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ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV/DEC 2024

MECHANICAL ENGINEERING

III Semester

EC7354 & Electronics Engineering (Tamil/English)

(Regulation 2015)

Max.Marks: 100

Time: 3hrs

PART- A (10 x 2 = 20 Marks)
(Answer all Questions)

Q. No	Questions	Marks
1	What is the depletion region in a PN junction?	2
2	Draw the symbol of Zener diode, PNP BJT, n- Channel MOSFET and diode.	2
3	State the Barkhausen criterion.	2
4	What is the phase relationship between the input and output signals in a BJT CE amplifier?	2
5	Define the ideal characteristics of OPAMP.	2
6	What is D/A converter? And mention its types.	2
7	Simplify the Boolean expression: $A+A'B$.	2
8	What is the advantage of using a JK flip-flop over an SR flip-flop?	2
9	How is the output of a semiconductor strain gauge typically measured?	2
10	How does an electrical tachometer work to measure the speed of a rotating object?	2

PART- B (5 x 13 = 65 Marks)
(Restrict to a maximum of 2 subdivisions)

Q. No	Questions	Marks
11 (a)	Explain the forward and reverse currents of a P N junction.	13
(OR)		
11 (b)	Explain the working principle of an N-MOSFET with a detailed diagram. Discuss how the gate, source, and drain terminals control the current flow in the device.	13
12 (a)	Explain the construction and working of a Common Emitter BJT amplifier. And also explain its characteristics.	13
(OR)		
12 (b) (i)	Explain the working of a Wein bridge oscillator. And also derive its frequency of oscillation.	13
13 (a)	Explain the workings of an inverting amplifier and non-inverting with the help of a circuit diagram. Derive its gain expression and explain how the input and output signals relate.	13
(OR)		
13 (b)	Explain the working of any one type of A/D converters. And mention its applications.	13
14 (a) (i)	Design a full adder and half-subtractor circuit with the help of K-map.	13
(OR)		
14 (b)	Explain the working principle of a 4-bit binary counter using JK flip-flop.	13
15 (a)	Explain the working principle of an LVDT. And mention its application.	13
(OR)		

15 (b) (i)	Explain the working principle of a Seven-Segment Display (SSD) and how it displays numbers. And list the different types of Seven-Segment Displays and their applications	7 13
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PART- C (1 x 15 = 15 Marks)
(Q.No. 16 is Compulsory)

Q. No	Questions	Marks
16 (i)	Explain the concept of an Avalanche and Zener breakdown..	4
(ii)	How does the number of bits affect the resolution of the R-2R DAC? Explain by solving the given question: A 6-bit R-2R DAC has a reference voltage of 5V. Calculate the output voltage for a digital input of 100101_2 .	11

