Code No. : 3261

FACULTY OF ENGINEERING

B.E. 2/4 (E & EE/ECE) I Semester (Main) Examination, December 2010 ELEMENTS OF MECHANICAL ENGINEERING

Time: 3 Hours]

[Max. Marks: 75

Note: Answer all questions from Part – A. Answer any five questions from Part – B.

PART - A

(25 Marks)

- 1. Give the classification of thermodynamic systems with examples.
- 2. Compare two stroke and four stroke engines.
- 3. What is Newton's law of cooling?
- 4. Give the classification of heat exchangers.
- 5. Define C.O.P and give the units of refrigeration.
- 6. Explain ammonia-water absorption refrigeration system.
- 7. What are the different types of gas flames in gas welding?
- 8. What do you mean by wire drawing process?
- 9. What is a compound belt drive?
- 10. What do you mean by reverted gear trains?

PART - R

 $(5\times10=50 \text{ Marks})$

- 11. a) Define enthalpy. Compare it with internal energy.
 - b) 30 liters of air expands from an initial pressure of 8 bar and temperature 850° C to a pressure of 1 bar and temperature 200° C. Using reference temperature 0° C, find the change in internal energy, enthalpy and index of expansion during the process. Assume $C_p = 1.005$ and $C_v = 0.718$ kJ/kg K.
- 12. a) State the Fouriers law of heat conduction.

 Calculate the rate of heat loss for a red brick wall of length 5 m, height 4 m and thickness 0.25 m. The temperature of the inner surface is 110° C and that of the outer surface is 40° C. The thermal conductivity of red brick, k = 0.70 W/mK. Calculate also the temperature at an interior point of the wall, 20 cm distance from the inner wall.
 - b) Derive an expression for the LMTD of a parallel flow heat exchanger.

(This paper contains 2 pages)

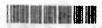
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Р.Т.О.

(2+4)

4

6



1

13.	a)	With the help of a block diagram, explain the working of simple vapour compression refrigeration system. Show the cycle on T-S and				
	L	P-H diagrams.		c. 2/4 (E & EE/ECE) I Semest	La 7	
	D)	What is heating and humidificati psychrometric chart.	on pro	ocess? Represent it on a	2	
		psychiometric chart.			omf.	
14.	a)	Explain the principle of arc welding for electric arc welding.	ing?(Give the list of equipment required	A 4	
	b)	Explain the principles of the following machining processes				
		a) turning b) drilling		c) shaping	- 6	
15.	a)	Explain the four bar chain mecha	nism v	with suitable sketches.	5	
		Derive an expression for the leng			5	
16						
10.		Draw the value timing diagram of			. 3	
	U)	A single cylinder, 4 stroke cycle l results were obtained.		gine was tested and following		
		Mean height of indicator diagram	1 =	21 mm		
		Indicator spring number		27 kN/m2/mm		
		Swept volume of cylinder	=	14 Liters		
		Speed of engine	=	396 rpm		
		Effective brake load		77 kg		
		Effective brake radius		700 mm vd atsom nov ob 1sd V		
		Fuel consumption	=	0.002 kg/sec		
		Calorific value of fuel	=	44000 kJ/kg		
		Determine a) indicated power b) d) indicated thermal efficiency e)	brake brake	power c) mechanical efficiency thermal efficiency.	7	
17.	W	rite short notes on any four of the	e follo	wing:	10	
	a)	Clausius inequality		expansion this ne the process.		
	b)	Critical radius of insulation		a. State the Fouriers law of heat		
	c)	Thermoelectric refrigeration		Calculate the rate of heat loss		
	d)	Forming process	II-m	height-4 m and thickness () 25		
	e)	Condition for maximum power transmission of flat belt drive.				
		Allow ranne of known sone		interior point of the wall, 20 o		