

JSS MAHAVIDYAPEETHA
JSS SCIENCE AND TECHNOLOGY UNIVERSITY, MYSURU

VII Semester B E Degree Examination
POWER ELECTRONICS

Duration: 3 Hours

Max. Marks: 100

NOTE: 1) Answer all the questions in Part-A

2) Questions in Part-B have internal choice.

PART - A

Q. NO	CO	CD	QUESTION	MARKS
1	1	L-1	Define power electronics. Explain the relationship of power electronics to power, electronics and control. Also discuss its applications.	10
2	3	L-3	Design the switching circuit using power BJT with following specifications: $V_{cc}=100V$, $V_B=8V$, $V_{CE(sat)}=2.5V$, $V_{BE(sat)}=1.7V$, $R_c=10\Omega$, $\beta=10$ to 60. Calculate, i) The value of R_B that will result in saturation with ODF of 20 ii) Forced β iii) Power loss in the transistor	10
3	2	L-4	With circuit and waveforms analyze ON-OFF ACVC. Also derive an expression for RMS output voltage.	10
4	1	L-4	Explain the basic principle of step-down chopper with R load and derive the expressions for i) Average output voltage ii) Output power iii) Effective input resistance in terms of chopper duty cycle	10
5	1	L-2	Explain the performance parameters of inverters. Compare between 120° and 180° conduction modes.	10

PART - B

Q. NO	CO	CD	QUESTION	MARKS
6	1	L-2	Explain briefly different types of power converters and mention two applications of each.	10
OR				

7	1	L-2	With circuit and model explain switching characteristics of power MOSFET. List its advantages.
---	---	-----	--

8	3	L-3	Design the values of $\frac{dt}{dt}$ inductor and RC snubber components for an SCR working in a 230V system. Given $\frac{di}{dt}$ rating is 90 A/ μ s and $\frac{dv}{dt}$ rating is 200V/ μ s. Effective series resistance is 1.5Ω with the damping factor of 0.6. Discuss the importance of snubber circuit.
9	3	L-3	Design the UJT triggering circuit for SCR with given specifications: $V_{BB}=20V$, $\eta=0.6$, $I_p=10\mu A$, $V_v=2V$, $I_v=10mA$. The frequency of oscillation is 100Hz with the triggering pulse width of 50 μ s.

10	2	L-4	For a single-phase full converter having highly inductive load derive the following: i) Fourier series for supply current ii) Fundamental component of supply current iii) RMS value of supply current
11	2	L-4	Derive the expression for average value of output voltage for unidirectional AC Voltage Controller. A single-phase half wave AC Voltage Controller has a load resistance of 50Ω with the input AC supply of 230V, 50Hz. If the thyristor is triggered at $\alpha=60^\circ$, calculate i) RMS output voltage and current ii) Input power factor iii) Average and rms thyristor currents

12	2	L-4	Derive an expression for peak-to-peak value of continuous load current for RLE load of step-down chopper. A step-down chopper with RL load has $V_s=220V$, $R=5\Omega$, $L=7.5mH$, $f=1kHz$, $k=0.5$ and $E=0V$. Calculate i) Minimum and maximum load current ii) Maximum p-p load ripple current iii) Average value of load current iv) Effective input resistance
13	2	L-4	OR Derive an expression for average output voltage of step-up chopper.

14	2	L-4	<p>Derive the following for single phase full bridge inverter having square wave output:</p> <ul style="list-style-type: none"> i) RMS value of output ii) Fourier series for output voltage iii) RMS value of fundamental component of voltage <p>OR</p> <p>Derive the equations for line and phase voltage of three phase inverter for 180° conduction mode. Analyze the circuit with waveforms for the same.</p>	10
15	2	L-4		10

Course Outcome (CO): At the end of the course the students will have the ability to

- CO-1 Explain the various power devices and circuits.
- CO-2 Analyze different power electronics circuits.
- CO-3 Design power electronics circuits to meet the given specifications.
- CO-4 Design and demonstrate the working of various power electronic circuits.
- CO-5 Demonstrate the skill sets using modern tool for analysis and simulation of power electronics circuits.

Cognitive Domain (CD)	
Level	Domain
L-1	Remember
L-2	Understand
L-3	Apply
L-4	Analyze
L-5	Evaluate
L-6	Create

--- End ---

JSS MAHAVIDYAPEETHA
JSS SCIENCE AND TECHNOLOGY UNIVERSITY, MYSURU

VII Semester B E Degree Examination
AUTOMOTIVE ELECTRONICS

Duration: 3 Hours

Max. Marks: 100

- NOTE:** 1) Answer all the questions in Part-A
 2) Questions in Part-B have internal choice.

