BE/ETRX/SEM-VII/C-2019/DEC.2022

Duration: 3hrs   [Max Marks: 80]

N.B. : (1) Question No 1 is Compulsory.
       (2) Attempt any three questions out of the remaining five.
       (3) All questions carry equal marks.
       (4) Assume suitable data, if required and state it clearly.

1		Attempt any FOUR	[20]
	a	Explain di/dt protection of SCR.	[05]
	b	Explain the Safe Operating Area (SOA) of power MOSFET.	[05]
	c	Draw VI characteristics of SCR and hence explain in brief all conducting states.	[05]
	d	Explain fly back converter in short.	[05]
	e	Explain Half Wave Controlled Rectifier for Resistive load.	[05]
2	a	What is commutation of SCR. List the various method and explain one method in brief	[10]
	b	List the advantages and disadvantages of the Buck and Boost converter.	[10]
3	a	Explain Full Wave Controlled Rectifier for R-L load.	[10]
	b	Explain synchronized UJT relaxation oscillator circuit to trigger SCR.	[10]
4	a	Describe Buck DC-DC converter with appropriate waveforms.	[10]
	b	What is the effect of source inductance on a full wave-controlled rectifier for R load	[10]
5	a	Describe the full bridge inverter for inductive load and draw suitable waveforms.	[10]
	b	Explain the single-phase AC controller for inductive load.	[10]
6	a	Describe the single-phase Cycloconverter for resistive load.	[10]
	b	Explain in detail the multiple pulse wave modulating (PWM) technique for single-phase inverters.	[10]

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Duration: 3hrs   **Max Marks: 80**

N.B. : (1) Question No 1 is Compulsory.
      (2) Attempt any three questions out of the remaining five.
      (3) All questions carry equal marks.
      (4) Assume suitable data, if required and state it clearly.

1		**Attempt any FOUR**	**[20]**
	A	List the various Communication models in IoT? Explain the communication model that is implemented in CoAP.	[5]
	B	Explain the following REST Architectural Constraints: Stateless Constraint and Cache-able Constraint	[5]
	C	List and Draw the Security Functional Group Components in IoT reference architecture	[5]
	D	List the various components of any IoT System. Explain the role of controller service and Web Service with reference to the components of IoT System.	[5]
	E	Examine how the following electrical parameters can be used as a part of sensing Technology: a) Capacitance and b) reverse saturation current of PN Junction	[5]
2	A	Compare and Contrast the various Phases of Analytics	[10]
	B	Contrast the various Data Categorizations for storage in IoT Systems. Discuss the various Cloud deployment models available.	[10]
3	a	List the various features of CoAP. Explain how PSK provides security measures in relation to DTLS in CoAP	[10]
	b	Compare and contrast CoAP and HTTP	[10]
4	a	Draw the information model for any Weather Monitoring IoT System. Detail any two Entities or Objects or Concepts defined in the domain model specification	[10]
	b	What do you understand by the term 'Functional View Specification'? Detail the any two Functional Groups with relevant example.	[10]
5	a	Compare and Contrast the various Communication APIs	[10]
	b	Discuss the purpose of Online Analytical Processing in Analytics with relevant examples.	[10]
6	a	What do you mean by Pub-Sub model? Detail the operation flow of MQTT protocol.	[10]
	b	Draw the Layered Attacker Model and possible attacks in IoT/M2M	[10]

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(3 Hours)   **Total Marks: 80**

N.B: (1) Question No.1 is compulsory and solves ant three questions from remaining
       questions.
   (2) Assume suitable data if necessary.

   (3) Draw neat and clean figures.

1.   **Answer any four:**

   (a) Explain trade off in Analog design with the help of analog design octagon   5

   (b) For N channel MOSFET draw i) small signal model ii)small signal model with   5
   channel length modulation iii)small signal model with body effect?

