KUMARAGURU
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Register Number:……..…

M.E DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Second Semester

EMBEDDED SYSTEMS TECHNOLOGIES

P18ESE2007: Industry 4.0

COURSE OUTCOMES

CO1: Familiarize the basics and advancements of Industry 4.0.

CO2: Understand the features of smart technologies using IoT.

CO3: Understand the concept of security used in Industry 4.0.

CO4: Apply the concepts of cloud computing in networked systems.

CO5: Study the various issues raised in Industry 4.0 environment.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Arrange the following cloud computing deployment steps in the correct sequence: CO4 [K_3]

   A) Provisioning resources

   B) Managing security and access controls

   C) Deploying applications

   D) Configuring network settings

   a) A-D-C-B b) A-C-D-B

   c) C-B-D-A d) B-D-A-C

2. Which cloud deployment model is commonly used in Industry 4.0 applications? CO4 [K_2]

   a) Public cloud b) Private cloud

   c) Hybrid cloud d) Community cloud

3. Which of the following is a key driver of digitalization in the networked economy? CO1 [K_2]

   a) Automation and artificial intelligence b) Globalization and interconnectedness

   c) Environmental sustainability d) Social media platforms

4. Match List I with List II CO1 [K_2]

List I	List II
A. Steam Power	1. Fourth Industrial Revolution
B. Electricity	2. First Industrial Revolution
C. Automation	3. Second Industrial Revolution
D. IIoT	4. Third Industrial Revolution

a) A-2, B-4, C-3, D-1 b) A-3, B-2, C-1, D-4

c) A-2, B-4, C-1, D-3 d) A-2, B-3, C-4, D-1

5. Which of the following is an opportunity for businesses in terms of customer experience in Industry 4.0? CO5 [K_2]

a) Decreased need for personalized and customized offerings b) Enhanced potential for real-time customer engagement and interaction

c) Reduced importance of digital touchpoints and omnichannel experiences d) Limited impact of customer feedback on product development

6. What is a challenge for businesses in terms of workforce and skills in Industry 4.0? CO5 [K_2]

a) Decreased need for upskilling and reskilling employees b) Limited importance of human capital in business operations

c) Increased demand for employees with digital and technological expertise d) Reduced need for collaboration and teamwork among employees

7. Assertion (A): In the 20th century, handloom cloth production expanded steadily. CO3 [K_2]
Reason (R): This was partly because of technological changes.

a) Both A and R are correct, R is correct explanation of A b) Both A and R are correct, but R is not correct explanation of A

c) A is correct R is wrong d) A is wrong R is correct

8. Which wireless communication technology is commonly used for mobile computing in Industry 4.0? CO3 [K_2]

a) Wi-Fi b) NFC (Near Field Communication)

c) Bluetooth d) 5G Communication

9. In the Digital Age (3rd Industrial Revolution) what two major inventions changed production and paved the way to Automation? CO2 [K_2]

1. Programmable Logic Controllers (PLC)
2. Robots
3. Model Control Systems

a) 1,3 b) 2

c) 1,2 d) 1,2,3

10. What is the primary objective of the Industrial Internet of Things (IIoT)? CO2 [K_2]

a) To connect everyday household devices
b) To optimize industrial processes and improve efficiency
c) To enhance virtual reality gaming experiences
d) To enable autonomous vehicles

PART B (10 x 2 = 20 Marks)

11. Which are the modern components of the automation of a smart factory? CO1 [K_2]
12. Mention the conceptual approaches in Industry 4.0. CO1 [K_2]
13. What are the functions of different layers in industrial IoT. CO2 [K_2]
14. Differentiate IoT and IIoT with a real time example. CO2 [K_3]
15. State the importance of automation in an industry. CO3 [K_2]
16. Infer how cyber security is implemented in Industry 4.0. CO3 [K_3]
17. Define cloud computing. CO4 [K_2]
18. Interpret the importance of data management in an industry. CO4 [K_3]
19. Infer the possibilities to increase the scalability of businesses in Industry 4.0. CO5 [K_2]
20. Outline the various research challenges to further enhance Industry 4.0. CO5 [K_2]

PART C (6 x 5 = 30 Marks)

21. Explain the evolution of Industry 4.0 with examples. CO1 [K_2]

22. Explain smart manufacturing system with relevant case studies. CO2 [K_3]

23. Discuss about cyber security in Industry 4.0. CO3 [K_2]

24. Discuss the use cases of cloud computing in Industry 4.0. CO4 [K_3]

25. Describe the opportunities and challenges for an engineer in Industry 4.0. CO5 [K_2]

26. Explain with a case study the application of artificial intelligence in industry evolution. CO3 [K_2]

Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)

27.	Classify and explain the various emerging technologies in Industry 4.0.	CO1	[K_2]
28.	Explain the architecture of Industrial IoT with a neat diagram.	CO2	[K_2]
29.	Describe the Cyber physical system pertaining to health care application.	CO3	[K_3]
30.	Demonstrate the cloud computing model developed by Amazon.	CO4	[K_3]
31.	Describe the strategies for a firm/company to compete in an Industry 4.0 world.	CO5	[K_2]

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