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Question Paper Code: U9771

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Open Elective

Mechanical Engineering

21UME971-INTRODUCTION TO INDUSTRY 4.0

(Common To All Branches)

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. The Internet of Things (IoT), access to real-time data, and the introduction of cyber-physical systems mark the big changes for this era CO1-U
 - a) 1st Industrial Revolution
 - b) 2nd Industrial Revolution
 - c) 3rd Industrial Revolution
 - d) 4th Industrial Revolution
2. What is/are the essential components of a smart factory? CO1-U
 - a) Smart Machines
 - b) People at Work
 - c) Trained Personnel
 - d) All of the above
3. Which of the following refers to the term “autonomation” CO2-U
 - a) Kaizen
 - b) Kanban
 - c) Jodoka
 - d) 5S
4. If the objective is maximize the quality production by ensuring production machine availability and reducing machine breakdowns, which of the following lean tool will best work for this? CO2-U
 - a) Total Productive Maintenance
 - b) Control Plan
 - c) Visual Controls
 - d) Kaizen
5. Which of the following is a potential benefit of IIoT in industrial settings? CO1-U
 - a) Increased waste and inefficiency
 - b) Reduced equipment maintenance
 - c) Decreased data security
 - d) Slower response times to equipment failures
6. What does IIoT stand for? CO1-U

a) Internet of Things	b) Industrial Internet of Things
c) Internet of Industrial Things	d) None of the above

7. Which of the following materials is NOT commonly used in Sheet Lamination processes? CO2-U
 a) Paper b) Polymer c) Metal d) Ceramic
8. Which file format is commonly used to convert a CAD file into a format that can be understood by an FDM 3D printer? CO2-U
 a) .PDF b) .JPEG c) .STL d) .OBJ
9. A mobile phone kept on the table. How many degrees of freedom required a robot to pick up the phone and kept in another place on the table (one surface of the phone is parallel to the table surface)? CO2-U
 a) 3 b) 5 c) 2 d) 4
10. Robots are specified by CO2-U
 a) Pay load b) Work volume c) degrees of freedom d) all of the above

PART – B (5 x 2= 10Marks)

11. Explain key challenges of industry 4.0. CO1-U
12. Discuss reskilling and upskilling. CO2-U
13. Illustrate the types of devices are commonly used in IIoT? CO1-U
14. Classify Additive manufacturing process. CO2-U
15. Illustrate the different types of sensors required for advanced robots. CO2-U

PART – C (5 x 16= 80Marks)

16. (a) Explain the Various Industrial Revolutions. CO1-U (16)
 Or
 (b) Discuss the significance of Big Data and Artificial Intelligence in Industry 4.0, providing examples of how they are utilized in modern manufacturing processes. CO1-U (16)
17. (a) Explain using ladder diagram the impact of Lean tools in the Industry 4.0 technologies. CO2-U (16)
 Or
 (b) Explain the applications of Automation Based Lean Production. CO2-U (16)
18. (a) Explain in detail about the Industrial Internet Uses in Logistics. CO1-U (16)
 Or
 (b) Explain in detail about the Industrial Internet Uses in automobile industry. CO1-U (16)

19. (a) Classify the additive manufacturing (AM) and explain the various AM processes. CO2-U (16)
- Or
- (b) Describe the arrangement and working of FD modeling and write its applications. CO2-U (16)
20. (a) Describe the recent advance sensor technologies used in robots. CO2-U (16)
- Or
- (b) Describe the recent advance technologies used in robots. CO2-U (16)