   (c) Explain importance of Miller theorem   5

   (d)Explain noise in differential amplifier circuit?   5

   (e) Draw and explain 3-bit flash ADC with its methodology of conversion?   5

2.   (a) Derive voltage gain of diode connected load CS amplifer?   10

   (b) Derive equation of differential gain, common mode gain, CMRR of differential   10
   amplifier?

3.   (a)Explain in detail how to generate temperature independent reference?   10

   (b) Explain correlated and uncorrelated noise sources in CMOS circuit?   10

4   (a) Design an amplifier that meet the following specification with a phase   20
   margin of 60.assume the channel length is to be $1\mu m$

   Av>5000v/v ,Vdd=2.5 ,Vss= -2.5v ,GB=5MHz , CL=10pf ,

   SR>10v/μsec, Vout range=+/- 2V, ICMR= -1 to 2V, Pdiss≤ 2mw.

5   (a)Explain Mixed signal layout issues in detail?   10

   (b)Explain noise in single stage CS amplifier circuit?   10

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6   **Write short notes(any three)**   20

   (a) White and flicker noise in MOSFET

   (b) Cyclic DAC

   (d) Noise bandwidth

   (e) Operational Amplifier Design Parameters

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Time: 3 Hours   **Max. Marks: 80**

Note:
(1) Question No. 1 is **Compulsory**.
(2) Attempt any **three** questions out of the remaining **five** questions.
(3) Each question carries 20 Marks.
(4) Assume suitable data if required.

1.		Attempt **any four.**	
	(a)	Define Intelligent Agent. What are the characteristics of an Intelligent Agent?	5
	(b)	Write applications of the Breadth First Search (BFS) algorithm.	5
	(c)	What is FOPL? Represent the following sentences using FOPL i) John has at least two friends ii) If two people are friends then they are not enemies.	5
	(d)	Differentiate between forward and backward chaining.	5
	(e)	Explain PEAS with the help of one example.	5
2.	(a)	Draw and Describe the Architecture of the Utility-based agent. How is it different from a Model-based agent?	10
	(b)	Explain A* Algorithm with an example.	10
3.	(a)	Explain the Resolution by Refutation with a suitable example.	10
	(b)	State the limitations of the steepest-ascent Hill climbing algorithm.	10
4.	(a)	Describe the Min-Max algorithm in detail with the help of one example. Also, discuss the properties of the Min-Max algorithm.	10
	(b)	Explain different inference rules for First Order Predicate Logic (FOPL).	10
5	(a)	Define the terms chromosome, fitness function, crossover and mutation as used in Genetic algorithms. Explain how Genetic algorithms work.	10

	(b)	Explain the following
		   i) Static and Dynamic Environment
		   ii) Single-agent and Multi-agent Environment.
			10

6.		Write a short note on **any two** of the following.	
	(a)	Expert System Architecture and Applications	10
	(b)	Local Search Algorithms	10
	(c)	Decision Tree learning	10

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E| ETRx| Sem-VII (C-2019) / Dec-2022

(3 Hours)   Marks: 80

NB: (1) Question No.1 is **compulsory**.

(2) Attempt any **three** out of remaining **five** questions

(3) Assume suitable data, if necessary.

Q1		Attempt any four.	**20**
	a	Draw and detail the GSM Reference Architecture.	**5**
	b	What are the various factors influencing the Handoffs?	**5**
	c	List and detail the fading effects due to multipath time delay spreading of signals.	**5**
	d	What are the limitations of 3G?	**5**
	e	What is the use of sectoring in Cellular Systems?	**5**
Q2	a	A total of 33 MHz bandwidth is allocated to a FDD cellular system with two 25 KHz simplex channels to provide full duplex voice and control channels. Compute the number of channels available per cell if the system uses (i) 4 cell (ii) 7 cell and (iii) 8 cell reuse technique. Assume 1 MHz of spectrum is allocated to control channels. Give a distribution of voice and control channels.	**10**
	b	Draw and detail the Free Space Propagation model. Also list and discuss the fundamental phenomena responsible for signal propagation in a mobile Communication system apart from LoS communication.	**10**
Q3	a	Explain the need and the concept of Spread Spectrum modulation.	**10**
	b	Differentiate between CDMA, TDMA and FDMA.	**10**
Q4	a	Detail the functions and types of Smart Antenna.	**10**
	b	Draw and detail the general Authentication and Ciphering key generation Process in GSM.	**10**
Q5	a	With neat diagram explain the architecture of UMTS.	**10**
	b	Detail the Radio Access Methods used by LTE and the advantages associated.	**10**
Q6	a	What do you mean by Indoor Propagation Model? Discuss the various losses encountered in it and along with the path loss model followed.	**10**
	b	Write a Short note on a) IS 95 b) GPRS.	**10**

