

Code No.: CS403ES

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CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS

II-B.TECH-II-Semester End Examinations (Regular) - August- 2023
ANALOG & DIGITAL ELECTRONICS
(Common to CSE, CSC)

[Time: 3 Hours]

[Max. Marks: 70]

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(20 Marks)

1. a) What is meant by "Doping" and "Dopant". [2M]
- b) Define Transformer Utilization Factor. [2M]
- c) What are the three factors contribute to thermal run away? [2M]
- d) Distinguish between Cascade and Cascode amplifiers. [2M]
- e) Give the classification of MOSFET device. [2M]
- f) Binary number system is preferable to represent digital data Why? [2M]
- g) What are the methods adopted to reduce Boolean function? [2M]
- h) Differentiate between a Demultiplexer and a Decoder. [2M]
- i) What are synchronous sequential circuits? [2M]
- j) List out the various types of shift registers. [2M]

PART-B

(50 Marks)

- 2.a) With neat sketch explain the V-I characteristics of PN junction diode. [5M]
- b) Derive the diffusion capacitance of PN junction diode. [5M]

OR

- 3.a) Draw the circuit diagram of an Half wave rectifier and explain its operation. [5M]
- b) A Half wave rectifier has a load of $3.5 \text{ k}\Omega$. If the diode resistance and secondary coil resistance together have a resistance of 800Ω and the input voltage has a signal voltage of peak value 240 V , Calculate D.C. Power output, A.C. Power Input, Efficiency of the Rectifier? [5M]

- 4.a) Compare the performance of transistor in different configurations. [5M]
- b) Consider common emitter NPN transistor with fixed bias. If $\beta=80, R_B=390\text{k}\Omega, R_C=1.5\text{k}\Omega$ and $V_{CC}=30\text{V}$, Find the coordinates of the Q-point. [5M]

OR

- 5.a) Draw the equivalent circuit diagram of RC coupled amplifier for mid band range, derive current and voltage gains. [5M]
- b) Explain the advantages and disadvantages of RC Coupled amplifier. [5M]

- 6.a) With neat sketch explain the operation of N-channel JFET. [5M]
- b) Distinguish between BJT and FET. [5M]

OR

- 7.a) Perform the indicated binary operations. [5M]
(i) $11101-10101$ (ii) $111011.01+110001.11$
- b) State and explain De Morgan's theorem. [5M]

- 8.a) Design 16:1 multiplexer using 8:1 multiplexer. [5M]
b) Draw the K-map and find its Boolean expression for the given function $F(A,B,C,D) = \sum m(1,3,5,7,8,11,12,14)$. [5M]

OR

- 9.a) What is a half Subtractor ? Realise a full subtractor using NAND gates. [5M]
b) Implement the following logic expressions with logic gates. [5M]
$$Y = ABC + AB + BC$$
$$Y = ABC(D + EF)$$
- 10.a) What is a sequential circuit? What is the main difference between combinational circuits and sequential circuits? [5M]
b) What is a Decade counter? Explain its operation using clock signal wave form. [5M]

OR

11. Explain the operation of T Flip-Flop. How to convert D flip-flop to T flip-flop? Explain. [10M]
