Registration No:

Total Number of Pages: 03

Course: B.Tech
Sub_Code: REL7D001

7th Semester Regular/Back Examination: 2023-24
SUBJECT: Advanced Control Systems
BRANCH(S): EEE, Electrical
Time: 3 Hour
Max Marks: 100
Q.Code : N139

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** (2 x 10)

a) Define state controllability of the control system.

b) A linear system is represented by

$$\dot{X} = \begin{bmatrix} -6 & 4 \\ -2 & 0 \end{bmatrix} X + \begin{bmatrix} 1 \\ 1 \end{bmatrix} U$$

$$Y = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} X$$

Draw a block diagram representing the system.

c) State Routh stability criterion for stability analysis of closed loop system in z-plane.

d) Determine the initial value x(0) if the z-transform of x(t) is given by

$$X(z) = \frac{(1-e^{-T})z^{-1}}{(1-z^{-1})(1-e^{-T}z^{-1})}.$$

e) What is the need of hold circuit in sample data control?

f) Explain with neat sketch the limit cycle behaviour of non-linear system.

g) Write two limitations of phase-plane analysis.

h) Write the relationship between controllability and observability of control systems.

i) State Cayley-Hamilton theorem.

j) Define global stability in the sense of Liapunov.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (6 × 8)

a) Define state of a system, state variables, state space and state vector. What are the advantages of the state space analysis?

b) Find the state transition matrix for

$$A = \begin{bmatrix} 0 & -1 \\ 2 & -3 \end{bmatrix}.$$

Registration No:

Total Number of Pages: 02

Course: B.TECH
Sub_Code: RCL7E004

7th Semester Regular / Back Examination: 2023-24
SUBJECT: Cyber Law and Ethics
BRANCH(S): CSE,CSEAIME,CSIT,CST,ELECTRICAL & C.E
Time: 3 Hour
Max Marks: 100
Q.Code : N069

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I (2 x 10)

Q1 **Answer the following questions:**

a) What do mean by domain name? Differentiate between UDRP and INDRP
b) What is Cybersquatting?
c) What do you understand by cyber jurisprudence?
d) Differentiate between piracy and privacy
e) What is a C2C business model? How does it work?
f) Differentiate between paper and paperless contact.
g) Name two applications of public key cryptography.
h) What are ethical issues of AI?
i) What is trademark security issue?
j) What is the difference between public key cryptography and private key cryptography?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (6 x 8)

a) What is blockchain? What are the privacy, security and data ownership issues in using blockchain technology?
b) Explain the historical background, Object, Extent, Scope and Commencement of the Information Technology Act.
c) Classify cybercrimes and categorize cyber criminals?
d) Explain the need and advantages of e-taxation.
e) Define the term hacking and explain its essentials.
f) What is a Digital Signature? How is it different from paper signature? What is the legal recognition of Digital Signature?
g) What is doctrinal approach? How is it different from consensual approach?
h) What is DoS attack? What are the methodologies to handle DoS attack?
i) What are the amendments made by it act 2008?
j) What is the necessity of corporate finance? Explain the regulations related to corporate finance.

k) What is intellectual property? What are the various types of intellectual property? Explain briefly.

l) What is Intellectual Property Infringement? What types of infringements may occur? How to stop IP infringement?

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What is Internet? Why there is a need for cyber regulations and ethics? What is the primary objective of cyber law? What are the various types of cyber laws defined? **(16)**

Q4 What is e-governance? Discuss the ethical issues in e-governance? **(16)**

Q5 Discuss what is a digital certificate? Explain how a digital certificate is created and revoked? **(16)**

Q6 What are the various international legal instruments for preventing cybercrime? **(16)**

Registration No:

Total Number of Pages: 02

Course: BTech
Sub_Code: RCS7D002

7th Semester Regular/Back Examination: 2023-24
SUBJECT: Cyber Security and Privacy
BRANCH(S): CSE
Time: 3 Hour
Max Marks: 100
Q.Code : N143

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) What is a spyware? What are the different types of spyware? How does a system get infected by a Spyware and how does it affect it?
b) What is a key logger? How does a system get infected by a key logger?
c) What do you understand by attack vector? How the attack vectors are blocked?
d) What is a zero-day attack?
e) Name four security issues involved in cloud computing environment.
f) What is the difference between a virus and worm?
g) Differentiate between DoS and DDoS attack.
h) What do you understand by "Chain of custody" in cyber forensics?
i) What are cookies? Is it safe to accept cookies in websites? Give reasons.
j) Differentiate between HTTP and HTTPS protocol.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) What kind of attack is possible on mobile/cell phones? Explain with examples. Explain the counter measures to be practiced for possible attacks on mobile /cell phones?
b) What are SQL injection and blind SQL injection attack? What counter measures can be taken to prevent these attacks?
c) What is the difference between authentication and authorization? What is various authentication methods? What are the ways of password cracking? Name two password cracking tools.
d) What is Identity Theft? ID theft is punishable offence in which section of IT act? What are the various types of ID theft is prevalent in society? How the social networking sites contribute to ID theft? How can you prevent it?
e) Write a short note on HIPPA.

