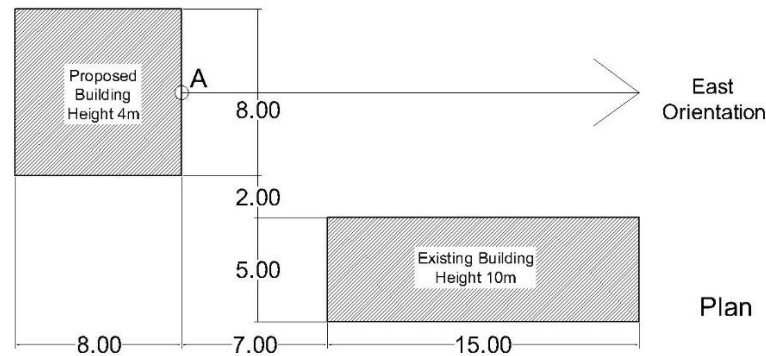**Q 1.** What is the classification of Erbil climate?

Q 2. What are the climatic design solutions for this particular climate? Explain them on a sketch of courtyard house?

Q 3. For what period is the point A of a proposed building overshadowed by the existing building?

Q 4. Plot the shading mask and explain the shading period using the given Sun-path diagram …….

Use scale <u>1:200</u>

Q 5. Find the minimum window area required for an office 6m x 5m?

Q 6. Design a solar shading device to overshade the window designed in **Q3**, assuming the window is facing south, during June, July, and August from 11 AM to 2:30 PM using the Sun-path Diagram of Erbil (36° N Latitude). The drawing scale is <u>1:50</u>?

Q 7. Plot the shading mask of the proposed shading element.

Q 8. Find the depth and width of it using related shadow angles.

36°N LATITUDE
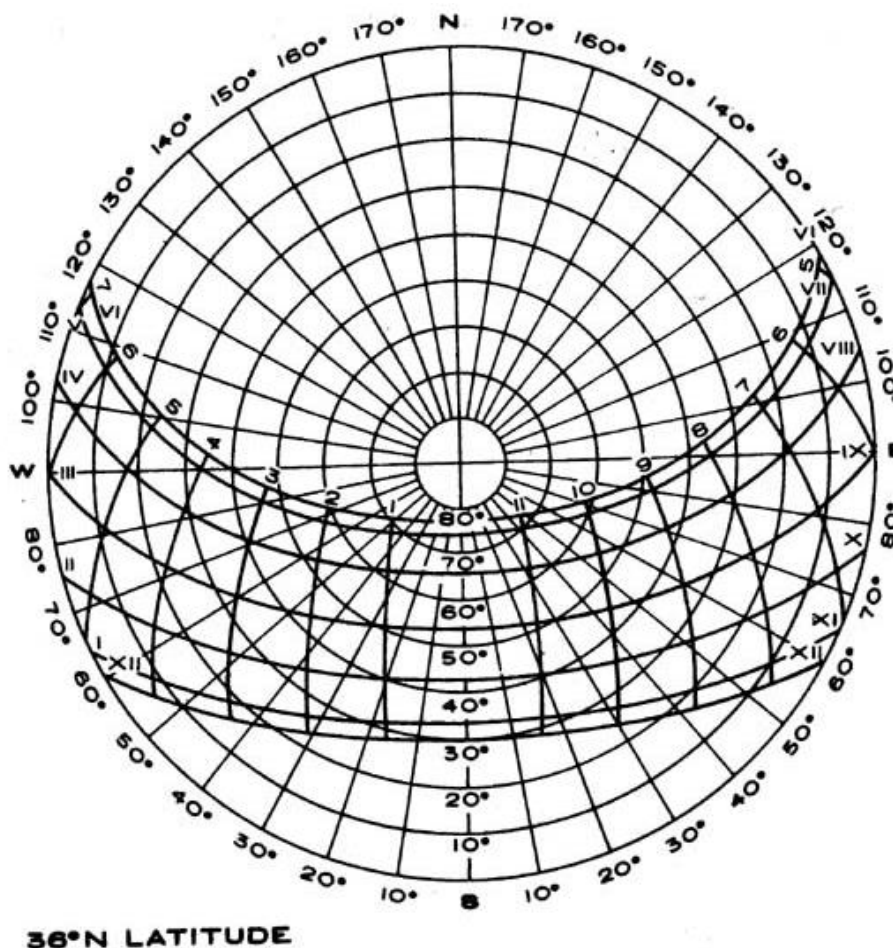
Q 9. Explain the following statements with appropriate sketches and examples?

