Reg. No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CE365

Course Name: FUNCTIONAL DESIGN OF BUILDINGS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks. Marks

1 a) How do you relate sound intensity in W/m^2 to sound intensity in dB? Explain the difference between dB and dBA. (5)

b) Write briefly about the audibility range of human beings. (5)

c) TL value of a $16m^2$ solid wall is 45 dB. If a hole of 5 cm diameter is drilled through it, find the reduction in TL value. (5)

2 a) What is reverberation time? Discuss how it affects the acoustical performance of a room. (4)

b) Discuss any five common acoustical defects seen in an auditorium. (5)

c) A lecture hall of 15mX9mX4m is designed to accommodate 120 people. There are two doors of 3 sq. m, 4 windows of 2 sq. m each. Absorption coefficients of ceiling and walls are 0.04 and that of the floor is 0.02. Absorption of 1 person is 0.46 (including that of the seat) and that of a vacant seat is 0.10. Find out the reverberation time (use Sabine's formula). How good the hall will acoustically be? (6)

3 a) What is noise? What are the impacts of excessive noise on human? Explain the standard measures followed for reduction and control of different categories of noises. (7)

b) Explain the acoustical considerations to be made in an Industrial/Factory building. (4)

c) What are the categories of sound absorption materials? Briefly mention their relative merits and demerits. (4)

PART B

Answer any two full questions, each carries 15 marks.

4 a) What are the purposes and primary aims of lighting? (3)

b) What is day-light factor? What are its components, explain. (6)

c) Explain the BIS method of determining the sky component on a horizontal plane at a point inside the room from a given window. (6)

5 a) What are the advantages and disadvantages of skylights? (4)

b) Distinguish between luminous intensity, luminous flux and illumination (Use (6)

neat sketches). Also indicate the SI units of these quantities.

c) Explain the concepts of colour temperature and colour rendering index in detail. (5)

6 a) What are polar distribution curves? Explain the same with the help of a neat sketch. (5)

b) Illustrate the lumen method with a typical design for a hall of 24 m X 10 m X 3.6 m. Assume the working plane height to be 0.80 m and the luminaire mounting height to be 2.8 m. Let the required illumination be 300 lux in the working plane. The luminaire may assume to be consisting of two florescent lamps of 1500 lumen output each. Take MF=0.75, UF=0.60 and SHR=1.5 (6)

c) Write a brief note on flood lighting. (4)

PART C

Answer any two full questions, each carries 20 marks.

7 a) What are the factors affecting thermal comfort? Explain the significance of thermal comfort indices. (6)

b) Explain how the ET-CET charts are useful in assessing the thermal comfort conditions (6)

c) Which are the four days in a calendar year, so important in the context of the apparent movement of the Sun with respect to the Earth? (4)

d) What you understand by the following 1) Solar constant 2) Solar azimuth 3) Solar Altitude (4)

8 a) What is a solar path diagram? Draw a rough sketch of a solar path diagram applicable to the Kerala region. Explain its uses. (5)

b) What do you understand by the term sol-air temperature? Explain with the help of a numerical example. (5)

c) Explain the various modes of heat transfer between a building and the environment (10)

9 a) Explain the considerations to be made in achieving thermal comfort in hot & dry and Warm & humid regions. (8)

b) What are the different thermal insulating materials used to maintain comfortable conditions inside a building? Explain the different methods of thermal insulation. (7)

c) Explain the concepts of Green buildings. (5)

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