f) What is computer forensics? How is it different from steganography? What are technical and legal challenges of computer forensics?

g) Explain how an E-mail can be traced for forensics purpose? Outline the various key steps involved.

h) What is an IMEI number? How does it work to trace a cell phone? What effect do you think it can have on tracking cyber criminals? Provide illustrative situation example to support your answer.

i) Explain with a suitable diagram how the three terms- incident response, incidence handling and incidence management are inter related.

j) What do you understand by penetration testing? What are the various methods available for penetration testing?

k) What is IPR act in India? What are the various types of IPR? Why IPR is important?

l) What is cyber security awareness? Why is it important? What are the methods to create cybersecurity awareness?

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What is a dictionary attack? What are the various types of dictionary attack? How dictionary attack is eliminated in Encrypted Key Exchange protocol? **(16)**

Q4 What is cyber security audit? How is it beneficial? What are the basic steps followed in a cyber security audit. Name few tools used for security auditing. **(16)**

Q5 What is the Information security Act? Discuss its aims and objectives. **(16)**

Q6 What is a blockchain? What are the applications of blockchain technology? How blockchain provides immutability property? What are the various types of blockchain available? What are the security challenges in blockchain? **(16)**

Registration No: | | | | | | | | | | |

Total Number of Pages: 02

B. Tech
RED7E001

7th Semester Regular / Back Examination: 2023-24
Entrepreneurship Development
BRANCH(S): ALL
Time: 3 Hour
Max Marks: 100
Q. Code : N020

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) What is the full form of PMEGP?
b) What do you mean by moratorium period?
c) Explain the meaning of 'sick unit'.
d) What is the achievement motivation of an entrepreneur?
e) What are the qualities of a good entrepreneur?
f) What inspired you to develop your idea?
g) What strategies did you first use to market your business?
h) What motivates entrepreneurs to be successful?
i) What is working capital cycle?
j) What is Letter of Credit?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) Explain the methods used by companies to ensure customers payment.
b) Discuss the various methods of financing working capital.
c) Mention five schemes of Govt. of India available for girl children.
d) What are the features of collective bargaining?
e) What is the rehabilitation of sick units?
f) What is the entrepreneurial performance in India?
g) What is product positioning?
h) Mention six differences between an entrepreneur and intrapreneur.
i) What are the different ways to reach out to target audience?
j) What is Swachh Bharat Mission?
k) Differentiate between wage employed and self employed people.
l) What are the key factors influencing the mobility of entrepreneurs?

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What is the meaning of an entrepreneur? Prepare a list of different categories of entrepreneurs and explain their role in business. **(16)**

Q4 What are the incentives provided by the government for industries in backward and hilly areas? **(16)**

Q5 What are the various roles played by the government to revive a sick unit in India? Justify your answer with suitable examples. **(16)**

Q6 What do you mean by 'business environment'? Explain the various micro and macro environment of a business. **(16)**

Registration No: | | | | | | | | | | |

Total Number of Pages: 02

Course:B.Tech
Sub_Code:RGT6A003

7th Semester Regular / Back Examination: 2023-24

SUBJECT: Green Technology

BRANCH(S):
AUTO,BIOMED,BIOTECH,CIVIL,C&EE,CSE,CSIT,ECE,EEE,ELECTRICAL,ELECTRICAL & C.E,ELECTRONICS & C.E,ETC,IT,MECH,METTA,MINING,MME

Time: 3 Hour

Max Marks: 100

Q.Code : N064

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** (2 x 10)

a) What are the three major green house gases?
b) What is photosynthesis?
c) What are LEED and GRIHA?
d) What is long half life?
e) What is green technology?
f) What is tidal energy?
g) Give examples of renewable sources of energy.
h) What is Heating Potential?
i) Which country was the highest emitter of CO_2 by 2010?
j) Give an example of carbon neutral.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (6 × 8)

a) How does climate change affect us?
b) Differentiate between LNG and CNG.
c) What are the various features of green building?
d) Write short note on wind energy.
e) How can the carbon emission reduction at personal level be achieved?
f) What is green house effect? Discuss about the major sources of green house gases.
g) Describe net accumulation of GHGs.
h) Write short note on Kyoto Protocol.
i) Describe about carbon emission and absorption in nature.
j) Discuss about municipal solid waste disposal management.
k) What measures can be taken for afforestation?
l) Suggest some green technologies to be adopted for a smart city.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3	Discuss solar PV system installations with the associated principles and its different applications.	(16)
Q4	Write short notes on a) Hydropower b) Fossil fuels.	(16)
Q5	Discuss about adaptive and mitigative measures for global reduction of carbon to address climate change.	(16)
Q6	Describe briefly the different steps adopted for carbon capture, storage and utilization.	(16)

