

**JSS MAHAVIDYAPEETHA**  
**JSS SCIENCE AND TECHNOLOGY UNIVERSITY, MYSURU**  
**Department of Electronics and Communication Engineering**  
**Bachelor of Engineering Degree**  
**VII Semester: Test 1**  
**Cryptography and Network Security**

**Duration: 1 Hr.**

**Max. Marks: 20**

**Date: 15/11/2022**

**Time: 2.30PM-3.30PM**

**Note:**

1. Questions 1 and 2 are compulsory.
2. Answer the remaining questions by making use of internal choice appropriately.

<b>Q. No.</b>	<b>CO</b>	<b>CD</b>	<b>Questions</b>	<b>Marks</b>
1	CO1	L2	Define a) Cryptography    b) Steganography    c) Monoalphabetic cipher d) Polyalphabetic cipher	04
2	CO1	L2	Explain the active and passive security attacks.	06
3	CO1	L3	Suppose the plain text "FRIDAY" is encrypted using 2*2 Hill cipher to yield cipher text "PQCFKU", find the value of the key used for encryption.	05
<b>OR</b>				
4	CO1	L3	What is transposition technique? Encrypt the message "Network Security" using rail fence technique with a depth of 3.	05
5	CO1	L2	Encrypt the message "Good Morning" using play fair cipher with the key "Monarchy".	05
<b>OR</b>				
6	CO1	L2	Explain the classical fiestal network.	05

**Cognitive Domains:**

**L1: Remember**

**L2: Understand**

**L3: Apply**

**L4: Analyse**

**L5: Evaluate**

**L6: Create**

<b>Course Outcome: At the end of the course the students are able to</b>	
<b>CO1</b>	Explain the fundamental concepts of network security and networking protocols.
<b>CO2</b>	Analyze network security threats and counter measures.
<b>CO3</b>	Design the network application security schemes.
<b>CO4</b>	Demonstrate an ability to work individually or in a team to carry out assigned tasks, by effectively managing resources adhering to standard practices and ethics.

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**Department of Electronics and Communication Engineering**

Bachelor of Engineering Degree

VII Semester: Test 1

***“Automotive Electronics”***

**Duration: 1 Hr.**

**Max. Marks: 20**

**Date: 15/11/22**

**Time: 09.30-10.30AM**

**Note:**

1. Questions 1 and 2 are compulsory.
2. Answer the remaining questions by making use of internal choice appropriately.

<b>Q. No.</b>	<b>CO</b>	<b>CD</b>	<b>Questions</b>	<b>Marks</b>
1	1	2	Using a diagram, enumerate the operating principles of the gas discharge bulb.	05
2	1	1	Identify four most important functions and the major components of the Motronic engine management system.	05
3	1	2	Explain the function of a coil ignition system using the ignition circuit's primary configuration.	05

**OR**

4	1	4	Differentiate between an internal combustion engine and an external combustion engine.	05
5	1	2	List and explain the fundamental functions of the internal combustion engine's components.	05
6	1	3	Illustrate the working principle of the four-stroke internal combustion engine	05

**Cognitive Domains:**

**L1: Remembering**

**L2: Understanding**

**L3: Applying**

**L4: Analysing**

**L5: Evaluating**

**L6: Creating**

<b>Course Outcome: At the end of the course the students are able to</b>	
<b>CO1</b>	Exhibit the knowledge of working of Sensors and actuators in electronic fuel injection, ignition systems and Active / Passive safety systems.
<b>CO2</b>	Demonstrate a comprehension of the roles and implementations of various bus systems used in automotive networking.
<b>CO3</b>	Explain and analyse the main requirements, trends and selection criteria of sensors for automotive applications.
<b>CO4</b>	Exemplify the different measuring principles involved in sensors and evaluate for automotive applications.
<b>CO5</b>	Demonstrate the knowledge of basic principle of actuators and explain the mechanism of hybrid drives.
<b>CO6</b>	Work efficiently in a group and complete the assigned task by demonstrating skills related to documentation and oral communication.

