KUMARAGURU college of technology
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Register Number:……..…

M.E DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2014)

Second Semester

ENERGY ENGINEERING

P14EETE33: Energy Conservation in Buildings and HVAC

(Use of Approved Psychrometric chart is permitted)

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Consider the following parts in an air conditioning system [K_2]

   1. Circulation fan 2. Air conditioning unit 3.Supply duct 4.Supply outlets 5. Return outlets 6.Filters

   The correct sequence of the components of Air conditioning

   a) 2-3-4-5-6-1 b) 1-2-3-4-5-6

   c) 6-5-4-3-2-1 d) 3-2-1-6-5-4

2. In comfort chart during summer air conditioning, the chart indicates that the effective temperature of people is---------- [K_1]

   a) 20ºC b) 18ºC

   b) 19ºC d) 21.6ºC

3. The minimum temperature to which moist air can be cooled under ideal conditions in a spray washer is---------- [K_1]

   a) Dew point temperature of inlet air b) Wet bulb temperature of inlet air

   c) Water inlet temperature d) Water outlet temperature

4. Matching type item with multiple choice code [K_2]

List I	List II
A. Heat production from healthy man	i. 40%
B.RH of summer air conditioning	ii. 0.7
C.RH of winter air conditioning	iii. 60%
D.SHF for cinema hall	iv. 60

	A	B	C	D
a)	iv	i	ii	iii
b)	iv	i	iii	ii
c)	iv	ii	i	iii
d)	iv	ii	iii	i

5. Assertion (A): Reflector lamps are used for floodlighting, spotlighting and downlighting [K_3]
Reason (R): Designed to spread light over specific areas

a) Both A and R are individually true and R is correct explanation of A
b) Both A and R are individually true and R is not correct explanation of A
c) A is true but R is false
d) A is false but R is true

6. The angle subtended by the partial surface area of a sphere at its centre is called---------- [K_1]

a) Plane angle
b) Solid angle
c) Candle porus
d) Glare angle

7. Compact fluorescent type bulb can save up to---------- of energy [K_1]

a) 70%
b) 75%
c) 73%
d) 78%

8. An air conditioning is handling 30m^3 of air per minute at 32ºC DBT and 22ºC WBT.If the final conditions of air are at 22ºC DBT and 50% RH.Calculate the heating capacity of the dehumidifier. [K_4]

a) 8 kg/h
b) 6 kg/h
c) 7.3 kg/h
d) 5 kg/h

9. The alignment circle is marked on the psychrometric chart [K_1]

a) 20ºC DBT and 50% RH
b) 26ºC DBT and 50%RH
c) 20ºC DBT and 60 % RH
d) 26ºC DBT and 60% RH

10. Consider the following statements [K_3]

1.In sensible heating the air is heated, without change in its dry bulb temperature

2. In sensible heating the air is heated,with change in its dry bulb temperature

3. Specific humidity during the sensible heating varies

4. Sensible heating of moist air can be done to any desired temperature.

Which of these statements are correct?

a) 1,3
b) 1,4
c) 1,2
d) 2,3

PART B (10 x 2 = 20 Marks)

11.	List the thermal properties and energy content of building materials	[K_1]
12.	Name few packages for carrying out thermal design of buildings	[K_1]
13.	Define equivalent temperature difference	[K_1]
14.	Identify the factors affecting comfort air conditioning	[K_1]
15.	Differentiate DBT and WBT	[K_2]
16.	Define Illumination	[K_2]
17.	List out the requirements of a good lighting system	[K_1]
18.	Differentiate fans and blowers	[K_2]
19.	Define energy targeting	[K_1]
20.	Define visual perception	[K_1]

PART C (6 x 5 = 30 Marks)

21.	The air enters a duct at 10ºC and 80% RH at the rate of 150m^3/min and is heated to 30ºC without adding or removing moisture. The pressure remains constant at 1 atmosphere. Determine the relative humidity of air at exit from the duct and the rate of heat transfer	[K_4]
22.	Discuss briefly the different types of heat loads acting in a restaurant for designing summer air conditioning	[K_2]
23.	Explain in detail about energy efficient lighting system	[K_2]
24.	Explain in detail how building energy performance is evaluated	[K_2]
25.	Outline the aesthetics of lighting system	[K_2]
26.	List the measures for efficient pumping system operation	[K_1]

PART D (4 x 10 = 40 Marks)

27.	Following data refers to an air conditioning system to be designed for an Industrial process: Outside conditions = 30ºC, 75% RH Required conditions = 20ºC, 60% RH The required conditions are achieved by cooling and dehumidification .If 20 m^3 of air is absorbed by the plant every minute, Determine 1.Capacity of the cooling coil in tones 2.Amount of water vapour removed per hour	[K_4]
28.	Discuss in detail about the design of daylighting system and parameters that influence it.	(K_2)

.29. Explain parameters affecting ventilation and air quality and also give the requirements of air conditioning. [K_2]

30. Explain the importance of energy audit for buildings and energy management options in commercial buildings. ($K_{2)}$

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