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Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2021

Programme Name: B TECH (CSE+IOT&SC) Course Name : Designer of Smart Cities Course Code : CSIS 4003 Nos. of page(s) : 10 Instructions : Attempt all 12 questions. All questions are compulsory.	Semester : 8 th Time : 03 hrs Max. Marks : 100
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SECTION A

S. No.		Marks	CO
Q 1	<p>(i) What is a Smart City?</p> <p>A. A smart city is a designation given to a city, that incorporates Information and Communications Technology (ICT) to enhance the quality and performance of urban services such as energy, transportation and utilities in order to reduce resource consumption, wastage and overall costs.</p> <p>B. A city equipped with the infrastructure to deliver a decent quality of life, a clean and sustainable environment through application of some smart solution.</p> <p>C. Smart city concept has digital technology embedded across all functions of a city.</p> <p>D. All Above</p> <p>(ii) The implementation of smart city needs to _____ the scale from strategy to project level.</p> <p>A. Reduce B. Increase C. Optimize D. None of the above</p> <p>(iii) Benefit(s) of city blue print is/are:</p> <p>A. It provides a quick method to reveal the city's strong and weak points. B. It suggests better and advanced techniques for development. C. It provides a better understanding on the needs of the city. D. All Above</p> <p>(iv) Which kind of architecture of Smart City is dependent on the geometrical shape of the building?</p> <p>A. Internal B. External C. Holistic D. Zone-level architecture</p>	5	CO1

	<p>(v) The _____ architecture focuses on the city environment where various sensors are deployed with certain parameters.</p> <p>A. Internal B. External C. Holistic D. Zone-level architecture</p>		
Q 2	<p>(i) The multi-level framework of Smart City includes:</p> <p>A. Data gathering & handling B. Data concatenation and analysis C. Device management and control D. All above</p> <p>(ii) _____ Architecture of Smart City describes different boundaries of the framework.</p> <p>A. Internal B. External C. High-Level D. Zone-level architecture</p> <p>(iii) Which communication cable is used for ICT structure?</p> <p>A. Twisted Pair B. Fibre C. Coaxial D. None</p> <p>(iv) In multi-level architecture data is stored in which level?</p> <p>A. Level 1 B. Level 3 C. Level 4 D. Level2</p> <p>(v) Building and home automation uses which kind of architecture?</p> <p>A. Internal B. External C. High-Level D. Zone-level architecture</p>	5	CO1

Q 3	<p>(i) Which is not used in HMI ?</p> <ol style="list-style-type: none"> 1. Track every product trends, time, tags. 2. monitor product input and output. 3. Electro-Mechanical Heat Detector 4. Represents the data in visual form. <p>(ii) Which is a component of AHU?</p> <ol style="list-style-type: none"> A. Heating or Cooling system B. Blower/Fan C. Mixing Chamber D. All the Above <p>(iii) Which colour is used for mandatory operation?</p> <ol style="list-style-type: none"> A. Red B. Green C. Yellow D. Blue <p>(iv) _____ maintenance is a process to divine the future failure point of a machine ingredient so that the ingredient can be replaced and doing some plan before it fails.</p> <ol style="list-style-type: none"> A. Corrective B. Predictive C. Both (a) & (b) D. None of the above <p>(v) HMI is used in which kind of home application:</p> <ol style="list-style-type: none"> A. Refrigerators B. Cookers hobs C. Dishwasher/Washing machine D. All Above 	5	CO2
Q 4	<p>(i) HMI provides relevant information about:</p> <ol style="list-style-type: none"> A. the machine B. the process C. Both (a) & (b) D. None of the above 	5	CO2