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E| ETRX | Sem-VII – (CC-2019) |Dec-2022

Duration : 3 Hours [Max Marks:80]

N.B. : (1) Question No 1 is Compulsory.
   (2) Attempt any three questions out of the remaining five.
   (3) All questions carry equal marks.
   (4) Assume suitable data, if required and state it clearly.

1   Attempt any FOUR   [20]

   a   Explain different Facets of data.   5

   b   Explain different data transformation techniques with an example.   5

   c   Differentiate between Linear regression and logistic regression.   5

   d   Compare and contrast different types of NoSQL databases.   5

   e   Define random sampling, systematic sampling and stratified sampling.   5

2   a   What is probability? Explain different probability types? A new project   [10]
       assignment order is received by an IT company and the authority wants to
       assign the projects according to the salary package. There are 60 employees
       without training and 45 employees who are trained with required professional
       courses. Now the task here is that you have to assign the job according to the
       salary package.
          i.   Find the probability of the employee that they have undergone
               professional training.
          ii. Find the probability that an employee has attended professional
               training and also has a good salary package.
          iii. Find the probability that an employee has a good salary package
               given that the employee has not undergone professional training.

Dataset for Employees				
Results		Training		Total
		Without Professional	With Professional	
Salary package obtained by employees	Poor salary	05	00	05
	Below-average	10	0	10
	Average salary	40	10	50
	Good salary	5	30	35
	Excellent salary	0	5	5
	Total	60	45	105

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b   What is hadoop? Explain Hadoop ecosystem in detail. What are the Limitations of Hadoop.

3 a   Elaborate and explain all the steps of Data Science Process.   **[10]**

   b   What is data science? Why is data science required? What is the role of data   **[10]**

science in an autonomous car?

4 A   Explain linear regression algorithm. The average rainfall (in mm) for the last 5   **[10]**
years in the state of Maharashtra was recorded along with the umbrellas sold in
that particular year. Calculate the Calculate the regression coefficients for the
following dat.

Rainfall in mm	121.2	152.6	98.4	171	85.6
Umbrella sold	52	72	40	100	34

   b   What is confusion matrix? Explain TYPE I and TYPE II Error with an example.   **[10]**
What is the difference between precision and recall?

5 a   Explain NoSQL databases. Explain CAP Theorem and BASE property of NoSQL.   **[10]**

   b   Explain Naïve Bayes Algorithm. Construct a Naïve Bayes classifier for the   **[10]**
given data for the three attributes: long, sweet and yellow to predict what fruit
is it.

Type	Long	Not long	Sweet	Not sweet	Yellow	Not yellow	Total
Banana	400	100	350	150	450	50	500
Orange	0	300	150	150	300	0	300
Other	100	100	150	50	50	150	200
Total	500	500	650	350	800	200	1000

6 a   Explain in detail Customer Sentiment Analysis with a block diagram.   **[10]**

   b   Write short note on any two: **[10]**
      1. Customer Segmentation
      2. Recommendation System
      3. Visualization using Tableau

E/ETRX/Sem-VII (C-2019) | Dec 2022

Time: 3 Hours   **Max Marks:80**

Note: 1. Q1 is compulsory
           2. Solve any three from remaining

Q1   Solve **any four** questions   **20**

           A. Role of science & Technology in Sustainable design of products
           B. Simultaneous engineering
           C. Explain Product design for Environment.
           D. What is PLM? State its need and scope and phases.
           E. What is digital mockup? State its benefits and list software used for
              it.

