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Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi

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DEPARTMENT OF MECHANICAL ENGINEERING

Date	21st November 2023	Maximum Marks	50
Course Code	ME113AT	Duration	90 Min
Semester	I	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 Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	00	00	50	00	20	10	20	00	00	00

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DEPARTMENT OF MECHANICAL ENGINEERING

Date	28th December 2023	Maximum Marks	50
Course Code	ME113AT	Duration	90 Min
Semester	I	CIE-II	
FUNDAMENTALS OF MECHANICAL ENGINEERING			

Answer all the Questions.

Sl. No.	Questions	M	BT	CO
1	With a neat sketch explain: a. Parallel Hybrid Electric Vehicle b. Series-Parallel Hybrid electric vehicle.	**10**	**L2**	**3**
2	What is automation? Discuss the different types of automation with an example each.	**10**	**L2**	**3**
3	With a neat sketch, explain the elements of CNC machine.	**10**	**L3**	**3**
4a	Discuss the industrial applications of Robot.	**5**	**L1**	**4**
4b	Explain with a sketch the concept of Regenerative braking systems used in HEV	**5**	**L1**	**3**
5	Classify the robot based on its configuration and explain each with the necessary diagram.	**10**	**L3**	**4**

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

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	00	00	35	15	10	200	20	00	00	00

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DEPARTMENT OF MECHANICAL ENGINEERING

Date	23rd January 2024	Maximum Marks	50
Course Code	ME113AT	Duration	90 Min
Semester	I	IMPROVEMENT CIE	
FUNDAMENTALS OF MECHANICAL ENGINEERING			

Answer all the Questions.

Sl. No.	Questions	M	BT	CO
1	With a neat sketch explain: a. Parallel Hybrid Electric Vehicle b. Series-Parallel Hybrid electric vehicle.	10	3	3
2	Explain with schematic diagram working principle of IC engine in which burning of fuel takes place at constant volume	10	4	3
3	Explain with Sketches: a. Bevel gears b. Worm gears c. Rack and Pinion gears d. Helical gear	10	3	3
4 a	Discuss the operations involved in the sequential control of a microprocessor-based washing machine.	7	4	4
4 b	Plot the graphical representation of Mechatronics by defining the term "Mechatronics".	3	2	4
5 a	Mention the drawback of the following energy sources related to their applications. a. Nuclear Energy b. Hydropower c. Fossil fuels	6	2	3
5 b	Explain the various stages in mechatronics system.	4	2	4

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

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	00	00	36	14	00	13	20	17	00	00

RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU)

I/II Semester B. E. Regular / Supplementary Examinations Feb-2024

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	_____ type of plastics cannot be recycled.	01
	1.2	Graphite is the example of _____ type of Engineering material.	01
	1.3	In _____ type of control system, feedback is absent.	01
	1.4	What are the phases of Mechatronic system design process?	02
	1.5	Constant pressure cycle engines are also called _____ type of *IC* engine.	01
	1.6	Cylinder of *IC* engine is made of _____ material.	01
	1.7	Thermal efficiency of petrol engine is _____ than diesel engine.	01
	1.8	What is regenerative braking system? Write its importance.	02
	1.9	In _____ type of automation in which sequence of processing or assembly of operation to be carried out is fixed by equipment configuration.	01
	1.10	_____ is the importance of *USB* in *CNC* system.	01
	1.11	Polar configuration of robot is also called _____ configuration.	01
	1.12	List out the type of computer vision in manufacturing.	02
	1.13	In _____ type of welding, the metal pieces are heated to a plastic state & then joined together.	01
	1.14	The temperature of soldering varies from _____ to _____.	01
	1.15	Define composite materials.	01
	1.16	Which are the different types of flames used in gas welding process?	02

PART-B

2	a	Define composite materials, give the complete classifications of composite materials and explain the applications of composite materials of each type.	10
	b	Differentiate between thermoplastics and thermosets.	06
3	a	Compare computer vision and artificial intelligence in manufacturing.	08
	b	With necessary diagram, explain the working principle of gas welding process.	08
		OR	
4	a	Explain the importance of human vision in computer interaction in manufacturing process.	08

	b	Explain any four defects which are occurred during welding process.	04
	c	List out the types of flames in gas welding and explain with neat diagram.	04
5	a	Highlighting the features, explain the various types of industrial automation with an example for each.	08
	b	Using schematic diagram, explain the various elements of computer numerical control systems.	08
		OR	
6	a	With a neat diagram, explain the anatomy of the robot.	08
	b	Explain the industrial applications of robots.	08
7	a	Explain with schematic diagram, and *PV* graph, working of $4-stroke$ otto cycle engine.	10
	b	Explain the concept of regenerative braking system used in *HEV*.	06
		OR	
8	a	With an example, bring out the velocity ratio for simple & compound gear trains.	08
	b	Explain with sketches: i) Helical gears ii) Bevel gears iii) Worm gears iv) Rack & Pinion gears	08
9	a	Discuss the operations involved in the sequential control of microcontroller based Engine Management System (*EMS*).	10
	b	Compare traditional design approach with mechatronics system.	06
		OR	
10	a	With schematic diagram, explain the various key elements of mechatronic system.	08
	b	In detail, explain the major causes for ozone depletion.	08