

University of Salahaddin-Hawler
College of Engineering
Department of Architecture
Class: Second Year Students

Question Bank
Example
Subject: Building Physic
Lecturer: Karzan Abdulla

- 1) What are the factors affecting the climate?
- 2) What are the components of indoor climate?
- 3) What is the Ideal room temperature for these rooms?
- 4) What are heat transfer types?
- 5) What is energy?
- 6) What are the main characteristics of the building to save energy?
- 7) What are the New Energy House Types?
- 8) What is Thermal Comfort?
- 9) Write in detail regarding the Three Magnet Theory of Ebenezer Howard. Illustrate with sketches and write your opinion on how this theory is evident in Indian cities and towns.
- 10) What are the various Green Building Rating Systems used commonly in India? Write briefly about each. Make a comment on how Green Buildings are helping sustainable city development.
- 11) Write briefly your opinions and thoughts on Urban Sprawl versus Compact City with reference to Sustainability in planning.
- 12) Write Short Notes on following :
 - a) Carrying Capacity.
 - b) Advocacy planning.

- c) Rational comprehensive planning theory.
 - d) Local Agenda 21.
 - e) Sustainability in transportation.
- 13) Write your thoughts and opinions on the Maharashtra State Housing Policy. What do you feel are the impact of this policy on the Housing sector in the state?
- 14) Discuss in brief the efforts taken by the government to address the issue of growing slums in cities. Express your opinion on slum rehabilitation, resale of the compensated house by the slum dwellers and TDR generation and other tools developed under the SRA.
- 15) Express your opinion about the housing development in pune. Express your thoughts on the Eco Housing Scheme of Pune Municipal Corporation.
- 16) Write short notes on following:
- a) Cooperative Housing.
 - b) Creating slum free cities.
 - c) HUDCO.
 - d) Rural Housing.
- 17) Give a list of biomes and describe any one of them in detail with respect to distribution, soil, climate rainfall.
- 18) Explain with diagrams, use of any one of landscape design elements in modifying the microclimate.
- 19) Describe soil formation process in detail.
- 20) What is continental drift theory? Explain various evidences supporting the drifting of the continents.

- 21) Explain the following terms:
- Porosity.
 - Permeability.
 - Water - table.
 - Types of rocks.
- 22) Write the differences between Climate and Weather?
- 23) What is the relationship between Fahrenheit and Celsius?
- 24) What is the main environmental factors affecting thermal comfort in the building?
- 25) Calculate the feel temperature of this room! Internal air temperature of the room = $22\text{ }^{\circ}\text{C}$, Temperature of circumvallation area = $10\text{ }^{\circ}\text{C}$?
- 26) Please explain whether condensation on the inner surface of the room component occurs?
- 27) If yes how much must to be at least the surface temperature to avoid condensation on the surface of the wall?
- 28) What is Building Physics? Please explain the Necessarily of this science?
- 29) What is energy? And the main actions of energy use in our life concentrate on?
- 30) What is the opposite of Heat Transmitting Coefficient? Please explain with relevant formulas!
- 31) Calculate the Heat transmittance resistance R_T and the Heat transmittance coefficient U-value for a Reinforced concrete roof 18 cm with 18 cm Wood fibre insulation board and 4 cm cement screed. The

pavement has a thickness of 1.2 cm with inside gypsum plaster of 1.5 cm.

- 32) What are Heat protection factors? Please write also the units of the factors?
- 33) How much Heat flow density or Heat flux (q) has a Lime sandstone with a U-value of $1.59 \text{ W / m}^2 \cdot \text{K}$ at a temperature difference between the inside and outside of 35 K in winter and 15 K in autumn?
- 34) What is thermal conductivity ? From what depends the thermal conductivity of a component ?
- 35) What is the factors, which affecting the heat transfer?
- 36) Please define Heat transmittance coefficient U-value ? And how can we determine the thermal resistance R_T ?
- 37) How much quantity of heat Q in Wh ($\rho = 1600 \text{ kg / m}^3$) with dimensions of 24 cm x 11.5 cm x 7.1 cm stores in a solid brick at heating from 15°C to 45°C ?
- 38) Arrange the each 12 cm thick components from the following materials to the correct Transmitting heat resistance R !
- 39) What is Heat quantity (Q) or Heat storage capacity (c) wh/ kg . K? and call the advantages of this factor!
- 40) How thick is the thermal insulation of exterior Lime sand stone (Density 1400 kg/ m^3) with Heat transmittance resistance R of $3.24 \text{ m}^2 \cdot \text{K/ W}$ must be shown, if outside plaster from lime cement mortar 1 cm and inside gypsum plaster 1.5 cm is, so that the inside surface temperature of 18°C be not undershot ? Please calculate also the Heat transmittance coefficient U-value of the wall.

