V- SEM MECH/ELECT.& MECH./DME /MECH(MAINT)/MECH(PROD)/2019(W)

EMT-504/MET-503 APPLIED THERMODYNAMICS

Full Marks: 80 Time : 3 Hours

Answer any FIVE Questions including Q No. 1& 2

Figures in the right hand margin indicates marks

(Refrigeration tables, steam tables and charts are allowed).

1	**Answer ALL the questions.** (a) Define specific fuel consumption. (b) Define Air fuel ratio. (c) What is the function of a compressor and write uses of compressed air. (d) Explain free air delivered and volumetric efficiency of reciprocating compressor. (e) Define tonne of refrigeration. (f) Define humidity and relative humidity. (g) What do you mean by enthalpy of moist air. (h)Define dry air and moist air. (i) Define Psychrometry. (j) What is the function of air filter.	2x10
2	**Answer any six.** (a) The following results refer to a test on a petrol engine: Indicated power =30kw. Brake power = 26kw Engine speed = 1000rpm Bsfc = 0.35kg/kwh CVof fuel used = 43900kj/kg. Calculate a) Indicated thermal efficiency b) Break thermal efficiency C) Mechanical efficiency. (b) Derive work done by a single stage reciprocating air compressor without clearance volume. (c) Explain with a neat sketch different components of vapour compression refrigeration system. (d) Explain Sling Psychrometer. http://www.sctevtonline.com (e) Define human comfort. Explain the factors affecting human body. (f) Differentiate between humidification and dehumidification. (g) Explain the difference between vapour absorption and vapour compression system.	5x6
3	The following data and results refer to a test on a single cylinder ,two stroke cycle engine, indicated mean effective pressure =550kpa, cylinder diameter = 21cm, piston stroke= 28cm,engine speed=360 rpm,brake torque=628Nm, fuel consumption=8.16kg/hr,calorific value of fuel=42700kj/kg. Calculate: (a) Mechanical efficiency,(b) the indicated thermal efficiency ,(c) the brake thermal efficiency, (d) brake specific fuel consumption in kg/kwh.	10
4	A single cylinder, double acting reciprocating air compressor receives air at 1 bar ,17^{0}c ,compresses it to 6bar according to the law $PV^{1.25}$ =Constant. The cylinder diameter is 300mm.The average piston speed is 150m/min at 100rpm.Calculate the power required in kw for driving the compressor.	10

	Neglect clearance.	
5	What do you mean by refrigerants? Classify different types of refrigerants and explain their properties.	10
6	What is a psychrometric chart? Describe different psychrometric process.	10
7	Explain air conditioning system. Describe with a neat sketch winter air conditioning system.	10