	<p>(ii) Which is not the Advantage of Audino:</p> <ul style="list-style-type: none"> A. Inexpensive B. Cross-platform/Multi platform C. Flexible and easy prototyping D. Less reliable for hardware applications <p>(iii) Which out of the following is not an Advantages of the <i>IoT-Based Smart Street Light System</i>:</p> <ul style="list-style-type: none"> A. Automatic Switching of Street lights B. Maintenance Cost Reduction C. Reduction in CO₂ emission D. Wired Communication <p>(iv) _____ is a device that detects the presence or absence of a nearby object, or properties of that object, and converts it into signal which can be easily read by user or a simple electronic instrument without getting in contact with them.</p> <ul style="list-style-type: none"> A. Temperature sensor B. Pressure sensor C. Proximity sensor D. Chemical Sensor <p>(v) Setting up the IoT environment includes what?:</p> <ul style="list-style-type: none"> A. Identifying the problem and data collection challenges. B. Identifying the cloud platform for data storage. C. Coding into the processor to meet your expected need after data analysis. D. All above 		
Q 5	<p>(i) An _____ meter has a rotating disk to record the electricity consumption.</p> <ul style="list-style-type: none"> A. Electromechanical B. Digital C. Binary D. Ternary <p>(ii) A _____ is an electronic measurement device installed by the utility to maintain a two-way communication between the consumer and the utility and also manage the electrical system of the consumer. _____ is capable of communicating the real time</p>	10	CO1

	<p>energy-consumption of an electrical system in very short intervals of time to the connected utility.</p> <p>A. Smart meter B. Electromechanical meter C. Digital meter D. None of the above</p> <p>(iii) A _____ is connected to the utility which is capable of transmitting the electricity usage on a real-time basis.</p> <p>A. Electronic meter B. Electromechanical meter C. Both (a) & (b) D. Smart meter</p> <p>(iv) _____ are computers used for industrial automation. These controllers can automate a specific process, machine function, or even an entire production line.</p> <p>A. Programmable Logic Controller (PLC) B. Arithmetic Logic Unit C. Input Controller D. Output Controller</p> <p>(v) The _____ mode is based on the use of predefined function blocks that allow for graphical programming. It is also used in basic functions such as: timers, counters, logic, etc.</p> <p>A. Assembly Language (AL) B. Function Block Diagram (FBD) C. Sequential Flow Chart (SFC) D. Structured Text</p>		
Q 6	<p>(i) Which sensor has all of the following features:</p> <p>i. Water-resistant, fixed case, and connector spread to stop dampness. ii. "One-Touch" Automatic and Manual Calibration. iii. Auto or Manual Temperature Compensation. iv. A large, easy-to-read LCD display. v. Self-Diagnostics alert of issue conditions. vi. Auto power off expand battery life.</p> <p>A. PH71/PH72 pH sensor B. PH450 sensor C. FLXA402 sensor D. FU20/FU24/pH20 (all in one) sensor</p>		

	<p>(ii) _____ sensor include four different parameters such as: pH, reference, temperature, and ORP.</p> <p>A. PH71/PH72 pH sensor B. PH450 sensor C. FLXA402 sensor D. FU20/FU24/pH20 (all in one) sensor</p> <p>(iii) In which area AMR is mostly used?</p> <p>A. Smart city infrastructure B. Gas system C. Electrical distribution D. All the above</p> <p>(iv) Wat is the full form of PLC?</p> <p>A. Process Logic Controller B. Programmable Logic Controller C. Procedural Logic Controller D. Procedural Logic control system</p> <p>(v) Which is continuous leak detection system?</p> <p>A. Inspection by helicopter B. Smart pigging C. Fiber optic cable D. Tracking dogs</p>		
SECTION B			
Q 7	<p>(i) Raw data is transmitted in _____ via NFFT in a file, while the location and position of the truck are transmitted from MQTT using the Watson IoT platform.</p> <p>A. Internet of Things (IoT) B. Internet of Garbage (IoG) C. Internet of Wires (IoW) D. None of the above</p> <p>(ii) _____ works in close collaboration with Clean City Network (CCN), which continuously bases container fill-level data through 2G / 3G, media transmission systems.</p> <p>A. Clean CAP sensor B. Track bin sensor C. Ethiopian tech</p>	10	CO3

D. All above

(iii) _____ design relies on the integrated ultrasonic sensor at the top of the waste to detect how close the waste is relative to the casing at the top.

- A. Clean CAP sensor
- B. Track bin sensor
- C. Ethiopian tech
- D. None of the above

(iv) _____ is equipped with ultrasonic sensors, it is capable of monitoring various waste management related parameters.

- A. Clean CAP sensor
- B. Track bin sensor
- C. Ethiopian tech
- D. TSwasTe sensor

(v) _____ is a wireless sensor introduced in waste containers or different kinds of containers to calculate the filling rate.