- 41) Which exterior wall of a building on a sunny summer day reached the maximum outer surface temperature? and why?
- 1- North wall
 - 2- South wall
 - 3- West wall
- 42) What is the basic equation for the heat loss?
- 43) Define the fire protection factors?
- 44) Please write examples for Conventional and Renewable energy?
- 45) What is Primary Energy! Please explain it with examples?
- 46) What is thermal bridge? Where happens thermal bridge in the house?
- 47) Thermal comfort has to do with -----, ----- and the ----- when they are in proper balance with each other.
- 48) The meteorological conditions, including -----, -----, -----, ----- and -----.?
- 49) What is the main environmental factors affecting thermal comfort in the building?
- 50) Please regulate these rooms to best orientation according to Arbil Climate?
- 51) What is thermal conductivity ? From what depends the thermal conductivity of a material?
- 52) Please correct the energy consumption of these houses!
- | | |
|---------------------|-----------------------------|
| a. Passive house | 70-80 kWh/ m ² a |
| b. Low-energy house | 30 kWh/ m ² a |

c. Zero-energy house 15 kWh/ m²

d. Three litre house 0 kWh/ m² a

- 53) What is energy? And the main actions of energy use in our life concentrate on:
- 54) Define the types of Energy and which is not a non-renewable energy resource?
- 55) Please write the value of **Internal heat convection resistance (R_{si})** and **external heat convection resistance (R_{se})** with units! Why are by external building components, the inside and outside **heat convection resistances** R_{si} & R_{se} of different size?
- 56) Please mention the main factors with Icons and Units, which influencing the Heat gain and Heat loss in the buildings?
- 57) Is air a good or a bad heat conductor? Please compare the thermal conductivity of the water with the air ! How we utilize the property of the air in thermal insulation?
- 58) Which heat flow density q has a Lime sandstone with a U-value 1.59 W / m². K at a temperature difference between the inside and outside of 35 K in winter and 15 K in autumn?
- 59) What is the comparison between **thermal conductivity** λ of a material and **Heat transmittance coefficient U-value** of the same materials?
- 60) Arrange the each 12 cm thickness of these building components from the following materials to the correct Heat transfer resistance R ?
- 61) Please select the right sentences and correct the wrong information's?

- a. Thermal bridges are the weakest point in the envelope
 - b. Thermal bridges reduce the building energy efficiency but decreases heating costs
 - c. Thermal bridges can cause considerable heat loss
 - d. Thermal bridges cannot in summer introduce further unwanted solar heat gain
 - e. Thermal bridges are localized areas with higher thermal conductivity than their neighbouring areas
 - f. Thermal bridge is an area with a lower Heat transmittance coefficient U-value
 - g. The larger the thermal diffusivity α , the better reacts the building material in summer heat protection
 - h. The larger Heat transmitting resistance R , causes a better winter heat protection in the buildings.
- 62) Arrange the each 12 cm thickness of these building components from the following materials to the correct Heat transfer resistance R ?
- 63) Calculate the **Water vapor pressure** difference between the air in a room at 20°C temperature with relative humidity 60% and outside air temperature at $(-10)^\circ\text{C}$ with relative humidity 70%.?
- 64) What is the effect of vapor barrier by building components?
- 65) What is the function of fire walls in a building?
- 66) How can you increase the fire resistance of components made of wood?
- 67) What is the aim of the building or structural fire protection?

- 68) Mention the new house types accordingly and mention the amount of diesel consumption per a year?
- 69) Arrange the each 12 cm thick components from the following materials to the correct Transmitting heat resistance R ?
- 70) Arrange the following materials from low to high with 10 cm thickness, according to its Thermal conductivity ?
- 71) Out side wall made of perforated brick masonry, density 1200 kg/m^3 , 36.5 cm thick. What is the Heat transfer resistance (R) of the wall ?
- 72) Outer wall 36.5 cm from cinder block stone Y-Tong, bulk density 400 kg/m^3 with 2 cm external plaster of lime cement mortar and 1.5 cm internal plaster of lime gypsum mortar. What is the heat transfer resistance (R) of the entire wall?
- 73) Calculate the **Heat transmittance resistance R_T** and the **Heat transmittance coefficient U-value** for a perforated brick wall with a density of 1200 kg / m^3 . 2 cm thick exterior plaster from lime cement mortar and 1 cm thick inside gypsum plaster?
- 74) Calculate the **Heat transmittance resistance R_T** and the **Heat transmittance coefficient U-value** for a perforated cement block stone wall with a density of 2400 kg / m^3 . 2 cm thick exterior plaster from lime cement plaster and 10 cm natural stone. 1.5 cm thick inside gypsum plaster?
- 75) Calculate the **Heat transmittance resistance R_T** and the **Heat transmittance coefficient U-value** for a Reinforced concrete roof 18 cm. 18 cm wood fibre insulation board and 4 cm cement screed. The

pavement has a thickness of 1.2 cm with inside gypsum plaster of 1.5 cm?

76) Which thickness needs the insulating board of external wall with thermal conductivity $\lambda = 0.03$, in order to improve the U-value of the wall in $0.15 \text{ W/ m}^2 \cdot \text{K}$.

77) Heat convection coefficient (h) depends on many factors, write three of them briefly?

78) What is Temperature factor f_{Rsi} ?

79) Calculate the temperature factor of this room?

$\Theta_{si} = 12.5 \text{ }^\circ\text{C}$ Internal surface temperature

$\Theta_e = -5.0 \text{ }^\circ\text{C}$ outside air temperature

$\Theta_i = 20.0 \text{ }^\circ\text{C}$ Inside air temperature

80) Reinforced concrete cantilever slab with thermal separation in the area of external wall insulation. Please calculate the **temperature factor f_{Rsi}** of this building components:

$\Theta_{si} = 18 \text{ }^\circ\text{C}$ Internal surface temperature

$\Theta_e = -2.0 \text{ }^\circ\text{C}$ outside air temperature

$\Theta_i = 15.0 \text{ }^\circ\text{C}$ Inside air temperature

GOOD LUCK