Registration No:

Total Number of Pages : 02

Course: B.Tech
Sub_Code: RIS7B001

7th Semester Regular / Back Examination: 2023-24
SUBJECT: INDUSTRIAL SAFETY ENGINEERING
BRANCH(S): AUTO,CHEM,CIVIL,CSE,ELECTRICAL & C.E,IT,MANUTECH,MECH,METTA,MINING,MME,PE,PLASTIC,PT
Time : 3 Hour
Max Marks : 100
Q.Code : N030

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) What do you mean by equipment maintenance management? State the prime objectives fulfilled by it.
b) Which of the process is followed to stop a fire by stopping the supply of oxygen using blanket and sand?
c) What do you mean by equipment maintenance management? State the prime objectives fulfilled by it.
d) What are the major types of tools used in maintenance for industrial equipments?
e) What is the basic difference between corrosion and wear?
f) What is the concept for fault finding activities? How does it help in decision making?
g) Which type of failure is generally occurred in rotating machinery due to some surface defects?
h) State some advantages of preventive maintenance in electrical machines.
i) What are the factors affecting Equipment life cycle?
j) What type of maintenance is required for industrial air compressor and Why?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) State and explain the criteria responsible for increase the productivity in a plant.
b) Service life of a tool affects the productivity. Justify.
c) What is fire triangle? Explain the different classes of fire with symbols and extinguishers used for them. Draw any four symbols for possible fire hazards.
d) State the types of hazards and explain any three in detail with possible causes and remedial actions.
e) What are the types of wears and corrosion? Explain one prevention method used in chemical plant.

f) What is decision tree? Draw decision tree for IC engine and explain.

g) State and explain different Steps for periodic and preventive maintenance of air compressor.

h) Explain role of management and government in industrial safety.

i) What is industrial safety? How it is associated with risk?

j) How equipment life cycle is useful for deciding maintenance activities? Explain in detail.

k) Explain in brief the maintenance economics.

l) Discuss repair cycle concept and its importance in small scale industries.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 State and explain the significances of different colour codes used in industrial safety. **(16)**

Q4 State and explain working and applications of different lubrication methods. Explain any three in details with neat sketch. **(16)**

Q5 Discuss different preventive maintenance techniques and explain the advantages and dis-advantages of overhauling electrical motor in DG set. **(16)**

Q6 Highlight the characteristics of factory act and explain employee's safety provisions to be made in factory. What is workman's compensation act and explain main features of the same? Also narrate the possible reasons for which compensation may not be given to employee. **(16)**

Registration No: | | | | | | | | | | |

Total Number of Pages: 02

Course: B.Tech
Sub_Code: RIT7D001

7th Semester Regular/Back Examination: 2023-24
SUBJECT: Internet of Things
BRANCH(S): AEIE,AERO,BIOMED,BIOTECH,CIVIL,C&EE,CSE,CSEAIME,CSIT,CST, ECE,EEE,ELECTRICAL,ETC,IT,MANUTECH,MECH,METTA,MINERAL, MINING,MME,PE,PLASTIC
Time: 3 Hour
Max Marks: 100
Q.Code : N095

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) Name three basic services provided by Cloud Computing.
b) What is the role of a controller service in an IoT system?
c) Why do IoT systems be self-adapting and self-configuring?
d) What is the function of Communication Functional Block in an IoT system?
e) What are the differences between machines in M2M and things in IoT?
f) What are the different web services used in IoT?
g) What is wearable electronics?
h) Write the different SPI interfaces available in Raspberry Pi.
i) Define SDN.
j) What is pcDuino?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) Discuss working principle of RFID and its uses.
b) What are the basic building blocks of an IoT device?
c) Briefly discuss the characteristic features of Raspberry Pi device.
d) Justify the use of Big Data in IoT.
e) Explain the protocol standardization for IoT.
f) Describe the working of IoT device with the help of its basic building blocks.
g) Explain how IoT can be used for Air Quality Monitoring.
h) Discuss about agility in IoT.
i) What is Industry 4.0?
j) Define Wireless Sensor Networks and its uses in IoT systems.
k) Write in brief about Network Function Virtualization.
l) Write a python program for blinking LED.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What are the different layers of IoT protocols? Explain in brief the functions of all the layers. **(16)**

Q4 Write down the characteristics and uses of Big Data analysis. **(16)**

Q5 Explain IoT cloud based data collection, storage and computing services. **(16)**