--- End ---

**Department of Electronics and Communication Engineering****Bachelor of Engineering Degree****VII Semester: Test 1*****Power Electronics*****Duration: 1 Hr.****Max. Marks: 20****Date: 14-11-2022****Time: 2:30-3:30PM****Note:**

1. Questions 1 and 2 are compulsory.
2. Answer the remaining questions by making use of internal choice appropriately.

<b>Q. No.</b>	<b>CO</b>	<b>CD</b>	<b>Questions</b>	<b>Marks</b>
<del>1</del>	1	2	Explain turn ON and turn OFF characteristics of SCR.	05
2	2	3	The latching current of the thyristor is 50mA and is triggered by a gate pulse width of 50 $\mu$ s. Show that without resistance $R^1$ the thyristor will fail to remain ON when the gating pulse ends. Also find the maximum value of $R^1$ to ensure firing. $V=100v$ , $R=40\Omega$ , $L=0.5mH$ .	05
<del>3</del>	1	2	Explain the control characteristics of GTO and MCT.	05
<b>OR</b>				
4	1	2	Explain the construction and working of IGBT.	05
<del>5</del>	1	2	Explain the switching characteristics of BJT with necessary sketches.	05
<b>OR</b>				
6	1	2	Explain the switching characteristics of MOSFET with necessary sketches.	05

**Cognitive Domains:****L1: Remember****L2: Understand****L3: Apply****L4: Analyse****L5: Evaluate****L6: Create****Course Outcome: At the end of the course the students are able to**

<b>CO1</b>	Explain the various power devices and circuits.
<b>CO2</b>	Analyse the performance parameters of power electronics circuits.
<b>CO3</b>	Design power electronics circuits to meet the given specifications.
<b>CO4</b>	Design and demonstrate the working of various power electronic circuits.
<b>CO5</b>	Demonstrate the skill sets using modern tool for analysis and simulation of power electronics circuits.

**--- End ---**

**Department of Electronics and Communication Engineering**

**Bachelor of Engineering Degree**

**VII Semester: Test 2**

**Cryptography and Network Security**

**Duration: 1 Hr.**

**Date: 16/12/2022**

**Max. Marks: 20**

**Time: 2.30PM – 3.30PM**

**Note:**

1. Questions 1 and 2 are compulsory.
2. Answer the remaining questions by making use of internal choice appropriately.

<b>Q. No.</b>	<b>CO</b>	<b>CD</b>	<b>Questions</b>	<b>Marks</b>
1	CO1	L2	Explain the block design principles used for symmetric encryption.	05
2	CO1	L2	With a neat diagram, describe the algorithm used for AES key expansion.	05
3	CO1	L2	Explain the single round of Data Encryption Standard.	05
<b>OR</b>				
4	CO1	L2	With a diagram explain output feedback mode and write the appropriate algorithm.	05
5	CO2	L3	Perform encryption for the plaintext 20 using RSA algorithm with p=5, q=11 and 13 as the public key.	05
<b>OR</b>				
6	CO2	L3	Perform decryption for the ciphertext 11 using RSA with p=17, q=11 and e=7.	05

**Cognitive Domains:**

**L1: Remember**

**L4: Analyse**

**L2: Understand**

**L5: Evaluate**

**L3: Apply**

**L6: Create**

**Course Outcome: At the end of the course the students are able to**

<b>CO1</b>	Encrypt and decrypt data using symmetric key and public key ciphers
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<b>CO2</b>	Analyse solutions for effective key management and distribution conduct cryptoanalysis
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Bachelor of Engineering Degree

VII Semester: Test 2

**Power Electronics**

Duration: 1 Hr.