Q 10. A. Climatic design principles for hot dry areas.

Q 11. B. Sustainable solutions introduced by vernacular architecture.

Q 12. C. Movable shading devices.

Q 13. What are the main principles of Sustainability?

Q 14. Mention the main climatic elements (only four of them)

Q 15. Find the Sun's Altitude and Azimuth for the following months and times using the provided sun path diagram 36° N Latitude

| Month	Hour	Altitude	Azimuth
August 21	10 AM		
March 21	12 PM		
November 21	2 PM		

Q 16. Design an effective solar shading device to overshade a window, which is facing south-east (135°), during the overheating period of Erbil city (36° N Latitude)?

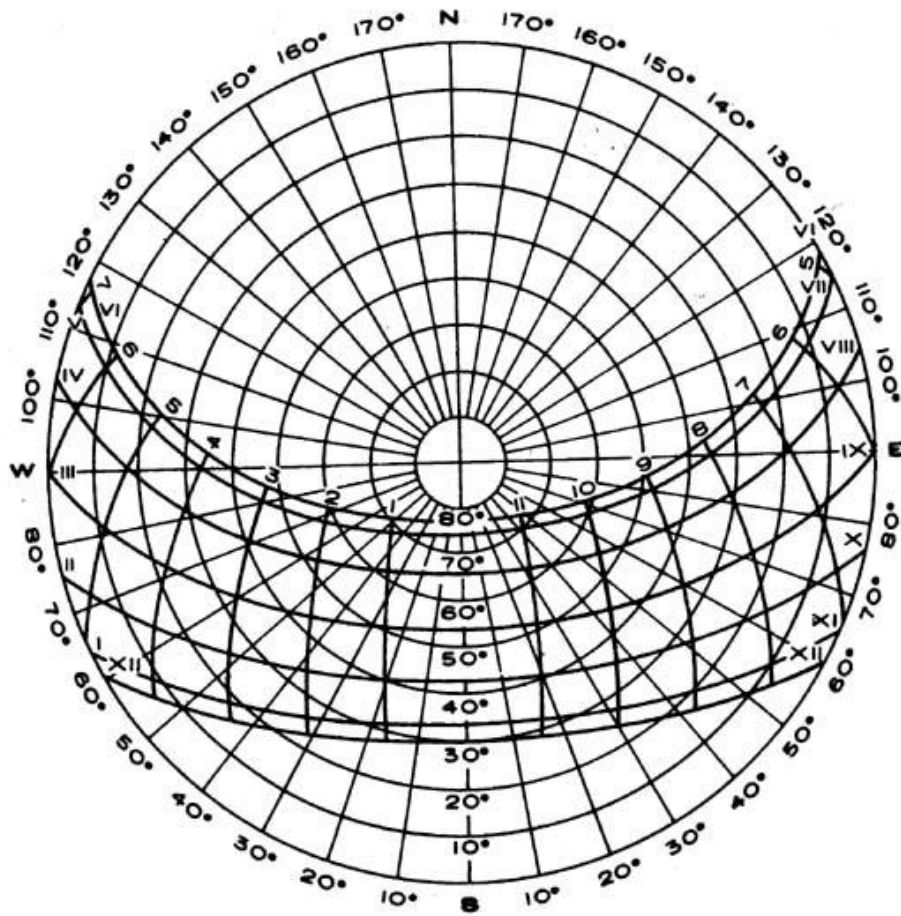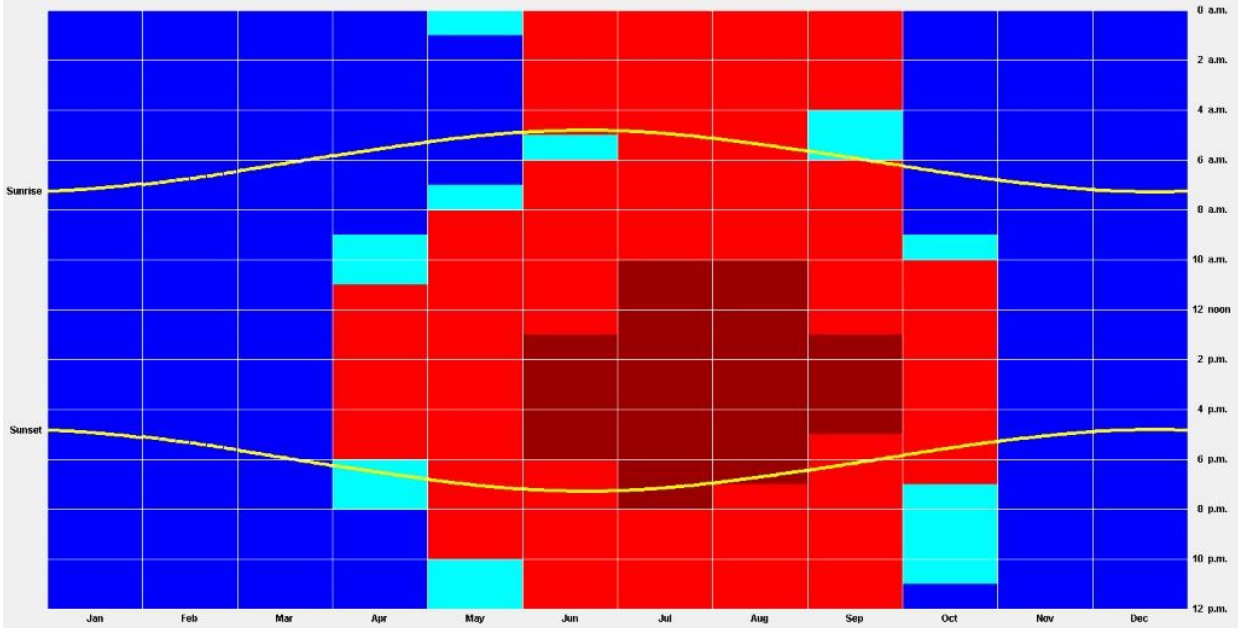**Q 17.** A. Plot the overheating period on the sun path diagram.