Q6 Describe interfacing a light sensor (LDR) with Raspberry Pi. **(16)**

Registration No: | | | | | | | | | | |

Total Number of Pages: 02

Course: B.Tech
Sub_Code: REI7D003

7th Semester Regular/Back Examination: 2023-24
SUBJECT: Mechatronics
BRANCH(S): ECE,EEE,ELECTRICAL,ETC,MANUTECH
Time: 3 Hour
Max Marks: 100
Q.Code : N226

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

(2 x 10)

Q1 **Answer the following questions:**

a) Define Mechatronics. List the applications of Mechatronics in day to day activities.
b) Enlist various functional elements of measurement system.
c) Define discrete signal? Distinguish between analog and discrete signal.
d) What do you mean by Passive and Active Mechanical Component?
e) Subtract 21 from 9 using 1's complement method of subtraction.
f) Convert decimal number 46 into equivalent binary and hexadecimal number.
g) What are the logic functions are used for switches in series and in parallel configuration?
h) Enlist the applications of Z-Transform.
i) What are the advantages of PLC over a relay control system?
j) What are the differences between the microprocessor and microcontroller?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (6 x 8)

a) Briefly explain about the measurement system using neat block diagram
b) Find out the Laplace Transform of the following functions. (i) Unit step function (ii) Ramp function
c) Briefly illustrate about conductors, semiconductors and insulators.
d) Distinguish between Distributed Control Systems and Centralized Control Systems.
e) State and explain De Morgan's Theorem. Using de Morgan's theorem prove $\overline{(A \bullet B)} = A \oplus B$
f) Find the inverse Z-transform, of the following.

$$X(z) = \frac{2z}{z^2 - 0.7z + 0.1}$$

g) Plot the following time domain signal in the frequency domain.

$v(t) = A_1 \sin 2\pi f_1 t + A_2 \sin 2\pi f_2 t + A_3 \sin 2\pi f_3 t$

Assume $A_1 > A_2 > A_3$ and $f_1 < f_2 < f_3$

h) Discuss in detail the logic circuit diagram and the working principle of (i) RS flip-flop (ii) D flip-flop

i) What is an optical encoder? What are their types?

j) Explain the principle of operation of Hall-effect transducers using neat sketches.

k) What do you mean by subroutines and nested subroutines? What are their uses?

l) Describe the working principle of piezoelectric pressure sensor.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 a) Find the Fourier Transform of the gate function and plot its amplitude of spectral density. **(8x2)**

b) Explain in detail about the basic modeling elements of mechanical elements with necessary equations and diagrams.

Q4 a) What is a thermistor? Write down the relationship between resistance and temperature for the thermistors. Draw the temperature resistance curve. **(8x2)**

b) Discuss the architecture of Intel's 8085 microprocessor in detail with neat sketch.

Q5 What is photoelectric effect? Discuss the transduction principle in photoemissive, photoconductive and photovoltaic transducers. **(16)**

Q6 Write the short notes on the following **(16)**

(i) Hydraulic actuators

(ii) Bimetallic strip

Registration No: | | | | | | | | | | |

Total Number of Pages: 02

Course: B.Tech
Sub_Code: REI6D001

7th Semester Regular/Back Examination: 2023-24
SUBJECT: Micro Electronic Mechanical Systems
BRANCH(S): MECH
Time: 3 Hour
Max Marks: 100
Q.Code : N056

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** (2 x 10)

a) What is the significance of the miniaturization aspect in MEMS devices?
b) What are the advantages of thin film deposition?
c) List the functional units of a typical PECVD system.
d) Enlist various materials used in the fabrication of MEMS devices.
e) What are the advantages of sputtering based thin film deposition?
f) What do you mean by System-in-a-Chip technology?
g) What is the photoelectric effect?
h) Write the principle of operation of MEMS accelerometer.
i) What is a phase shifter? Enlist the applications of phase shifters.
j) How many basic elements exist in case of a thermal system?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (6 × 8)

a) Define machining and micromachining processes. How do they differ from each other?
b) What do you mean by a wafer? What kind of material is commonly used for wafer?
c) With suitable schematic diagram and using two types of photoresists, describe in detail the process of photolithography.
d) What are the main advantages of using MEMS technology in sensors?
e) What do you understand from Ion Implantation Process? Briefly explain its various steps.
f) What is the principle of operation and types of MEMS resonator?
g) How do MEMS-based actuators differ from traditional macro-scale actuators?
h) Briefly explain the principle of operation of actuators. Write down some of the important applications of microactuators.
i) How many basic elements exist in case of a Fluid system? Define fluid resistance and fluid capacitance.

j) Discuss in detail about different actuation mechanisms in MEMS switches.

k) What design considerations are involved in the packaging of MEMS systems?

l) Discuss in detail about the transduction principle in photoemissive, photoconductive transducers.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Compare and contrast different microfabrication techniques used in MEMS manufacturing, such as bulk micromachining, surface micromachining, and LIGA. Highlight the advantages and limitations of each technique. **(16)**

Q4 a) Describe the Young's modulus (E), Bulk modulus (K), Shear modulus (G) and Poisson's ratio and discuss about their relationship. **(8x2)**

b) Explain in detail about the basic modeling elements of mechanical elements with necessary equations and diagrams.