PART – A

Q. NO	CO	CD	QUESTION	MARKS
1	1	L-2	What is adaptive front lighting system (AFS)? With the help of the system frame, explicate the different components which constitute AFS.	10
2	2	L-2	Explicate the different types of addressing methods used in automotive networking. (Also, explain the two types of control mechanisms used in automotive networking with its advantages and disadvantages.)	10
3	3	L-3	Analyze the different levels of driving automation in autonomous cars. Explicate the three major sensors used in autonomous vehicle with their working and improvement factor.	10
4	4	L-3	Explicate how the inductive type sensor is used to measure the speed and rpm in the automobile. With illustration, explain the working of inductive type sensor and outline its advantages and disadvantages.	10
5	5	L-3	Analyze the power flow control in series hybrid and parallel hybrid drives. Explain the different modes with representations.	10

PART – B

Q. NO	CO	CD	QUESTION	MARKS
6	1	L-2	What is electronics ignition system? With a neat labelled diagram, explain the working of different components.	10

OR

7	1	L-2	<p>Explain the following fuel injection methods with its function, working and activation curves,</p> <p>a) Fuel injector for intake manifold injection.</p> <p>b) High pressure fuel injector for gasoline direct injection.</p>	10
8	2	L-2	<p>Explicate the hardware arrangements of basic CAN module and full CAN module. Explain how the protocol layers of CAN is implemented in these two types of hardware arrangement.</p>	10
9	2	L-2	<p>With a neat illustration of MOST frame, explain the three modes of channels supported. Further, explain the different system events and addressing types supported by MOST bus.</p>	10
10	3	L-2	<p>What is sensor? With necessary equation explain the modeling of sensor in automotive domain. How automotive sensors are classified based on their uses in vehicle? Explain each type.</p>	10
11	3	L-2	<p>What are the advantages of intelligent sensors in automotive domain? Explain the three levels of intelligent sensor integration with illustration.</p>	10
12	4	L-3	<p>How the principle of wiper potentiometer can be used in angular position sensor? Explain with illustration. Deduce the advantages, disadvantages and applications.</p>	10
13	4	L-3	<p>Explicate how the piezoelectric principle can be used to measure the yaw-rate in the vehicle? Also, illustrate the sensor construction and its working.</p>	10

14	5	L-2	What is idle speed actuator? What are the functions of it? Explain the different type of idle speed actuator configuration.	10
----	---	-----	---	----

OR

15	5	L-2	Explicate the working, benefits and applications of the following types of actuators, a) Linear Actuators b) Rotary Actuators c) Solenoid Actuators d) Diaphragm Actuator e) Piezoelectric Actuators f) Magnetic Levitation Actuators	10
----	---	-----	---	----

Course Outcome (CO): At the end of the course the students will have the ability to				
CO-1	Exhibit the knowledge of working of Sensors and actuators in electronic fuel injection, ignition systems and Active / Passive safety systems.			
CO-2	Demonstrate, a comprehension of the roles and implementations of various bus systems used in automotive networking.			
CO-3	Explain and analyze the main requirements, trends and selection criteria of sensors for automotive applications.			
CO-4	Exemplify the different measuring principles involved in sensors and evaluate for automotive applications.			
CO-5	Demonstrate the knowledge of basic principle of actuators and explain the mechanism of hybrid drives.			
CO-6	Work efficiently in a group and complete the assigned task by demonstrating skills related to documentation and oral communication.			

Cognitive Domain (CD)	
Level	Domain
L-1	Remember
L-2	Understand
L-3	Apply
L-4	Analyze
L-5	Evaluate
L-6	Create

JSS MAHAVIDYAPEETHA
JSS SCIENCE AND TECHNOLOGY UNIVERSITY, MYSURU
VII Semester BE Degree Examination
ENTREPRENEURSHIP AND MANAGEMENT

Duration: 3 Hours

Max. Marks: 100

NOTE: 1. Answer the questions taking the given choices
 2. Write diagrams appropriately

PART – A

Q.NO	CO	CD	QUESTION	MARKS
1.	CO1	L2	Consider an entrepreneur and his domain of operations, Discuss chief qualities required for being a successful Entrepreneur?	10
2.	CO2	L2	Discuss various modern entrepreneurial training and implementing schemes available, to make Entrepreneurship more attractive?	10
3.	CO2	L2	With the help of a block diagram, Explain how systems approach to management helps one to understand the complexities of managerial functions?	10
4.	CO3	L2	Discuss various legal means for protection of person's ideas?	10
5.	CO3	L3	Discuss the process in detail, How to file a patent? Explain the advantages of owning a patent?	10

PART – B

Q.NO	CO	CD	QUESTION	MARKS
6.	CO1	L2,	List various practical problems faced by MSMEs. Suggestion some solutions, how they can be solved without compromising quality of business?	10
OR				
7.	CO1	L2	Discuss the myth, "YOU NEED TO BE BORN IN A BUSINESS FAMILY TO DO BUSINESS", write at least 10-points, to disapprove the statement? Quote examples?	10

