RV Educational Institutions
RV College of Engineering

Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi

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DEPARTMENT OF MECHANICAL ENGINEERING

Date	11th July 2023	Maximum Marks	50
Course Code	22ES24E	Duration	90 Min
Semester	II	CIE-I	

FUNDAMENTALS OF MECHANICAL ENGINEERING

Answer all the Questions.

Sl. No.	Questions	M	BT	CO
1.	Explain with schematic diagram working principle of IC engine in which burning of fuel takes place at constant pressure.	10	L2	3
2.	With a neat sketch explain Series-Parallel Hybrid electric vehicle.	10	L2	3
3	Explain with Sketches: a) Helical gears b) Elliptical gears c) Worm gears d) Rack and Pinion gears	10	L3	3
4a	Explain the concept of regenerative braking systems used in HEV	5	L1	3
4b	Compare between constant Pressure and constant Volume cycle IC engines.	5	L1	3
5	With an example, bring out the velocity ratio for simple and compound gear trains.	10	L3	3

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
Distribution	Max Marks	00	00	50	00	20	10	20	00	00	00

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Academic year 2022-2023 (C

DEPARTMENT OF MECHANICAL ENGINEERING

CIE II

ate	22nd August 2023	Maximum Marks	5
ourse Code	**22ES24E**	Duration	**90 Mi**
ourse Title	**Fundamentals of Mechanical Engineering**	Sem: II	

nswer all the Questions.

l. No.	Questions	M	BT
1. a	Highlighting the features, explain the various types of industrial automation	7	L2
b	Explain the industrial applications of Robots	3	L3
2	What are the basic configurations of an industrial robot? Explain them schematically.	10	L3
3. a	Discuss the operations involved in the sequential control of a microprocessor-based washing machine.	7	L3
b	Plot the pictorial representation of Mechatronics by defining the term "Mechatronics".	3	L2
4	Using schematic diagram explain the elements of computer numerical control systems	10	L2
5	Mention the demerits of the following energy sources. a. Nuclear Energy b. Hydropower c. Fossil fuels	10	L2

BT-Blooms Taxonomy, **CO-Course** Outcomes, M-Marks

Marks	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5
Distribution	Max Marks	00	00	10	40	00	30	20	00	00

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DEPARTMENT OF MECHANICAL ENGINEERING

Date	7th september 2023	Maximum Marks	50
Course Code	22ES24E	Duration	90 Min
Semester	II	CIE-Improvement test	

FUNDAMENTALS OF MECHANICAL ENGINEERING

Answer all the Questions.

Sl. No.	Questions	M	BT	CO
1.	Explain with schematic diagram working principle of IC engine in which burning of fuel takes place at constant volume.	10	L2	3
2.	With a neat sketch explain Parallel Hybrid electric vehicle.	10	L2	3
3	What are composite materials? Classify it and explain the applications of different types of composite materials.	10	L2	1
4a	Differentiate between Thermoplastics and thermosets	5	L2	1
4b	Bring out the classification of Engineering materials with one example in each category.	5	L2	1
5	Explain the general properties and characteristics of polymers	10	L2	1

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	30	00	20	00	00	50	00	00	00	00

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RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU)

I / II Semester B. E. Examinations Oct/Nov-2023

Common to all programs

FUNDAMENTALS OF MECHANICAL ENGINEERING (ELECTIVE)

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2 is compulsory. Answer any one full question from 3 and 4, 5 and 6, 7 and 8 & 9 and 10.

PART-A

1	1.1	Name any two thermosetting plastics.	02
	1.2	Natural rubber comes under the classification of _____ type of polymer.	01
	1.3	Give an example of 'Particulate Composite'.	01
	1.4	What is Pattern detection/Pattern recognition in computer vision of manufacturing?	02
	1.5	Temperature obtained in arc welding is about _____ ^0C.	01
	1.6	Commonly used flux in soldering is _____.	01
	1.7	Name types of Automation.	02
	1.8	Name any two types of feedback devices in *CNC* system.	01
	1.9	Polar Configuration robots are also called as _____.	01
	1.10	Compression ratio in 4-stroke petrol and diesel engines ranges from _____ and _____.	02
	1.11	*IC* engine cylinder is made up of _____ material.	01
	1.12	In electrical drives, inverter adjusts frequency and amplitude of AC with the help of _____.	01
	1.13	Mention phases of mechatronic system design process.	02
	1.14	Washing machine is a _____ type of control system.	01
	1.15	In Micro Hybrid Electrical vehicles, electric motor supplies power of _____.	01

PART-B

2	a	With a flowchart, classify and discuss engineering materials. Explain in detail, materials which are used in i) Automotive ii) Aerospace iii) Electronic systems.	08
	b	Compare between thermosetting plastics and thermoplastics.	05
	c	Classify polymers and discuss general characteristics of polymers.	03
3	a	Explain in detail the types of computer vision in manufacturing.	08
	b	What are the differences between computer vision and artificial intelligence?	05
	c	Explain industrial applications of computer vision system.	03
		OR	

4	a	With a neat diagram, explain in detail Arc welding process. Name any four applications of arc welding process.	08
	b	Explain with neat diagrams, different types of flames obtained in Oxy-Acetylene flames.	05
	c	Write brief note on welding defects.	03
5	a	Define automation. Explain in detail, types of automation with their merits and demerits.	08
	b	With a neat diagram, explain in detail, elements of *CNC* system.	08
		OR	
6	a	Explain with diagrams: i) Cylindrical configuration ii) Cartesian configuration.	08
	b	Name and explain applications of Robotic systems.	05
	c	Justify advantages and disadvantages of Robotic system in Industrial applications.	03
7	a	Explain with neat diagrams including Pressure-Volume chart, Constant pressure heat addition cycle.	08
	b	With a neat sketch, explain the working gears: i) Spur gears ii) Bevel gears iii) Rack and pinion.	08
		OR	
8	a	With neat sketches, explain working of i) Series hybrid vehicles ii) Parallel hybrid vehicles. Mention advantages and disadvantages of above mentioned vehicles.	08
	b	Compare electric engine and *IC* engine.	05
	c	Briefly discuss about characterization of Traction motors and their selection.	03
9	a	Define mechatronics. Discuss the phases of mechatronic system design process.	08
	b	With a neat sketch, explain mechatronic system of an Automatic camera system.	08
		OR	
10	a	Discuss in detail, conventional energy sources: i) Fossil fuels (Coal, Petroleum) ii) Hydro energy iii) Nuclear energy.	08
	b	Compare traditional and mechatronics design process.	05
	c	Compare renewable and non-renewable energy sources.	03