Q 18. B. Plot the overheating period on the shading mask protractor.

Q 19. C. Plot the shading mask of the proposed shading element.

Q 20. D. Find the depth and width of it using related shadow angles.
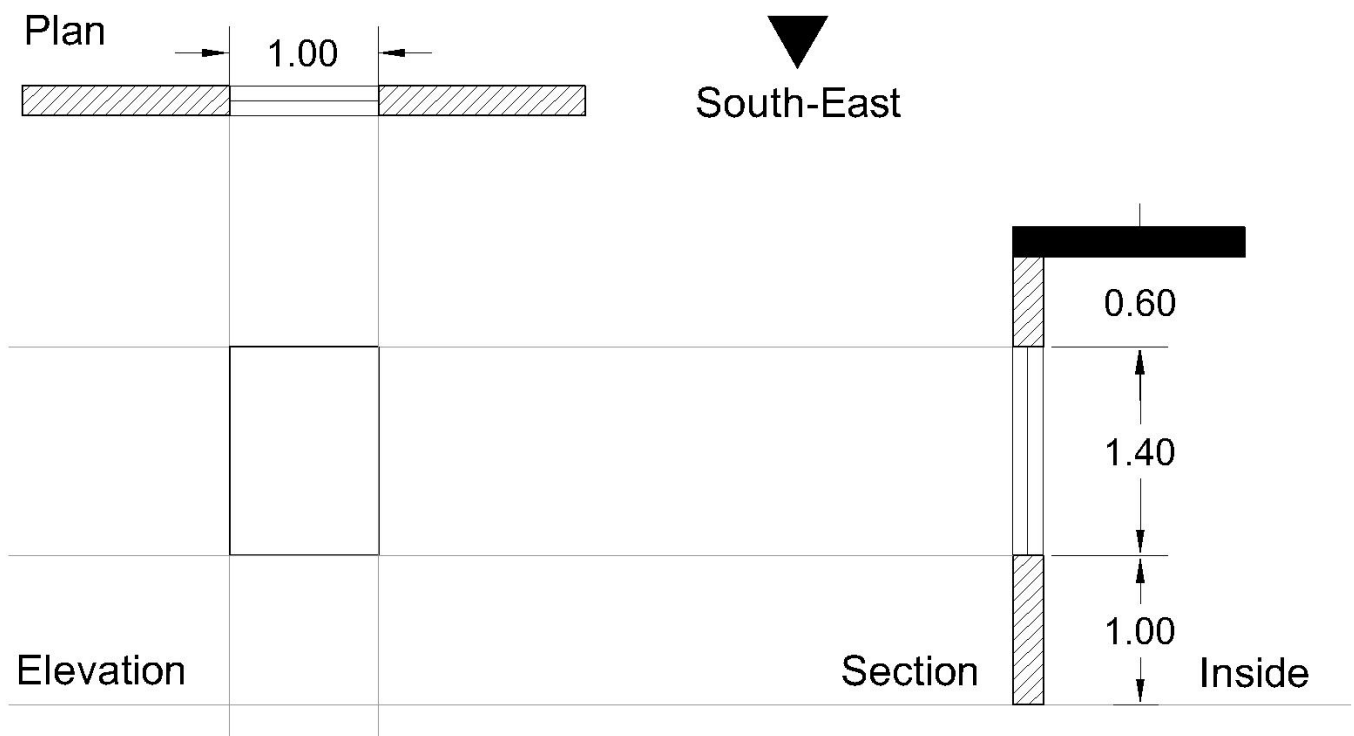
Plan   1.00

