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Name:

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: CE365

Course Name: FUNCTIONAL DESIGN OF BUILDINGS (CE)

Max. Marks: 100

Duration: 3 Hours

(4)

PART A

Answer any two full questions, each carries 15 marks.

- 1 a) What is the meaning of sound level measurements in dBA?
 - b) List the various types of sound absorption materials and fixings. (5)
 - c) Let S1 and S2 be two sound sources within a room having sound power level 40 (6) dB and 50 dB respectively. Point A within the room is at 2m distance from both the sources. Calculate the sound intensity level at point A.



2	a)	List any five harmful effects of noise on human.	(5)
	b)	Differentiate the behaviour of sound in free field and reverberant field.	(5)
	c)	A 1m by 2.1m louvered door which has a TL of 10 Db is located in one wall of a	(5)
		conference room. The 5.5m x 2.4 m wall has a TL of 45 Db. Find the composite	
		TL for this wall construction.	
3	a)	Elaborate on any five acoustical defects	(5)
	b)	Find the reverberation time for a hall of 12m x 9m x 6m having average	(5)
		absorption coefficient 0.15. Also, how much area we should treat with a material	
		having absorption coefficient 0.20 to reduce its reverberation time to 1.2s.	
	c)	List and elaborate on basic steps involved in acoustical design of an auditorium	(5)
		PART B	
		Answer any two full questions, each carries 15 marks.	
4	a)	Define luminous flux, luminous intensity, illuminance and luminance	(5)
	b)	What are the different types of luminares? What is their flux distribution	(5)
		characteristics?	
	c)	Define daylight factor and determine the required indoor lux level of a room if	(5)
		the recommended Daylight factor is 1.2%	
5	a)	What is ambient lighting and task lighting?	(5)
	b)	Define the different components of daylight factor	(5)

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	c)	What are the types of Lux grids used for design of side lit windows? Discuss their suitability.	(5)
6	a)	Illustrate a method for determining the SC of Davlight factor.	(5)
0	b)	Determine the number and arrangement of twin lamp luminaires for a 5m x 3m x 3m room, for providing 150 lux on the work plane 0.75m above the floor. It is proposed to mount the luminaires at a height of 2.25m above the floor. Given, coefficient of utilization of a 2440 lumen lamp as 0.30 and the maintenance factor as 0.70.	(5)
	c)	What are polar distribution curves? What is its use?	(5)
		PART C	
		Answer any two full questions, each carries 20 marks.	
7	a)	What is a bioclimatic chart? What is its application?	(5)
	b)	What is Corrected Effective Temperature? What is its modification over ET?	(5)
	c)	What are the three modes of heat transmission? Give the basic equations introducing the parameters involved.	(5)
	d)	Determine the solar radiation incident on a vertical surface, given the following angles ; solar altitude angle = 50° , wall azimuth angle = 0° , solar azimuth angle = 30° and direct solar radiation of 2800 W/m ²	(5)
8	a)	What is a solar chart? What are its applications?	(5)
	b)	Differentiate thermal conductivity and thermal conductance	(5)
	c)	Using a diagram, illustrate the solar azimuth – altitude coordinate system used to locate suns position by an observer on earth	(5)
	d)	U value for 19 cm thick plain brick wall is estimated to be 2.371 W/m ² °C. What would be the change in its U value if the wall is plastered on both sides by 1 cm thick plaster of k value 0.721 W/m°C. Assume inside and outside surface conductance values as 8 W/m ² °C and 16 W/m ² °C respectively.	(5)
9	a)	What are equinoxes? Illustrate with a sketch.	(5)
-	b)	Define time lag and decrement factor. Illustrate with a sketch. Comment on the indoor temperature range within a room having wall thermal properties of 6 hrs time lag and 0.5 decrement factor located in a place with a daily temperature change between 32 to 42°C.	(5)
	c)	Define sol air temperature. Give the concerned equation and introduce the parameters involved.	(5)
	d)	Differentiate passive and active methods for thermal comfort in buildings	(5)