8	CO2	L2	Discuss the policies and procedure set by authorities to start new business venture, write the flow diagram	10
OR				
9.	CO2	L2	Analyze the following with respect to organization formations. a) Public b) Private and c) cooperative organizations. List their merits and demerits in Indian context.	10
10.	CO3	L2	Explain why capital budgeting is of paramount importance in financial decision making of an enterprise?	10
OR				
11.	CO3	L2	Discuss why planning is "primal" among all Managerial functions, with the help of a diagram?	10
12.	CO4	L4	Discuss salient features of project feasibility study, write a flow diagram. Give an example?	10
OR				
13.	CO4	L4	"Every technology reaches a decline phase". Analyze the reasons for such decline and suggest measures that could be helpful in such decline.	10
14.	CO4	L4	List various Business opportunities in ESDM sector. Analyze one such idea/opportunity in ESDM sector under Indian context?	10
OR				
15.	CO4	L4	Select an area in ESDM sector, Develop a business plan, to capture the opportunity created by the governments?	10

L1: Remembering L2: Understanding L3: Applying L4: Analyzing L5: Evaluating L6: Creating

Course Outcome: At the end of the course the students will have the ability to	
CO-1	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.
CO-2	Analyze the importance of technology management with respect to organizational finance, ethics, team work and project planning. Investigate techno-economic feasibility of a project
CO-3	Develop/design innovation with regard to IPR and patents in technology oriented business.
CO-4	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.

JSS MAHAVIDYAPEETHA
JSS SCIENCE AND TECHNOLOGY UNIVERSITY, MYSURU

VII Semester B E Degree Examination
EMBEDDED SYSTEMS

Duration: 3 Hours

Max. Marks: 100

NOTE: 1) Answer all the questions in Part-A

2) Questions in Part-B have internal choice.

PART - A

Q. NO	CO	CD	QUESTION	MARKS
1	1	L-2	What do you mean by embedded system? Explicate the different types of processing cores used in embedded systems.	10
2	2	L-3	Analyze, Why LoRa is used for long distance communication and is best suited for battery operated sensors and actuators in embedded systems? Explain the architecture entities of LoRaWAN.	10
3	2	L-2	What is the need for device drivers in embedded systems? Deduce the different sources of embedded device drivers.	10
4	3	L-4	Design the state machine model and sequential program model for automatic seat belt warning system. The system specifications are as follows, a) When the vehicle ignition is turned ON and the seat belt is not fastened within 10 seconds of Ignition ON, the system should generate an alarm signal for 5 seconds. b) The alarm is turned off when the alarm time expires or if the driver fastens the belt or if the ignition switch is turned OFF, which ever happens first.	10
5	4	L-3	What is deadlock in real time operating systems? Analyze the different situations which favors the deadlock and how this deadlock recovery can be done?	10

PART - B

Q. NO	CO	CD	QUESTION	MARKS
6	1	L-2	What is System on Chip (SoC)? With a block diagram expound the different functional blocks which constitute the SoC.	10

OR

7 1 L-2

Explain the six-layer architecture of IoT with a neat illustration.

8 2 L-2

How the communication between two Bluetooth devices is established? Analyze, how the different layers of protocol stack are involved in the connection establishment process.

10

9 2 L-2

Deduce the benefits of using CAN bus in embedded systems. Also, explicate the CAN frame fields with neat illustration.

10

10 2 L-2

With a neat illustration and example, explicate the following,

- Programmed input
- Programmed output
- Programmed input/output

10

11 2 L-2

How the interrupt is serviced in embedded system? Explain the Interrupt service routine with two examples.

10

12 3 L-2

What is design process model? Explicate the water fall and V cycle model used for designing embedded systems.

10

13 3 L-2

Explain assembly language-based firmware development and high-level language-based firmware development with the illustration of machine language conversion process. Brief out the advantages and disadvantages of each.

10

Consider the set of five processes whose arrival time, burst time and priority are given below-

Process ID	Arrival time	Burst time	Priority
P1	0	6	6
P2	2	3	9
P3	4	8	4
P4	5	2	8
P5	7	7	1

10

a) If the CPU scheduling policy is priority non-preemptive, calculate the average waiting time and average turnaround time.

b) If the CPU scheduling policy is priority preemptive, calculate the average waiting time and average turnaround time.

c) Which scheduling algorithm gives better results?

4

4 L-3

15 4 L-3

10

Consider the set of five processes whose arrival time and burst time are given below-

Process ID	Arrival time	Burst time
P1	3	1
P2	1	4
P3	4	2
P4	0	6
P5	2	3

- a) If the CPU scheduling policy is non-preemptive shortest job first (SJF), calculate the average waiting time and average turnaround time.
- b) If the CPU scheduling policy is preemptive shortest job first (SJF), calculate the average waiting time and average turnaround time.
- c) Which scheduling algorithm gives better results?

Course Outcome (CO): At the end of the course the students will have the ability to

CO-1	Explain the major components that constitute an embedded system.
CO-2	Analyze the basic structure of embedded systems.
CO-3	Apply contemporary techniques for Hardware-Software co-design of embedded systems for Real time applications using RTOS.
CO-4	Design real time embedded systems using the concepts of RTOS, simulate using modern software tools through group projects and give effective oral presentation with documentation.

Cognitive Domain (CD)	
Level	Domain
L-1	Remember
L-2	Understand
L-3	Apply
L-4	Analyze
L-5	Evaluate
L-6	Create

--- End ---