South-East

0.60

1.40

1.00

Elevation   Section   Inside

36°N LATITUDE

Q 21. Define the following?

Q 22. Built Environment?

Q 23. Human comfort?

Q 24. Renewable resources?

Q 25. sustainable developments?

Q 26. resource efficiency?

Q 27. Metabolic Rate?

Q 28. Adaptive or intelligent façade?

Q 29. Hybrid wind-catcher system.?

Q 30. Green building design is the practice of creating structures and using processes that are environmentally responsible throughout a building's life cycle.

Q 31. Explain the implementation of the green building strategies through each step of building's life cycle with appropriate sketches**?**

 Q 32. Explain with appropriate sketches only**?**

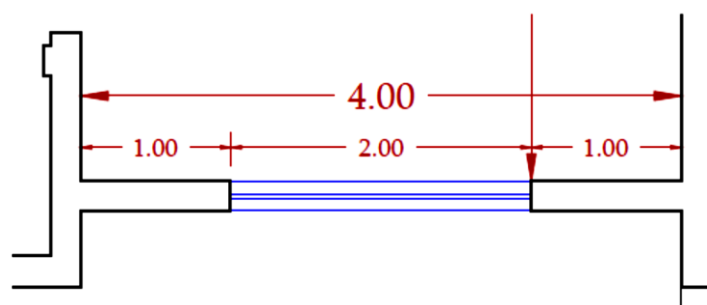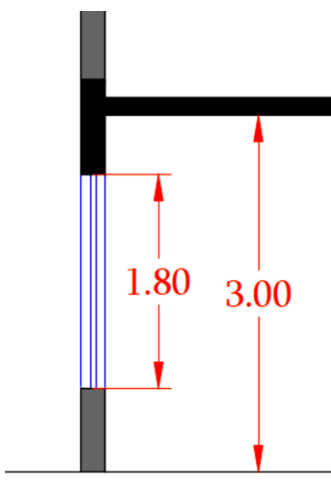**Q 33.** Types of movable shading devices

Q 34. Overhangs are designed to reflect direct sunlight into the depth of the room.

Q 35. Space treatments to maximize the stack effect.

**Q 36.** Natural ventilation treatments for the double loaded atrium.

Q 37. Single gazing and double-glazing façade.

Q 38. Two mechanisms type of wind-catcher

Q 40. Design two different types of horizontal shading devices and two different alternatives of vertical shading devices. The shadow angles are (VSA=60 and HAS= 55) East orientation from 9 a.m. to 4p.m. Then find the depth and width of the proposed Shading devices each time (window height = 1.80 m) use the figures above.

Q 41. Explain the following statements with appropriate sketches and examples where available?

Q 41. "Climatic design principles for hot dry areas."

Q 42. "Sustainable solutions introduced by vernacular architecture".

Q 43. "The more insulation the better"

Q 44. Estimate the average heat gain from the occupants of the drawing hall with dimensions 12m X 8m. The hall occupied with 20 architectural students, five of them are seated relaxing while the rest doing graphic professions. The hall also has two lecturers, one of them teaching and the other one walking around on level 2 km\h?

Q 45. Find the CFM for business office space that have a window and exterior door on two side. The space dimension is (10 X 8 X 4m.