Q5 How does an MEMS gyroscope work? Define coriolis force and coriolis acceleration. Discuss the compensation techniques used in process of fabricating the gyroscope. **(16)**

Q6 Write short notes on the following **(16)**

(i) Micropump

(ii) MOEMS

Registration No:

Total Number of Pages: 02

Course: B.Tech
Sub_Code: RME7D001

7th Semester Regular/ Back Examination: 2023-24
SUBJECT: Power Plant Engineering
BRANCH(S): MECH
Time: 3 Hour
Max Marks: 100
Q.Code : N158

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** (2 x 10)

a) What is blowdown? Why is it needed?
b) What is the function of economizer?
c) What do you understand by choked flow?
d) What is the optimum velocity ratio for impulse blading?
e) What is 50% reaction turbine?
f) What do you understand by throttle governing of turbine?
g) Why are feedwater heaters used?
h) What do you mean by mass defect and binding energy?
i) What is thermal reactor?
j) What do you understand by peak load and peak load plant?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (6 x 8)

a) Mention the merits and demerits of fire-tube boilers.
b) Explain the characteristics of a circulating fluidized bed boiler.
c) Explain (a) subsonic nozzle (b) subsonic diffuser
d) Draw the velocity diagrams for impulse blading.
e) Compare the diagram efficiencies of impulse and two-row Curtis stages.
f) How does a cooling tower operate?
g) What is FD cooling tower? Mention its merits and demerits.
h) What are single-pass and two-pass condensers?
i) Explain with a sketch main feature of CANDU-type reactor.
j) Explain the characteristic feature of BWR.
k) Explain the effect of load factor of an electric power station on the cost per kW-hr generated.
l) Discuss the methods of determining the depreciation of power plant.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3	Discuss the various types of power plant and site selection. Explain the working of steam power plant with neat diagram.	(16)
Q4	Explain the Working Principles of a Steam Turbine and also explain its types with the neat diagram.	(16)
Q5	Explain the operation of nuclear reactor which uses Liquid Metal as coolant.	(16)
Q6	What are the different arrangements of components of thermal power plant when used as peak load plants? List out the specific features of each.	(16)

Registration No: | | | | | | | | | | |

Total Number of Pages: 02

Course: B.Tech
Sub_Code: REC7D006

7th Semester Back Examination: 2023-24
SUBJECT: Radar and TV Engineering
BRANCH(S): ECE, ETC
Time: 3 Hour
Max Marks: 100
Q.Code: N125

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

(2 x 10)

Q1 **Answer the following questions:**

a) What is the time taken for a radar signal to travel a nautical mile and back?
b) How CW radar can measure both range and velocity of a moving target?
c) State the basic distinguishing factors between MTI and pulsed Doppler radar.
d) Explain false alarm in context with a radar receiver.
e) How interlaced scanning is different from progressive scanning?
f) How G-Y signal is generated from R-Y, B-Y and Y signal?
g) Draw the colour circle diagram for primary colours used in TV transmission.
h) What are basic blocks of MPE4?
i) What do you mean by digital TV over IP?
j) What are different display technologies used in TV?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) MTI radar detects the direction of radial velocity of a target. How?
b Draw the block diagram of radar modulator and explain its principle.
c) What are the applications of pulse radar, pulse doppler radar and MTI radar?
d) Explain the principle of a distance measuring equipment.
e) Define and explain what is meant by (i) Tonal gradation
(ii) Half line scanning
f) What is composite video signal? Draw a composite video signal for a period of two lines and make the details according to CCIR-B standards.
g) Explain the operational principle of colour TV camera pick-up tube.
h) Explain how compatibility of a monochrome TV receiver is obtained to colour TV reception.
i) Explain different formats used for digitization of analog signal of bandwidth F_{max}.

j) With neat diagram, write down the basic principles of digital video broadcasting (DVB).

k) QAM is a modulation scheme for Terrestrial digital TV. Explain its working principle.

l) Explain briefly plasma video display technology.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Derive the radar range equation which includes noise figure, receiver noise bandwidth, system losses, and where detection is based on integration of *n* received pulses. **(16)**

Q4 How ground control approach (GCA) is different from instrument landing system (ILS). With neat diagram explain the principle of ILS in details. **(16)**

