

Reg.No. _____



Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : 14EE3054
Sub. Name : Passive Solar Architecture

Semester : 2016-17 ODD
Duration : 3hrs
Max. marks : 100

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	A building has 1,800 m ² of exterior wall area which is constructed with concrete blocks, 200 mm thick with an R value of 0.395 m ² °C /W. A retrofit is being planned to reduce the heat flow through the wall by installing a layer of fibre glass insulation, 38 mm thick with a R value of 0.795, on the outside surface of the wall, and then covering the insulation with metal cladding. Determine the reduction in heat flow through the wall when the outdoor temperature is -5°C and the indoor temperature is 21°C.	CO2	10
	b.	Outline the main elements of passive solar home design with a neat diagram	CO2	10
(OR)				
2.	a.	How will you choose a site with good solar exposure? Draw a diagram which shows the bearing angle and altitude angle of sun and also draw a flow chart to get better solar energy performance in passive design	CO1	20
3.	a.	Define daylight factor and Solar heat Gain Coefficient	CO2	5
	b.	Discuss about the orientation of a passively conditioned solar home for ideal solar gain with suitable diagrams.	CO1	10
	c.	Determine the length of the overhang projection for a window with 6 feet height and F factor of 2.7.	CO2	5
(OR)				
4.	a.	Sequence the principles of passive solar heating and cooling	CO1	15
	b.	Distinguish active and passive solar design.	CO2	5
5.	a.	Define Time lag and decrement factor.	CO2	5
	b.	Write notes on 1. Trombe Wall and 2. Landscapping	CO2 CO1	15
(OR)				
6.	a.	Draw a line graph which shows the daily temperature fluctuations for different construction methods.	CO2	5
	b.	Summarize the Energy management opportunities for the building envelope to reduce heat losses of the three types: a) conduction b) convection and c) radiation.	CO2	15
7.	a.	Why engineers use natural light in building and passive home designs? Illustrate day lighting techniques used in various types of architecture, such as windows, solar tubes, light shelves, clerestory windows and skylights	CO2	15
	b.	Discuss about the computer packages available for carrying out thermal design of buildings	CO2	5
(OR)				

8.	a.	Recommend the most effective design to passively cool a building,	CO2	10
	b.	Outline the passive design strategies appropriate for Cold and Temperate Climatic zones of India.	CO3	10
<u>Compulsory:</u>				
9.	a.	Write a simple but effective strategy for minimizing the energy cost of air conditioning system.	CO2	5
	b.	State the Rule of thumb for achieving best solar gain in the following passive solar design techniques: 1. Direct gain system 2. Indirect gain system 3. Isolated gain system	CO2	15

ALL THE BEST