Max. Marks: 20

Date: 15-12-2022

Time: 2:30-3:30PM

Note:

1. Questions 1 and 2 are compulsory.
2. Answer the remaining questions by making use of internal choice appropriately.

Q. No.	CO	CD	Questions	Marks
1	2	L2	Explain the use of anti-saturation base control technique to improve performance of BJT.	05
2	3	L3	An UJT used in a relaxation oscillator is having $\eta = 0.7$ , $V_V = 1V$ and the supply voltage is 15V. Design the suitable values of R and C given the frequency of oscillation is 1kHz, $I_P = 1mA$ , $I_V = 8mA$ .	05
3	1	L2	Explain $di/dt$ and $dv/dt$ with its limitations.	05

**OR**

4	1	L2	Explain with circuit the base drive control method during turn-ON of BJT.	05
5	2	L3	Compute the required parameters for a snubber circuit to provide reliable $dv/dt$ protection to SCR used in a single phase fully controlled bridge circuit. The SCR has maximum $dv/dt$ capability of $50V/\mu s$ , the input line to line voltage has a peak value of 380V and the source inductance is 0.1mH.	05

**OR**

6	2	L3	For the single phase semi-converter having resistive load determine the: i) Average output voltage ii) RMS output voltage.	05
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**Cognitive Domains:**

**L1: Remember**

**L2: Understand**

**L3: Apply**

**L4: Analyse**

**L5: Evaluate**

**L6: Create**

<b>Course Outcome: At the end of the course the students are able to</b>	
<b>CO1</b>	Explain the various power devices and circuits.
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<b>CO5</b>	Demonstrate the skill sets using modern tool for analysis and simulation of power electronics circuits.

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**Department of Electronics and Communication Engineering**  
**Bachelor of Engineering Degree**  
**VII Semester: Test 2**

***“Entrepreneurship and Management”***

**Duration:** 1 Hr.

**Max. Marks:** 20

**Date:** 15-12-2022

**Time:** 09:30 – 10:30 am

**Note:**

1. Questions 1 and 2 are compulsory.
2. Answer the remaining questions by making use of internal choice appropriately.

<b>Q. No.</b>	<b>CO</b>	<b>CD</b>	<b>Questions</b>	<b>Marks</b>
1	1	L2	Illustrate with examples the motivation of Engineers in the historical development of Engineering management	05
2	1	L2	With the help of a flow diagram, discuss various steps to start a new business.	05
3	1	L2	List business opportunities across various domains, choose one, and explain how to turn the opportunity into a business.	05
<b>OR</b>				
4	1	L2	List different sources of generating business ideas.	05
5	2	L2	Discuss the role of government and financial institutions in promoting small-scale industry in a given region	05
<b>OR</b>				
6	2	L2	Discuss demand and supply problems in the food industry, the supply chain from farmer to store.	05

**Cognitive Domains:**

**L1:** Remember

**L2:** Understand

**L3:** Apply

**L4:** Analyse

**L5:** Evaluate

**L6:** Create

**Course Outcome: At the end of the course the students are able to**

<b>CO1:</b>	Explain entrepreneurship, management and innovation with an emphasis on their evolution. Identify various institutional support for starting new business, assessment of demand and supply in potential areas of growth, opportunity identification and feasibility analysis.
<b>CO2:</b>	Analyse the importance of technology management with respect to organizational finance, ethics, teamwork and project planning. Investigate techno-economic feasibility of a project,
<b>CO3:</b>	Develop/design innovation with regard to IPR and patents in technology-oriented business.
<b>CO4:</b>	Demonstrate various successful entrepreneurial profiles, the startup ecosystem and new venture creations, working in teams study case examples, develop a business plan, prepare a report, and critically evaluate.

--- End ---

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**Department of Electronics and Communication En**  
**Bachelor of Engineering Degree**  
**VII Semester: Test 2**  
**"Automotive Electronics"**

**Duration: 1 Hr.**  
**Date: 16-12-2022**

**Max. Marks: 20**  
**Time: 9.30 - 10.30AM**

**Note:**

1. Questions 1 and 2 are compulsory.
2. Answer the remaining questions by making use of internal choice appropriately.

<b>Q. No.</b>	<b>CO</b>	<b>CD</b>	<b>Questions</b>	<b>Marks</b>
1	2	2	Discuss in detail the functionalities of the OSI reference model.	05
2	2	1	List and define the primary requirements, considering both financial and technical boundaries, that must be addressed when choosing a bus system for automotive applications.	05
3	2	2	Classify and explicate the different addressing strategies used in automotive network architecture using block diagrams.	05
<b>OR</b>				
4	2	3	Illustrate the network node architecture in CAN bus with a neat diagram.	05
5	2	3	With suitable illustrations, explain the different voltage levels used for transmitting recessive and dominant states in transmission in CAN-B and CAN-C bus.	05
<b>OR</b>				
6	2	2	With the help of a flow diagram explain the data transfer of the driving speed to the various modules in an automobile.	05