Q5 With neat sketch explain the different blanking and synchronizing signals of Composite Colour Video Signal (CCVS). **(16)**

Q6 Draw and explain the simplified view of the complete DVB transmission/reception chain. **(16)**

Registration no:

Total Number of Pages: 02

B Tech
REL5D005

7th Semester Regular/Back Examination: 2023-24
RENEWABLE POWER GENERATION SYSTEMS
Branch: CSE/CST/CSEAI
Time: 3 Hours
Max Marks: 100
Q Code: N381

Answer all questions of Part-A, any 08 questions of (Part-B) and any two from Part-C
The figures in the right-hand margin indicate marks

Part-I

Q1 Objective Answer Type Questions (Answer All) (02x10)

a) Give two examples of non-renewable small-scale distributed generation sources
b) What is meant by terrestrial and extraterrestrial radiation?
c) What are the different types of instruments used for measuring solar radiation?
d) What is the basic difference between an active and passive Solar Heating system?
e) Briefly explain Partial or Complete Shadowing on a solar cell in a module
f) What do you mean by Pitch Angle?
g) What range of wind speed is considered to be favorable for wind power generation?
h) What are the merits of hybrid renewable power systems?
i) Write two demerits of vertical axis type wind turbine system
j) Name the constituents of biogas.

Part-II

Q2 Focused-Short Answer Type Questions- (Answer Any Eight) (06x08)

a) What is wind power and derive an expression for the power contained in wind?
b) What is the need of maximum power point tracking in solar PV system andhow does it affect the output of the PV system.
c) Explain the construction and working principle of doubly-fed-induction generator (DFIG) Discuss its merits and demerits.
d) Write the working principle of solar pumping system. Discuss also the issues and challenges in designing the solar pumping systems.
e) Explain Power versus wind speed characteristics of Wind turbine.
f) A two blade HAWT is installed at a location with free wind velocity of 20 m/s. If the diameter of rotor is 30m, at what rotational speed will it produce maximum power
g) Explain in details the various advantages and disadvantages of energy extracted from biomass.
h) Write a short note on Diesel-PV and Wind-PV System
i) Describe the operation and the relevant challenges in grid connected and self- excited induction generators used in wind power extraction.

j) Why reactive power compensation is required in wind firms and how is it provided? Explain.

k) Write a short note on Solar desalination systems.

l) Discuss various types of electric and hybrid electric vehicles. Discuss the challenges in efficiently charging these vehicles.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Draw and explain an equivalent circuit of a practical solar PV cell. Explain about Solar PV Module, Solar PV Panel and Solar PV Array. **(16)**

Q4 Explain the process of production of biogas from biomass. What are the main advantages of anaerobic digestion of biomass? What are the various Biomass conversion technologies presently used? What are the main advantages and disadvantages of Biomass Energy? **(16)**

Q5 a) With the help of a neat sketch, discuss the different types of rotors used in wind turbines. **(8x2)**

b) Mention the advantages of vertical axis wind turbine over horizontal axis wind turbine.

Q6 Derive the expression for maximum power extracted from a wind energy conversion system (WECS). Comment on the overall efficiency WECS. **(16)**

Total Number of Pages : 02

B.Tech
REL7D003

7th Semester Regular / BackExamination 2023-24
SMART GRID
CSE/EEE/EE/ELECTRICAL & CE/IT
Max Marks: 100
Time: 3 Hours
Q.CODE: N127

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

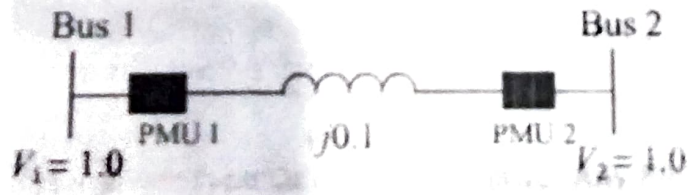
Q1 **Only Short Answer Type Questions (Answer All-10)** **(2 x 10)**

a) Briefly distinguish between a conventional grid and a smart grid.
b) What is meant by 'Demand Response'? Briefly explain.
c) What is a HAN?
d) What is a PMU?
e) Name two storage systems used in Smart Grid.
f) What are the advantages of using a micro turbine?
g) Explain the term "Prosumer" with reference to a smart grid.
h) State the importance of IP v6 in Smart Grid.
i) What are V_2G and G_2V?
j) A smart meter displays current harmonic measurements up to the 5th harmonic component. What should be the minimum sampling frequency used in the signal conditioning stage? Assume that the frequency of the supply is 50 Hz.

