

Roll No: -----



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018

Program: M.Tech (Automation & Robotics Engg.)

Subject (Course): Wired and wireless sensor network

Course Code : ECEG7008

No. of page/s: 02

Semester : II

Max. Marks: 100

Duration: 3 Hrs

SECTION A			
S. No.	Attempt all the questions.	Marks	CO
Q 1	An embedded system has a 12bit ADC for measuring voltages between-10V and +10V. What is the digital value corresponding to 5.6V.	5	CO2
Q 2	Elaborate the product life cycle in wireless sensor node design	5	CO1
Q 3	Enlist and explain the wireless standard for communication in WSN.	5	CO1
Q 4	Draw the protocol architecture of TCP/IP model and suggest the same for IoT applications.	5	CO2
SECTION B			
Attempt all the questions.			
Q 5	Draw and discuss the hardware interfacing circuitry required to run the following to drive using microcontroller (i) Single phase energy meter (ii) Relay 12V,1A	10	CO3
Q 6	Design the block diagram schematics of one WPAN device, which is capable to read BMP185 sensor data information from the remote locate using Wi-Fi modem.	10	CO4
Q 7	Draw schematic for the hardware interfacing circuitry required to run the following drive and discuss the working- (i) LDR (ii) POT (iii) Electromechanical relay 15V,2A	10	CO2
Q 8	Write algorithm and draw block diagram for wireless traffic sensor networks to monitor vehicle traffic on highways or in congested parts of the city.	10	CO3

SECTION-C
Attempt all the questions.

Q 9	<p>Consider the following g real time system:</p> <ol style="list-style-type: none">1. Elevator control system for simple home elevators.2. Core monitoring of a nuclear power plant.3. Distributed airline reservations system for global use. <p>Discuss the type of design approach and life cycle model you would prefer with each of them and why.</p> <p style="text-align: center;">OR</p> <ol style="list-style-type: none">1. Elaborate the application of WSN in robotics engineering and explain any two with an example.2. Derive an expression for energy consumption model for packet exchange over wireless link.	20	CO3
Q 10	<p>Take the procedural design approach and create first the context diagram, and then the highest level data flow and control flow diagrams for an electronic lock in the laboratory door having the following requirements specifications:</p> <ol style="list-style-type: none">1. The lock has an integrated RFID card reader with serial out, and every registered user has a unique identification code2. An accepted card is acknowledged by a green LED and rejected one by a red LED3. The lock will open when and adequate current is flowing through its control solenoid; otherwise, it remains locked.4. Information about registered users and their permitted entrance times is stored on a database of a remote workstation that manages all locks within the whole college building5. Every successful and unsuccessful opening attempt is recorded on the database with the corresponding identification code, date and time6. Embedded controllers of individual locks in the building communicate with the common workstation through a wireless communications network. <p>You may define additional requirements yourself, if needed.</p>	20	CO4

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SECTION A			
S. No.	Attempt all the questions.	Marks	CO
Q 1	List and discuss the different types of interaction pattern between sources and sinks in WSN.	5	CO1
Q 2	An embedded system has a 10 bit ADC for measuring voltages between-12V and +12V. what is the digital value corresponding to 8.5 V.	5	CO2
Q 3	List the protocols related to routing of data in WSN.	5	CO2
Q 4	Draw the protocol architecture to realize the internet of things application.	5	CO1
SECTION B			
Attempt all the questions.			
Q 5	Draw and discuss the hardware interfacing circuitry required to run the following to drive using microcontroller (i) DC voltage sensor having input voltage rating 25V (ii) DC current sensor with minimum current sensing capability is 1mA.	10	CO3
Q 6	Design the block diagram schematics of one WPAN device, which is capable to DHT11 sensor related sensory data information from the remote locate using ESP8266 Wi-Fi modem.	10	CO4
Q 7	Draw schematic for the hardware interfacing circuitry required to run the following drive and discuss the working- (iv) Ultrasonic sensor with serial out (v) IR sensor (vi) Solid state relay	10	CO2
Q 8	Write algorithm and draw block diagram of sensor networks to monitor environmental changes in plain, forests, oceans, and so on.	10	CO3
SECTION-C			
Attempt all the questions.			

<p>Q 9</p>	<p>Consider the following g real time system:</p> <ol style="list-style-type: none"> 1. Disaster monitoring system hilly area 2. Car health monitoring system using OBD 3. Elevator control system for simple home elevators. <p>Discuss the type of design approach and life cycle model you would prefer with each of them and why.</p> <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 3. “Energy preservation, efficiency, security challenges and fault-tolerance are open research Issues in wireless sensor network” justify. 4. Discuss the various transport protocol with respect to upstream congestion control, downstream congestion control, upstream reliability guarantee, and downstream reliability guarantee. 	<p>20</p>	<p>CO3</p>
<p>Q 10</p>	<p>Draw and design the procedural approach and create first the context diagram, and then the highest level data flow and control flow diagrams for an electronic lock control though fingerprint sensor in the laboratory door having the following requirements specifications:</p> <ol style="list-style-type: none"> 1. The lock has an integrated fingerprint sensor with serial out, and every registered user has a unique identification code 2. An accepted card is acknowledged by a green LED and rejected one by a red LED 3. The lock will open when and adequate current is flowing through its control solenoid; otherwise, it remains locked. 4. Information about registered users and their permitted entrance times is stored on a database of a remote workstation that manages all locks within the whole college building 5. Every successful and unsuccessful opening attempt is recorded on the database with the corresponding identification code, date and time 6. Embedded controllers of individual locks in the building communicate with the common workstation through a wireless communications network. <p>You may define additional requirements yourself, if needed.</p>	<p>20</p>	<p>CO4</p>