**Cognitive Domains:**

**L1: Remembering**

**L2: Understanding**

**L3: Applying**

**L4: Analysing**

**L5: Evaluating**

**L6: Creating**

**Course Outcome: At the end of the course the students are able to**

<b>CO1</b>	Exhibit the knowledge of working of Sensors and actuators in electronic fuel injection, ignition systems and Active / Passive safety systems.
<b>CO2</b>	Demonstrate, a comprehension of the roles and implementations of various bus systems used in automotive networking.
<b>CO3</b>	Explain and analyse the main requirements, trends and selection criteria of sensors for automotive applications.
<b>CO4</b>	Exemplify the different measuring principles involved in sensors and evaluate for automotive applications.
<b>CO5</b>	Demonstrate the knowledge of basic principle of actuators and explain the mechanism of hybrid drives.
<b>CO6</b>	Work efficiently in a group and complete the assigned task by demonstrating skills related to documentation and oral communication

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**Bachelor of Engineering Degree**  
**VII Semester: Test 3**  
**"Automotive Electronics"**

**Duration: 1 Hr.**

**Date: 17/01/2023**

**Max. Marks: 20**

**Time: 09.30-10.30AM**

**Note:**

1. Questions 1 and 2 are compulsory.
2. Answer the remaining questions by making use of internal choice appropriately.

<b>Q. No.</b>	<b>CO</b>	<b>CD</b>	<b>Questions</b>	<b>Marks</b>
1	5	2	With a neat sketch, elucidate the working principle of split powered hybrid drives.	05
2	4	3	Illustrate the multi-layered process of a sensor in motor vehicle with the help of diagram.	05
3	5	3	Demonstrate the recuperative breaking mechanism in operation. with its benefits and drawbacks	05
<b>OR</b>				
4	5	4	Classify and explain the hybrid vehicles based on the degree of hybridization	05
5	4	2	Illustrate the working principle of the hot wire air mass meters with the help of a schematic diagram	05
<b>OR</b>				
6	4	2	Illustrate the working of inductive type position sensor.	05

**Cognitive Domains:**

**L1: Remembering**

**L4: Analysing**

**L2: Understanding**

**L5: Evaluating**

**L3: Applying**

**L6: Creating**

<b>Course Outcome: At the end of the course the students are able to</b>	
<b>CO1</b>	Exhibit the knowledge of working of Sensors and actuators in electronic fuel injection, ignition systems and Active / Passive safety systems.
<b>CO2</b>	Demonstrate, a comprehension of the roles and implementations of various bus systems used in automotive networking.
<b>CO3</b>	Explain and analyse the main requirements, trends and selection criteria of sensors for automotive applications.
<b>CO4</b>	Exemplify the different measuring principles involved in sensors and evaluate for automotive applications.
<b>CO5</b>	Demonstrate the knowledge of basic principle of actuators and explain the mechanism of hybrid drives.
<b>CO6</b>	Work efficiently in a group and complete the assigned task by demonstrating skills related to documentation and oral communication

--- End ---

**Department of Electronics and Communication Engineering**  
**Bachelor of Engineering Degree**  
**VII Semester: Test 3**

***“Entrepreneurship and Management”***

**Duration: 1 Hr.**

**Max. Marks: 20**

**Date: 16-01-2023**

**Time: 09:30 – 10:30 am**

**Note:**

1. Questions 1 and 2 are compulsory.
2. Answer the remaining questions by making use of internal choice appropriately.

<b>Q. No.</b>	<b>CO</b>	<b>CD</b>	<b>Questions</b>	<b>Marks</b>
1	2	L2	Discuss the various functions of Management	05
2	2	L2	With the aid of block diagram, explain Planning/decision making process	05
3	2	L2	Discuss various legal forms of organisations with examples	05

