

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2021

Course: Analytics to IoT(ECEG4013)

Program: B Tech ECE

Time: 03 hrs.

No. of page/s: 2

Semester: VIII

Max. Marks: 100

Instructions:

- The question paper contains three sections namely Section-A, Section-B and Section-C.
- Attempt all questions. The number of marks for each question is mentioned on the right side of it.
- Assume any data if required and indicate the same clearly. Unless otherwise indicated symbols and notations have their usual meanings.

SECTION A (30 Marks)

S. No.		Marks	CO
Q 1	What is meant by IoT device? Write the characteristics of IoT devices.	5	CO1
Q 2	What is need of standardization in IoT? Mention at least five IoT international standardized bodies.	5	CO2
Q 3	Define five “V’s” of big data characteristics.	5	CO3
Q 4	Mention some key features of Microsoft Azure IoT Hub. Also explain the differences in supervised versus unsupervised machine learning techniques.	5	CO4
Q 5	Describe briefly the essential characteristics of cloud infrastructure.	5	CO4
Q 6	What are the stages in IoT product life cycle? Explain any one of them briefly.	5	CO1

SECTION B (50 Marks)

Q 1	How are the following devices or techniques: sensors, smart phones, RFID labels/readers, bar code are used for data collection and sensing in IoT applications?	10	CO1
Q 2	Explain each component in IoT node with neat block diagram.	10	CO2
Q 3	Describe any two of the following communication protocols: I2C; Bluetooth Low Energy (BLE) and ZigBee	10	CO2
Q 4	(a) Define IoT analytics. Also explain different types of IoT analytics. (b) Mention at least four services offered by AWS. Also describe anyone of these services.	7+3	CO3
Q 5	Explain the in detail about Hadoop frame work for data analytics in cloud.	10	CO3

Or

	What is Elastic MapReduce (EMR) on the AWS? How it is implemented? What language is applied to use EMR and how does it work with the Hadoop system?		
SECTION-C (20 Marks)			
Q 1	<p>Explain AWS key concepts. Also describe the steps that how an AWS cloud analytics environment can create for IoT analytics.</p> <p style="text-align: center;">Or</p> <p>The System Availability (A) of a server cluster is defined in terms of three parameters: the mean time to failure (MTTF), the mean time to repair (MTTR) and a regular maintenance time (RMT).</p> <p>(a) Given a cloud system with a demanded availability $A = 98\%$. If the MTTF is known to be 2 years (or $365 \times 24 \times 2 = 17,520$ hours) and the MTTR is known as 24 hours. What is the value of RMT in hours per month you can schedule for this cloud system?</p> <p>(b) Consider a cloud cluster of 3 servers. The cluster is considered available (or acceptable with a satisfactory performance level), if at least k servers are operating normally where $k \leq 3$. Assume that each server has an availability rate of p (or a failure rate of $1 - p$). Derive a formula to calculate the total cluster availability A (i.e. the probability that the cluster is available satisfactorily). Note that A is a function of k and p.</p> <p>(c) Given that each server has an availability $p = 0.98$. What is the largest minimum number of servers that must be available to achieve a total cluster availability A, which is higher than 96%? You have to check the effect of all possible values of k in part (b) in order to answer this question correctly.</p>	20	CO4