Q 47. Calculate the amount of heat gain of inner air due to natural ventilation if the outside temperature was 30°C and the inside was 25°C. Assuming an air change rate of 0.5 ACH and the volume of the house as 240 m3.

Q 48. Compare the followings with drawing appropriate sketches?

Q 49. Air movement in single-loaded corridor and double-loaded.

Q 50. Natural ventilation for high level window vs. low level window.

Q 51. Simple volumes VS. Complex volumes of buildings

Q 52. Exposure of heritage building VS. Modern buildings exposure.

Q 53. Wind effect difference between short and tall building.

Q 54. Cold and Worm facades.

Q 55. Define Double skin façade and what are the most common types of the system. Support your answer with sketches and examples for each type?

Q 60. Calculate the total U value of a modern multi-layer wall that have solid walls two bricks thick (shown in table below).

Q 61. Then find out which of the following gives the lower *U*-value?

Q 62. Adding a cavity to a two-brick solid wall (R= 0.18)

Q 63. Increasing the thickness of wall to the solid three bricks thickness?

Layer	Thickness /m	Conductivity/ W m⁻¹ K⁻¹	Resistance/ m² K W⁻¹
Outside thermal resistance			0.04
Single Brick	115 mm	0.77	
Single brick	115 mm	0.77	
Dense plaster	13 mm	0.57	
Inside thermal resistance			0.13

South   North

SECTION

West   East
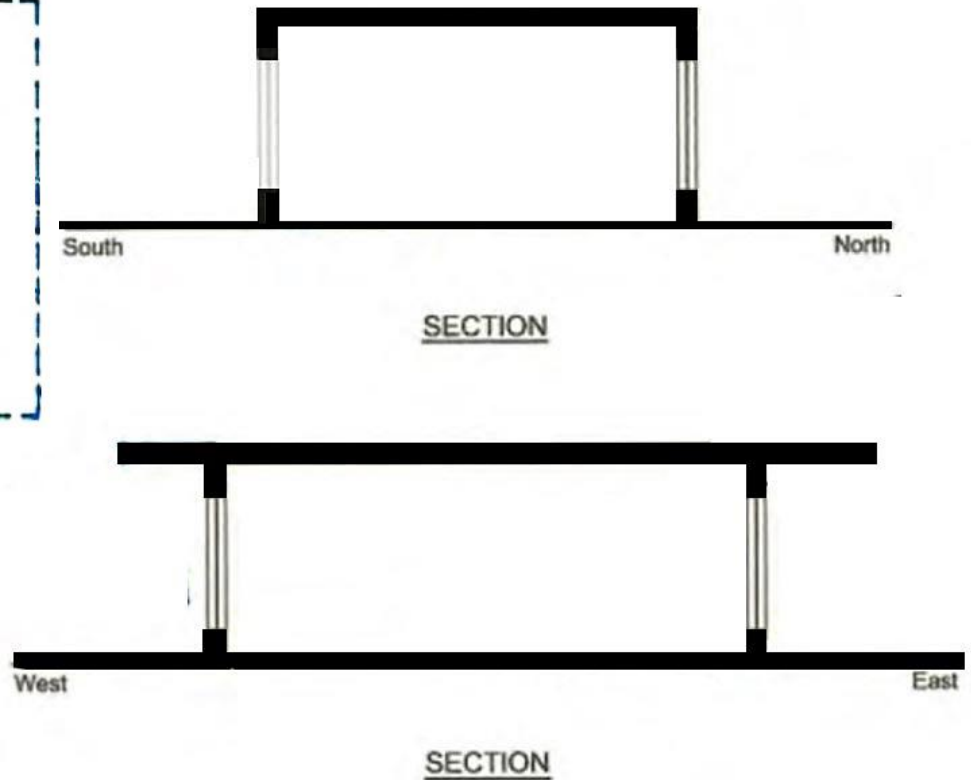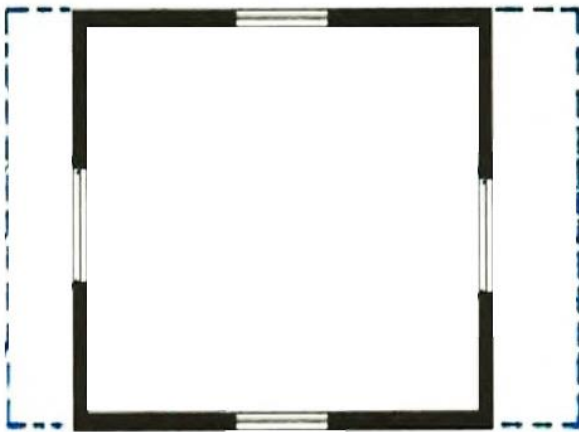
SECTION

Q 64. Draw the sunbeams for each time on the plan and sections of the building presented in Figures below.

