RAMAIAH
Institute of Technology

ESC134/ESC234

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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 AND BACKLOG SUBJECT EXAMINATIONS - SEPTEMBER / OCTOBER 2023

Program	: **B.E. – Common to all Programs**	**Semester**	: **I / II**
Course Name	: **Introduction to Mechanical Engineering**	**Max. Marks**	: **100**
Course Code	: **ESC134 / ESC234**	**Duration**	: **3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.
- Use of steam tables is permitted.

UNIT - I

1.	a)	Briefly explain the emerging trends and technological advancements in Aerospace and Automotive industries.	CO1	(10)
	b)	Find the enthalpy of one kg of steam at 12 bar when i) Steam at 22% wet ii) Steam is dry saturated iii) Superheated to 250 °C, Assume specific heat of super-heated steam as 2.25 kJ/kg. Properties of steam at 12 bar, ts=188 °C, hf= 798.43 kJ/kg and hfg=1984.3 kJ/kg.	CO1	(10)
2.	a)	Describe the construction & working of wind power plant with a schematic diagram.	CO1	(10)
	b)	Explain the utilization of solar energy using flat plate collector with a schematic diagram.	CO1	(10)

UNIT - II

3.	a)	With a neat sketch, explain thread cutting performed on lathe.	CO2	(08)
	b)	Explain the following operations with neat sketches: i) Counter sinking ii) End milling iii) Slot milling.	CO2	(12)
4.	a)	What is taper turning? With a neat sketch explain taper turning by swiveling the compound rest.	CO2	(08)
	b)	With a block diagram, explain the working of CNC machine.	CO2	(08)
	c)	State the applications of CNC machines.	CO2	(04)

UNIT - III

5.	a)	Explain the working of a four stroke Petrol engine with a sketch.	CO3	(10)
	b)	What are parameters to be observed in Performance of IC Engine, give its applications.	CO3	(10)
6.	a)	What do you mean by C.I Engine? Explain its working.	CO3	(10)
	b)	Explain the concept of Refrigeration, List different refrigerants, and desired properties.	CO3	(10)

UNIT- IV

7.	a)	Explain the different types of Flames obtained in oxy-acetylene Gas welding with their importance.	CO4	(06)
	b)	Sketch and explain the following gear drives. i) Reverted gear Train ii) Rack and Pinion drive.	CO4	(06)

	c)	In a cross belt drive the difference in tension between tight side and slack side of the belt is 1000N. find the tension on slack slide and tight side, if the angle of contact is 160^0.	CO4	(08)
8.	a)	Derive an expression for Length of belt for open belt drive.	CO4	(08)
	b)	A compound gear train consists of 4 gears, A, B, C and D and they have 20,30,40 and 60 teeth respectively. A is keyed to the driving shaft and D is keyed to the driven shaft B and C are compound gears, B meshes with A and C meshes with D. if A rotates at 180 rpm, find the rpm of D.	CO4	(08)
	c)	Give the comparison between welding and soldering.	CO4	(04)

UNIT - V

9.	a)	With help of block diagram , Explain the various components of Electric and Hybrid Vehicles	CO5	(08)
	b)	Write a note on Industrial collaborative robots.	CO5	(04)
	c)	Explain with neat sketch of a Robot Anatomy.	CO5	(08)
10.	a)	With neat sketch explain various joint configuration of a Robot .	CO5	(08)
	b)	Distinguish between Electric Vehicles and Hybrid Vehicles mention their advantages and disadvantages.	CO5	(08)
	c)	Write a note on Robot sensors.	CO5	(04)

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