- A. Clean CAP sensor
- B. Track bin sensor
- C. TSwasTe sensor
- D. U-Dump M2M

(vi) Following sensor is Suitable for extreme weather, can easily monitor the cloud/mountain/snowpack area and widely used by the meteorologist:

- A. Clean CAP sensor
- B. Snow Depth Sensor Ush-9
- C. Track bin sensor
- D. TSwasTe sensor

(vii) Which one is not the advantages of Ice detection:

- A. This is a non-contact continuous measurement tool
- B. This is suitable for detecting the ice layer as well as freezing rainwater
- C. Easily can identify the water and ice
- D. Hard installation and very time consuming replaceable with a new system

(viii) What is the first layer of the early warning architecture?

	<p>A. Publish B. Remote transmission C. Instrument monitoring D. Data analysis</p> <p>(ix) What is the detecting distance covered by the IR flame?</p> <p>A. 20cm B. 40cm C. 10cm D. 1m</p> <p>(x) What is the maximum wavelength distance of IR flame?</p> <p>A. 760 nanometres to 1000 nanometres B. 500 nanometres to 700 nanometre C. 400 nanometre to 1000 nanometre D. None of these</p>		
Q 8	<p>(i) Humidity can be controlled by which way(s):</p> <p>A. Dehumidifiers B. Humidifiers C. Both (a) & (b) D. None of the above</p> <p>(ii) Natural gas is fundamentally used as fuel for generating:</p> <p>A. Electricity B. Heat C. Both (a) & (b) D. None of the above</p> <p>(iii) This sensor detect or measure gasses like LPG, Alcohol, propane, Hydrogen, CO and methane</p> <p>A. MQ2 Gas sensor B. MQ3 Gas sensor C. MQ4 Gas sensor D. MQ5 Gas sensor</p> <p>(iv) Air Quality can be measured by which type of sensor:</p> <p>A. MQ135 Gas sensor B. MQ136 Gas sensor</p>	10	CO4

- C. MQ137 Gas sensor
- D. MQ138 Gas sensor

(v) What is the maximum detection range of MQ-8 sensor?

- A. 100 PPM
- B. 500 PPM
- C. 1000 PPM
- D. 800 PPM

(vi) What are the first layer of the smart data management system?

- A. Data layer
- B. Application layer
- C. Service layer
- D. Client Layer

(vii) Which gas is measures by MQ-138 sensor?

- A. Hydrogen
- B. Benzene
- C. Ester
- D. Both a and c

(viii) The ISC40 inductive conductivity sensor is ideal for determining the _____ in concentrated acid.

- A. percentage concentration
- B. mean concentration
- C. median concentration
- D. None of the above

(ix) NH₃ and Benzene can be detected by which type of sensor:

- A. MQ-131
- B. MQ-135
- C. MQ-136
- D. MQ-137

(x) Detection range of MQ-131 sensor for detecting Ozone gas is:

- A. 1 ppb to 2 ppm
- B. 10 ppb to 2 ppm

	C. 10 ppb to 20 ppm D. 100 ppb to 20 ppm		
Q 9	Describe the current scenario of electricity meters. Compare and contrast the traditional electricity grids and smart grids. What advantages of Smart Meters you observe as an IoT engineer? Draw and discuss Traditional AMR architecture and new generation Wi-Fi based AMR architecture.	10	CO3
Q 10	What are the different causes of pipeline leak detection. Describe the process of Pipeline leak detection. Explain few commonly used sensors used for pipeline leak detection.	10	CO3
Q 11	How the concept of Smart bins can be a very a useful aspect in Urban living? Describe the functioning of various Sensors used for waste management. OR Discuss the architecture of the early warning system by taking examples of Earthquake and Tsunami detection. What are the new methods for tsunami warning? Explain by taking a suitable example the EEW Early Warning System. Discuss New methods for tsunami warning based on Smart concept.	10	CO4
SECTION C			
Q 12	Design an IoT based applications for the treatment of Air Pollution as a part of Smart City project. Give complete hardware and software specifications along with cost considerations of the project. Specify issues, if any, like legal, ethical etc. How IoT data shall be used to recycle CO ₂ emissions? Clearly specify how IoT technology can help where humans struggle. OR Design an IoT based applications for the treatment of Humidity control as a part of Smart City project. Give complete hardware and software specifications along with cost considerations of the project. Specify issues, if any, like legal, ethical etc. How IoT data shall be used to recycle CO ₂ emissions? Clearly specify how IoT technology can help where humans struggle.	20	CO4