Q.2   A. What do you mean by Design for X. How will you use design for X tools   **20**
in the design process?

      B. Explain useful life extension strategies.

Q.3   A. Explain the general framework of LCCA.   **20**

      B. What is sustainable development? Explain role of science & technology in
it.

Q.4   A. Discuss new product development process   **20**

      B. Explain cost analysis and life cycle approach in detail.

Q.5   A. Explain the strategies for recovery at the end-of-life cycle   **20**

      B. What is the virtual product development process? Write its applications
and advantages.

Q.6   A. Explain the product life cycle in detail with suitable example   **20**

      B. Explain various reasons for implementation of PDM system. Explain
various barriers for PDM implementation

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ETRX / Sem - VII (c-2019) / Dec-2022 .

Duration: 3hrs [Max Marks: 80]

N.B. : (1) Question No 1 is Compulsory.
    (2) Attempt any three questions out of the remaining five.
    (3) All questions carry equal marks.
    (4) Assume suitable data, if required and state it clearly.

1	Attempt **any FOUR**	[20]
a	Differentiate between cybercrime and cyber fraud.	
b	Explain various threats associated with cloud computing.	
c	Explain methods of password cracking	
d	Explain E-contracts and its different types.	
e	Explain different attack vectors in cyber security	
2 a	Explain the classification of cybercrimes with examples.	[10]
b	Explain various types of credit card frauds	[10]
3 a	Explain different buffer overflow attacks also explain how to mitigate buffer overflow attack	[10]
b	Explain electronic banking in India and what are laws related to electronic banking in India	[10]
4 a	What do you understand by DOS and DDOS attack? Explain in detail.	[10]
b	Write a note on Intellectual Property Aspects in cyber law.	[10]
5 a	Explain the objectives and features of IT Act 2000	[10]
b	What are Botnets? How it is exploit by attacker to cause cyber attack?	[10]
6 a	Explain SQL injection attack. State different countermeasure to prevent the attack.	[10]
b	Explain what is Information Security Standard and Explain HIPAA act in detail	[10]

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B.E | 8EM VII | EtRx| C-2019 | 8 Nov-Dec 2022

Duration: 3hrs [Max Marks: 80]

N.B. : (1) Question No 1 is Compulsory.
     (2) Attempt any three questions out of the remaining five.
     (3) All questions carry equal marks.
     (4) Assume suitable data, if required and state it clearly.

1		Attempt **any FOUR**	**[20]**
	a	What are the different types of MIS?	**[05]**
	b	How is data governance achieved in case of MIS?	**[05]**
	c	Analyse briefly to highlight the difference between Web 2.0 and Web 3.0?	**[05]**
	d	Evaluate the MIS Hierarchy to comment on Decision Support System.	**[05]**
	e	List the main difference between Wireless and Wired Technologies?	**[05]**
2	a	Give an understanding on types of Control to achieve Security.	**[10]**
	b	What is Mobile Commerce? What are the new challenges that it has introduced in business?	**[10]**
3	a	What do you mean by CRM? Give its types and relate the role of SC on CRM.	**[10]**
	b	What is Data Mart and Data Warehouses? Give two examples which show generation of Big Data.	**[10]**
4	a	Write short notes on (1) TPS (2) ERP	**[10]**
	b	Evaluate the role of Confidentiality, Integrity and Availability in order to achieve security.	**[10]**
5	a	What is the need of Social Computing for Businesses?	**[10]**
	b	Create MIS system for any hospital.	**[10]**
6	a	What is Big Data? What are the various challenges and characteristics of Big Data?	**[10]**
	b	Describe various Cloud Computing Models and highlight their evolution.	**[10]**

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