**OR**

4	2	L2	Illustrate with examples the concept of Project planning and acquisition	05
5	3	L2	Discuss different types of intellectual property protection	05
6	3	L2	Discuss the components of techno-economic feasibility report	05

**Cognitive Domains:**

**L1: Remember**

**L2: Understand**

**L3: Apply**

**L4: Analyse**

**L5: Evaluate**

**L6: Create**

**Course Outcome At the end of the course the students are able to**

<b>CO1:</b>	Explain entrepreneurship, management and innovation with an emphasis on their evolution. Identify various institutional support for starting new business, assessment of demand and supply in potential areas of growth, opportunity identification and feasibility analysis.
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<b>CO4:</b>	Demonstrate various successful entrepreneurial profiles, the startup ecosystem and new venture creation, working in teams study case examples, develop a business plan, prepare a report, and critically evaluate.

**Department of Electronics and Communication Engineering**

**Bachelor of Engineering Degree**

**VII Semester: Test 3**

**Power Electronics**

**Duration: 1 Hr.**

**Date: 16-01-2023**

**Note:**

1. Questions 1 and 2 are compulsory.
2. Answer the remaining questions by making use of internal choice appropriately.

**Max. Marks: 20**

**Time: 2:30-3:30PM**

<b>Q. No.</b>	<b>CO</b>	<b>CD</b>	<b>Questions</b>	<b>Marks</b>
1	2	L2	Explain the working of full wave ACVC with only one SCR.	05
2	2	L2	Derive an expression for average output voltage of the step-up chopper.	05
3	2	L2	Derive the expression for RMS output voltage of single phase full wave ACVC having inductive load.	05

**OR**

4	2	L2	Derive an expression for RMS output voltage of a bi-directional ACVC employing ON-OFF control.	05
5	2	L3	The DC supply to the SCR chopper is 220V, chopping frequency is 250Hz, ON-OFF time ratio of chopper is 2:4, $R=12\Omega$ , $L=2.5H$ , calculate i) Maximum and minimum load currents. ii) Average load current. iii) RMS load current.	05

**OR**

6	2	L3	The single phase half wave ACVC has a resistive load of $R=5\Omega$ and input voltage of 120V, 60Hz. If the delay angle of thyristor is $\pi/3$ calculate, i) RMS value of output voltage. ii) Input power factor. iii) Average input current.	05
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**Cognitive Domains:**

**L1: Remember**

**L2: Understand**

**L3: Apply**

**L4: Analyse**

**L5: Evaluate**

**L6: Create**

**Course Outcome: At the end of the course the students are able to**

<b>CO1</b>	Explain the various power devices and circuits.
<b>CO2</b>	Analyze the performance parameters of power electronics circuits.
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<b>CO4</b>	Design and demonstrate the working of various power electronic circuits.
<b>CO5</b>	Demonstrate the skill sets using modern tool for analysis and simulation of power electronics circuits.

--- End ---

## Cryptography and Network Security

Max. Marks: 20

Time: 2.30PM – 3.30PM

Duration: 1 Hr.  
Date: 17/01/2023

Note:

1. Questions 1 and 2 are compulsory.
2. Answer the remaining questions by making use of internal choice appropriately.

Q. No.	CO	CD	Questions	Marks
1	CO4	L3	Perform addition of two points on elliptic curve with $P = (3,8)$ and $Q = (6,5)$ on $E_{11}(1,1)$ .	05
2	CO5	L2	With a neat diagram explain Internet mail architecture.	05
3	CO4	L2	Interpret IP Security architecture along with its applications.	05

OR

4	CO4	L2	Explain Diffie-hellman key exchange algorithm.	05
5	CO5	L2	Define MIME and explain S/MIME functionality.	05
6	CO5	L2	Explain Encapsulating security payload.	05

## Cognitive Domains:

L1: Remember

L4: Analyse

L2: Understand

L5: Evaluate

L3: Apply

L6: Create

## Course Outcome: At the end of the course the students are able to

O4	Analyse the cause for network attacks and describe the working of various advanced security controls.
O5	Explore the attacks and controls associated with IP, transport-level, web and E-mail security.

--- End ---