Part- II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Discuss about the opportunities and challenges related to Smart Grid.
b) A specification sheet of a smart meter states that its rated current is 100 A and power dissipation is 3 W. It employs a current-sensing resistor of 200 μΩ. When the load current is at the rated value of the meter, calculate:
   i) the power dissipation in all the other components of the meter,
   ii) the voltage across the current-sensing resistor,
   iii) the gain of the PGA to match with an ADC having a full scale of 5V
c) The power flow on the transmission line in Figure below is 5 pu and the voltage at both busbars is 1.0 pu. The system frequency is 50 Hz. The power flow is estimated using the phase difference between busbars 1 and 2, that is using $\varphi_1 - \varphi_2$. The measurement of the phase angle φ_1 has a time stamp error of 0.1 ms and that of the phase angle φ_2 is zero. Find the error in the estimated power flow.



d) Write a note on protection and control of micro-grid

e) Explain details about feeder automation in smart grid.
f) Explain the WAMS component used in smart grid communication.
g) Write the various opportunities and changes of smart grid.
h) Explain the working of a smart meter using its Functional Block Diagram.
i) Explain web based power quality monitoring system.
j) What is GIS and explain its components?
k) Explain the different storage system used in smart grid.
l) Write a short note on smart home management system.

Part-III
Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Explain about various types of Intelligent Electronic Devices (IED) and their application for Monitoring & Protection. **(16)**

Q4 Explain concept of Micro-grid and issues related with utility grid. What is DG and write the advantages and disadvantage of distribution generation? **(16)**

Q5 Write the various components of smart grid and its function details with block diagram. **(16)**

Q6 Discuss in detail the integration of renewables and issues involved also explain about power quality issues of grid connected renewable energy sources. **(16)**

Registration No: | | | | | | | | | | |

Total Number of Pages: 02

Course: B. Tech.
Sub_Code: RCS7D007

7th Semester Regular / Back Examination: 2023-24
SUBJECT: SOFT COMPUTING
BRANCH(S): AEIE, AUTO, CIVIL, ECE, EEE, ELECTRICAL, ETC, MECH, METTA, MINING, PT
Time: 3 Hour
Max Marks: 100
Q. Code: N284

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right-hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** (2 x 10)

a) Define multivariate functions.
b) Why is optimization challenging in the presence of non-linearities?
c) Define a neural network and discuss its biological inspiration.
d) Discuss the key characteristics of fuzzy sets.
e) Provide a numerical example demonstrating the composition of fuzzy relations.
f) Define defuzzification.
g) Discuss the limitations of a single-layer perceptron in handling non-linearly separable data.
h) What is the significance of non-linear activation functions in neural networks?
i) Define hybrid evolutionary algorithms.
j) List any four fitness functions that are suitable for the genetic algorithm.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (6 x 8)

a) Discuss the basic components of a fuzzy logic system. How does fuzzy inference work, and what are the types of fuzzy inference methods? Explain.
b) Explain the backpropagation algorithm. How is it used for training artificial neural networks? Explain with an example. Discuss its advantages and limitations.
c) Compare and contrast gradient-based and evolutionary optimization methods. In what situations would one be preferred over the other? Explain.
d) Compare and contrast the Mamdani and Takagi-Sugeno fuzzy system architectures.
e) Explore the applications of fuzzy logic systems in pattern recognition.
f) Discuss how fuzzy logic control systems adapt to changes and uncertainties.
g) Define radial basis function (RBF) networks and their applications. Explain the least square training algorithm for RBF networks.

h) Explain the significance of feedback loops in RNNs. Provide an example scenario where an RNN would be more suitable than a feedforward neural network.

i) Define the Kohonen Self-Organizing Map (SOM). Discuss one application where SOMs are commonly used

j) Discuss the significance of crossover and mutation in reproduction.

k) Define genetic programming and its application in evolutionary computing.

l) Discuss the advantages of combining genetic algorithms with other optimization techniques in a hybrid approach. Explain with an example.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Discuss the role of optimization algorithms in addressing any two complex problems with examples. Provide specific examples of how these algorithms can be applied to optimize decision parameters in an autonomous vehicle. **(16)**

Q4 Explain the Mamdani fuzzy inference model. Show its architecture, including the input and output variables, fuzzy sets, and the rule base. Explain how these elements collectively contribute to the decision-making process. **(16)**

Q5 Explain simulated annealing in the context of neural networks. Discuss the advantages and disadvantages of using simulated annealing in training neural networks. **(16)**

Q6 Discuss any four selection strategies used in genetic algorithms with their pros and cons. **(16)**

Registration No:

Total Number of Pages: 02

Course: B.Tech
Sub_Code: RCI7D006

7th Semester Regular/Back Examination: 2023-24
SUBJECT: Water Resource Engineering
BRANCH(S): CIVIL, C&EE
Time: 3 Hour
Max Marks: 100
Q.Code: N162

