09-06-2026 SE ELECTRICAL SEM-III (NEP-2020) EE QP CODE: 20012628

2 HOURS **Max. Marks 60**

NOTE:

- Question No 01 is compulsory.
- Attempt any THREE questions from the remaining five questions.
- Each question carries 15 marks.
- Figure to the right indicates full marks.

Q. 1. Answer any **Three.**

i. Convert the $(328.751)_{10}$ into equivalent octal and Hexadecimal number. (05 Marks)
ii. Draw and explain the half and full subtractor circuit. (05 Marks)
iii. Explain the structure and working of an opto-isolator (optocoupler). (05 Marks)
iv. Describe an operation Op-amp in inverting mode. (05 Marks)
v. Differentiate between RISC and CISC architecture of microcontroller. (05 Marks)

Q. 2 A] Minimize the following expression using K-map and realize the circuit using minimum gates. (08 Marks)

$$f_1 = \sum m\ (0,1,2,3,11,12,14,15)$$

Q. 2 B] Classify and briefly explain the different types of ROM memory. (07 Marks)

Q. 3 A] Draw and explain the 3-bit synchronous binary Counter. (08 Marks)
Q. 3 B] Explain the operation of an n-channel JFET with the help of characteristics. (07 Marks)

Q. 4 A] Explain the construction, operation and characteristics of enhancement MOSFETs. (08 Marks)
Q. 4 B] Using LM317, design a circuit for 9V voltage regulator. (07 Marks)

Q. 5 A] Describe the Harvard and Von-Neumann architectures of microcontroller. (08 Marks)
Q. 5 B] Explain the different instruction sets along with the instructions of 8051 microcontroller. (07 Marks)

Q. 6. A] Discuss the different pipeline stages with examples and advantages. (05 Marks)
Q. 6. B] Describe the Internal RAM and its organization in 8051 microcontroller. (05 Marks)
Q. 6. C] Explain the working of 8:1 multiplexer along with truth table. (05 Marks)

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