a) Explain following Logic Gates with truth table and Logic Symbols for two inputs.	6	CO2	3
	i. OR (2 Marks). ii. NAND (2 Marks). iii. XNOR (2 Marks).			
	(b) Simplify the following Boolean function using a <b>4-variable K-map</b> : $F(A,B,C,D)=\Sigma(0,1,2,5,6,7,8,9,10,14)$	9	CO2	3
	OR			
	(b) Convert following	9	CO2	3
	i. $(101101.01)_2$ Binary to Octal (3 Marks). ii. $(61.5)_{10}$ Decimal to Octal (3 Marks). iii. $(2F.A)_{16}$ Hexadecimal to Decimal (3 Marks).			
Q.5				
	(a) Explain <b>any four</b> of the Following:	20	CO4	4
	i. Full Adder (5 Marks). ii. Full Subtractor (5 Marks). iii. Decoders (5 Marks). iv. Multiplexers (5 Marks). v. Analog to Digital Converter (ADC) (5 Marks).			
Q.6				
	(a) Explain the working principle of an S–R flip-flop using logic diagram and truth table.	7	CO3	4
	(b) Describe any four important applications of shift registers in digital systems.	7	CO3	2
	(c) T flip-flop from a J–K flip-flop and explain its operation with timing diagram	6	CO3	3
	OR			
	(c) Compare asynchronous (ripple) and synchronous counters.	6	CO3	3