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right-hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** (2x10)

a) What are the Theisen polygon and isohyets?
b) Explain the difference between evaporation and transpiration.
c) What is the difference between the Perennial, Ephemeral and Intermittent streams?
d) What is the curve number in the SCS method of runoff estimation?
e) Define the Instantaneous unit hydrograph
f) Draw a velocity profile curve along the open channel and pipe flow depth.
g) What is the criteria for choosing the routing interval Δt in the Muskingum routing method?
h) Define basin lag and attenuation of a hydrograph.
i) What is the difference between normal flow depth and critical flow depth?
j) The Froude number of a flow in a rectangular channel is 0.73. If the depth of flow is 1.50 m, find the specific energy.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (6x8)

a) Explain the Depth-Area-Duration curves.
b) Explain the concept of a flow mass curve and flow duration curve.
c) Ordinates of the 1-hr unit hydrograph of a basin at 1-hr intervals are 5, 8, 5, 3, and 1 cumecs. Calculate S- curve hydrograph and 2-h unit hydrograph for the catchment.
d) The direct runoff hydrograph resulting from a 5.0 cm effective rainfall of 6-h duration is given below. Determine the catchment area and the ordinates of the 6-h unit hydrograph.

Time (hr)	0	6	12	18	24	30	36	42	48	54	60	66	72
Direct runoff (m^3/s))	0	25	175	320	360	310	230	165	105	60	30	10	0

e) In a 300 ha watershed, the CN value was estimated as 70 under the AMC-III condition. Estimate the value of direct runoff volume for the following 5 days of Rainfall. The AMC on 18 May 2000 was of category III. Use standard SCS-CN equations.

Date	18 May	19 May	20 May	21 May	22 May
Rainfall (mm)	38	21	22	10	30

f) Define IUH, S-curve hydrograph, and their relationship to the unit hydrograph (UH).
g) Discuss the various steps involved in Modified Pul's method of reservoir routing.
h) Explain different types of droughts.

i) Describe the Gradually varied flow (GVF) profile classifications with neat sketches.

j) A hydraulic jump occurs in a horizontal rectangular channel with sequent depths of 0.25m and 4.9 m. Calculate the flow rate per unit width, energy loss and initial Froude number.

k) Explain classification of hydraulic jump.

l) With a neat sketch, describe the Specific Energy depth relationship.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 (a) Observed values of inflow and outflow hydrographs at the end of a reach of a river are given below. Determine the best values of K and x for use in the Muskingum flood routing method. **(8)**

Time (h)	0	6	12	18	24	30	36	42	48	54	60	66
Inflow (m^3/s)	20	80	210	240	215	170	130	90	60	40	28	16
Outflow (m^3/s)	20	20	50	150	200	210	185	155	120	85	55	23

(b) With a neat sketch, describe the hydrologic cycle and all the processes involved. **(8)**

Q4 (a) The following are the ordinates of the hydrograph of flow from a catchment area of 800 km^2 due to a 6-h rainfall. Derive the ordinates of the 6-h unit hydrograph. Make suitable assumptions regarding the base flow. **(8)**

Time (h)	0	6	12	18	24	30	36	42	48	54	60	66	72
Discharge (m^3/s)	40	65	215	360	400	350	270	205	145	100	70	50	42

(b) With a neat sketch, describe the Specific Energy depth relationship. A 3.0m wide rectangular channel carries 2.4 m^3/s discharges at a depth of 0.7m. Determine specific energy at 0.7m depth. Determine the critical depth. Is the flow subcritical or supercritical? Determine the depth alternate to 0.7m. If Manning's n = 0.015, determine the critical slope. **(8)**

Q5 (a) Design the trapezoidal channel as best hydraulic cross-section with Q = 12 m^3/sec, n = 0.015, S_0 = 0.0003, and side slope (m) = 3/2. **(8)**

(b) In a 4.0-m wide rectangular channel (n = 0.017), the bed slope is 0.0006. When the channel is conveying 10.0 m^3/s of flow, estimate the nature of GVF profiles at two far away sections P and R, in this channel where the depth of flow is measured as 1.6 m and 2.1 m respectively. **(8)**

Q6 A reservoir has the following elevation, discharge, and storage relationships: **(16)**

Elevation (m)	101.0	101.5	102	102.5	103	103.5	104	104.5
Storage (10^6 m^3)	4.56	4.57	5.90	5.25	5.90	6.32	6.53	6.83
Outflow (m^3/s)	0	20	34	50	79	115	120	133

The following flood hydrograph entered the reservoir when the reservoir level was at 101.50m.

Time (h)	0	6	12	18	24	30	36	42	48	54	60
Inflow (m^3/s)	15	40	125	235	160	105	75	60	45	30	18

Rout the flood and obtain the outflow hydrograph.