Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**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**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14EE3054** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Passive Solar Architecture** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | A building has 1,800 m2 of exterior wall area which is constructed with concrete blocks, 200 mm thick with an R value of 0.395 m2 oC /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 -5oC and the indoor temperature is 21oC. | CO2 | 10 |
| b. | Outline the main elements of passive solar home design with a neat diagram. | CO2 | 10 |
| (OR) | | | | |
| 2. |  | 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 |
|  | | **Compulsory:** |  |  |
| 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