ESC134

RAMAIAH
Institute of Technology

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(Autonomous Institute, Affiliated to VTU)
(Approved by AICTE, New Delhi & Govt. of Karnataka)
Accredited by NBA & NAAC with 'A+' Grade

SEMESTER END EXAMINATIONS – MAY 2023

Program	:	**B.E :- Common to all Programs**	**Semester**	:	**1**
Course Name	:	**Introduction to Mechanical Engineering**	**Max. Marks**	:	**100**
Course Code	:	**ESC134**	**Duration**	:	**3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.
- Use of thermodynamic data hand book, steam tables is permitted.

UNIT - I

1.	a)	Explain the role of mechanical engineers in the field of automobile and aerospace.	CO1	(10)
	b)	Explain the formation of steam at constant pressure with neat sketches.	CO1	(10)
2.	a)	Illustrate the working of nuclear power plant with a neat diagram. Also mention the reactions taking place in the process.	CO1	(10)
	b)	Describe how mechanical engineering plays important role in the emerging technologies in the energy and marine sector.	CO1	(10)

UNIT - II

3.	a)	Explain the following lathe operations with relevant sketches: i) Step turning ii) Thread cutting iii) Facing.	CO2	(06)
	b)	What are the different operations that can be performed on drilling machine? Explain any three operation with a neat sketch.	CO2	(08)
	c)	Classify the different types of milling machines and explain Plane milling and end milling operations with a sketch.	CO2	(06)
4.	a)	Explain the components of CNC and highlight its advantages.	CO2	(08)
	b)	What is 3D printing? and what are its advantages?	CO2	(04)
	c)	Explain with a sketch, the principle of working of Fused deposition modeling method of additive manufacturing.	CO2	(08)

UNIT - III

5.	a)	Explain with a sketch, the working of 4 stroke diesel engine. Also mention few applications of IC engines.	CO3	(10)
	b)	The following data is collected from a four stroke, single cylinder oil engine. Bore 200 mm, stroke 280 mm, speed 300 rpm, indicated mean effective pressure 5.6 bar, torque on the brake drum 250 N-m, oil consumed 4.2 kg/hr, calorific value of fuel used 41000 KJ/kg. Determine the mechanical efficiency, indicated thermal efficiency and brake thermal efficiency.	CO3	(10)
6.	a)	What is refrigeration? List the different refrigerants used in practice and highlight the applications of refrigeration.	CO3	(08)
	b)	Differentiate between Refrigeration and air conditioning.	CO3	(04)
	c)	Explain with a neat sketch, the working principle of a Room air conditioner.	CO3	(08)

UNIT- IV

7.	a)	Derive expression for length of belt for an open belt drive.	CO4	(12)
	b)	Explain TIG welding with a neat sketch.	CO4	(08)

8.	a)	Derive expression for ratio of tensions in a flat belt drive.	CO4	(10)
	b)	Explain electric arc welding with a neat sketch.	CO4	(10)

UNIT - V

9.	a)	With a neat sketch, explain different components of electric vehicle.	CO5	(10)
	b)	State the advantages and disadvantages of hybrid vehicles.	CO5	(06)
	c)	Define a robot and work volume of a robot.	CO5	(04)
10.	a)	Explain the following: i) Robot anatomy ii) Robot sensors.	CO5	(10)
	b)	State the applications of industrial robots.	CO5	(06)
	c)	What is collaborative robot? Explain briefly.	CO5	(04)

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