Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 33704 | Roll No. | 1 2 2 0 4 4 0 0 5 8

B. Tech. Examination 2023-24

(Odd Semester)

ARTIFICIAL INTELLIGENCE IN MECHANICAL ENGINEERING SYSTEM

Time : Three Hours]   [Maximum Marks : 60

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following :   8×1=8

    (a)   Define artificial intelligence.

    (b)   Define machine learning.

    (c)   What is automation?

    (d)   What is a sensor?

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(e) What is an end effector?

(f) What is an industrial robot?

(g) Manufacturing systems are divided into three categories, according to worker participation. Name them.

(h) What is manufacturing?

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

(a) Briefly explain about the central principles of artificial intelligence. Explain also the application of artificial intelligence in robotics and telecommunications.

(b) What are the some of the reasons, why companies automate their operations?

(c) What are the general characteristics of industrial work situations that tend to promote the substitution of robots for human workers?

(d) What is the role of artificial intelligence in thermal power plants. Explain in detail.

SECTION – C

Note :– Attempt all questions. Attempt any two parts from each question. $5 \times 8 = 40$

3. (a) Write down the application of AI in medicine and banking.

   (b) Differentiate between machine learning and data mining.

   (c) How AI is used to improve upon a mechanical system?

4. (a) Identify three situations in which manual labour is preferred over automation?

   (b) What is the difference between a closed loop control system and an open loop control system?

   (c) Identify the five levels of automation in a production plant.

5. (a) What is an expert system? Briefly explain about the components of an expert system.

   (b) Briefly explain about the five joint types used in robotic arms and wrists.

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(c)   What is the purpose of adaptive control system? Discuss their types in detail.

6. (a)   What is additive manufacturing and its uses? How does 3-D printing work?

(b)   What is the application of AI in manufacturing sector? Explain in detail.

(c)   What is the difference between fixed routing and variable routing in manufacturing systems consisting of multiple workstations?

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