Q 65. Then Draw each sunbeam (sunray) for the times on the key plan by using the azimuth angle to visualize the direction of each sunbeam. The building is located at 36° N latitude.

Month	Hour	Altitude	Azimuth
March 21	12 noon		
July 21	10 Am		
August 21	2 Pm		

Q 66. Complete the sentences with the right answers?

Q 67. 'Built environment' refers to aspects of our surroundings that are built by humans, that is, distinguished from the …………………………….

Q 68. Sustainable concept intend to find a balances the relationship between…………………., ……………………………. and ………………………. .

Q 69. Of 48 % of energy consumption by buildings, about 40 percent is for ……………………….and about 8 percent is for ……………………………. .

Q 70. The Relative Humidity should be above **…………** all year, below **…………..** in the summer, below **…..…..** in the winter.

Q 71. The orbit tilt of …………. is the cause of the Seasons and has major implications for solar design.

Q 72. Vertical fins are generally not successful on…………………………….façades since the solar altitude angle is …………… during the hot season.

Q 73. ………………………….. are compounds that easily become vapors or gases.

Q 74. Green buildings can reduce up to ……………… of water use

Q 75. Double-hung, single-hung, and sliding windows do not change the direction of the airstream, can block at least ……………..of the airflow.

Q 76. …………………. a special kind of wooden screen, which is placed outside the windows.

Q 77. Define the DF?

Q 78. A: assess the required area of glass for living Room dimensions: 8m (d) x 4m (w) x 3m (h)

Q 79. B: Suggest two different size for window with different location within the given room .

Q 80. C: Draw the distribution of DF on plan and section and determine which one is the best option and why ?

36°N LATITUDE
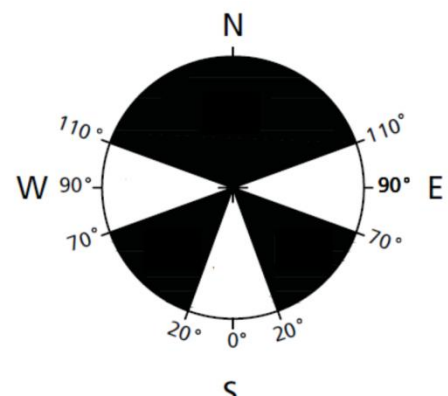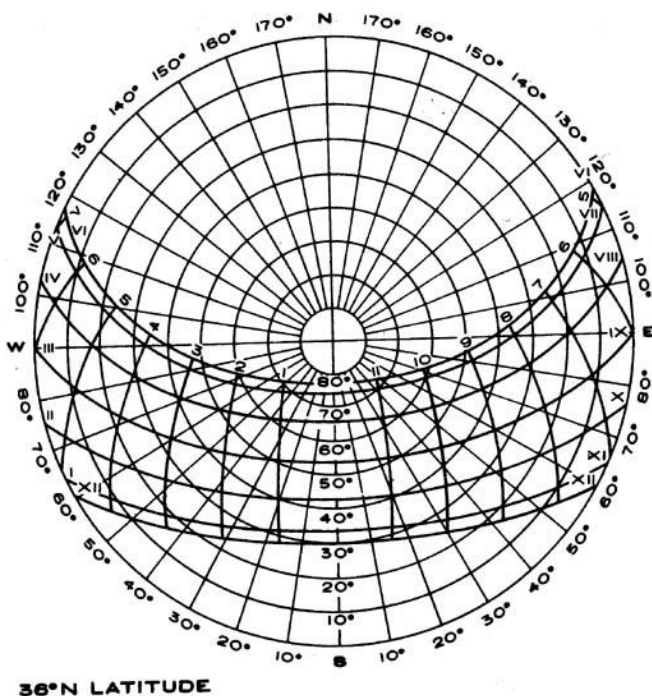
Q 81. What are the implications of sustainable development?