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DIPLOMA IN MECHANICAL ENGINEERING (DME) Term-End Examination December, 2019 BME-032 : REFRIGERATION AND AIR CONDITIONING

Time : 2 Hours			Maximum Marks : 70			
Note	: Answer	five	questions	in	all.	Question
•	number	1 is	compulsory	. U	se of	scientific
	calculator is permitted. Assume missing data					
	sui tabl y.	Use	of refrigera	tion	char	r ts, t ables
	and psychrometric charts is permitted.					

- 1. Select the correct answer from the given four alternatives for the following questions $:7 \times 2=14$
 - (a) One ton of refrigeration is equal to the refrigeration effect corresponding to melting of 1000 kg of ice :
 - (i) in 1 hour
 - (ii) in 1 minute
 - (iii) in 24 hours
 - (iv) in 12 hours

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- (b) The moisture in a refrigerant is removed by:
 - (i) evaporator
 - (ii) safety relief valve
 - (iii) dehumidifier
 - (iv) driers
- (c) In a refrigeration process, the flow of refrigerant is controlled by :
 - (i) compressor
 - (ii) condenser
 - (iii) evaporator
 - (iv) expansion valve
- (d) Freon group of refrigerants are :
 - (i) Inflammable
 - (ii) Toxic
 - (iii) Inflammable and toxic
 - (iv) Non-toxic and non-inflammable
- (e) Dew point temperature is always an indication of :
 - (i) dryness of air
 - (ii) latent heat
 - (iii) moisture content of the air
 - (iv) coolness of air

- (f) During sensible cooling process, wet bulb temperature :
 - (i) remains same
 - (iii) decreases

(iii) increases

(iv) unpredictable

- (g) Air is dehumidified by :
 - (i) heating
 - (ii) cooling
 - (iii) injecting water
 - (iv) injecting steam
- 2. (a) Draw a simple vapour compression system and explain its working. 7
 - (b) Define sub-cooling. Discuss the effect of sub-cooling on compressor work, refrigerating effect and C. O. P. 7
- 3. (a) What do you understand by dry bulb temperature and wet bulb temperature ?
 Define dew point temperature.
 - (b) Explain the concept of defrosting. How is defrosting achieved in a domestic refrigerator? 7

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- 4. (a) Name the various types of compressors used in Refrigeration and Air conditioning. Describe any *one* type of compressor. 7
 - (b) Describe the functioning of air-cooled condensers. 7
- 5. (a) How would you determine the refrigeration load in freezers ? Name all sources from which heat can leak inside a freezer.
 - (b) Differentiate between primary and secondary refrigerants. 7
- 6. A Carnot refrigeration system absorbs heat at 260 K and rejects heat at 290 K. 14
 - (a) Calculate the coefficient of performance of this system.
 - (b) If the cycle is absorbing 1140 kJ/min. at 260 K, how much kJ of work will be required per second ?
 - (c) If the Carnot heat pump operates between the same temperatures as the above refrigeration system, what will be C. O. P. ?
 - (d) How many kJ/min. will the heat pump deliver at 290 K if it absorbs 1140 kJ/min. at 260 K?

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