

SECTION – A

There are **FOUR** questions in this section. Answer **Q. No. 1** and any **TWO** from the rest.

1. Discuss briefly any **TWO** of the following: (15×2=30)
 - (a) Dome of Hagia Sophia
 - (b) Gothic Stain Glass Decoration
 - (c) Palladian Motif

2. Establish the architectural characteristics of the Byzantine Period using proper sketches and examples. (20)

3. (a) Explain the structural innovations in the Gothic Period. (10)
 (b) Compare English Gothic with French Gothic Architecture. (10)

4. (a) Explain the effects of Humanism in Architecture in Renaissance period. (10)
 (b) Distinguish the Purist style from the Mannerist or Proto Baroque style in the high Renaissance period citing examples. (10)

SECTION – B

There are **FOUR** questions in this section. Answer **Q. No. 5** and any **TWO** from the rest.

5. Discuss briefly any **TWO** of the following: (2×15=30)
 - (a) Greek Acropolis
 - (b) Roman Forum
 - (c) Greek Temples

6. (a) Compare the different "Orders" of the Greek and Roman period with proper sketches. (10)
 (b) Discuss the various types of optical corrections made by the Greeks to overcome optical illusions created in their temples. (10)

7. Describe the "Colosseum" with necessary sketches to establish the architectural characteristic of the Roman Period. (20)

8. The Aegean period is known for constructing several large and great places. Describe the "Palace of Knossos" to establish the architectural characteristics of the Aegean Period. (20)

L-2/T-1/ARCH

Date: 30/04/2023

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-1 B. Arch. Examinations 2021-2022

Sub: **ARCH 251** (Visual Environment)

Full Marks: 140

Time: 3 Hours

The figures in the margin indicate full marks

In case of quotations and extracts, please give the full reference at the bottom of the paper.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE** questions.

1. Assess the unique qualities of daylight in detail. (23 1/3)
2. Justify the importance and application of daylight simulation for sustainable building design. (23 1/3)
3. Differentiate between design strategies of buildings for daylighting in hot-dry climate and those in warm-humid climate. (23 1/3)
4. Appraise with annotated sketches the daylighting features of an internationally renowned architectural project. (23 1/3)

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE** questions.

5. (a) Illustrate the visual field and its components. Explain direct, indirect, disability and discomfort glares. (23 1/3)
 6. Assess the measurement techniques of different visual efficiency for the human eye, i.e., visual acuity, contrast sensitivity and visual performance. (23 1/3)
 7. Interpret four key photometric terms and their relationships: (23 1/3)
Flux, Intensity, Illuminance and Luminance.
 8. Explain the characteristics and design process of supplementary artificial lighting. (23 1/3)
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SECTION – A

There are **FOUR** questions in this section. Answer any **THREE** questions.

Assume reasonable values for missing data, if any.

1. (a) Define force and its characteristics with an example. (8)
 (b) Two cable exert a force on a vertical pole as shown in Figure 1. The pole is fixed to the ground at point C and has a self-weight of 4 kN. The force in the stay wire should cause the resultant force on the pole to be downward and collinear with the pole. Determine- (15 $\frac{1}{3}$)
 - (i) The horizontal and vertical components of the stay wire
 - (ii) The net force on the pole
 - (iii) The reaction forces at the base of the pole if there was no stay wire attached.

Show the direction of the component forces, net force and reaction forces for all three questions.
2. (a) Show different types of support conditions and their reaction forces with neat sketches. (5)
 (b) Three cylinders are pinned in a rectangular ditch as shown in Figure 2. Neglecting friction, determine the reaction at the interface between the cylinders and the surfaces of the ditch. Given, Cylinder A (mass 8 kg, radius 100 mm). Cylinder B (mass 12 kg, radius 150 mm) and cylinder C (10 kg, radius 125 mm). (18 $\frac{1}{3}$)
3. (a) Explain the following terms with figure: (15)
 - (i) Coplanar concurrent force system
 - (ii) Non-coplanar concurrent forces
 - (iii) Two force member
 - (iv) Surface force
 - (v) Couple Moment
 (b) A weight A weighing 50 kg rests on a smooth frictionless plane as shown in Figure 3. Determine the weight of the body B to prevent sliding of the body A along the surface. Also calculate the plane reaction and tension in the chord. (8 $\frac{1}{3}$)

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4. (a) Write down the characteristics of a couple. (8)
- (b) Wedge A (weight 50 kg) supporting a downward load of 400 N is pressed two block B (weight 30 kg) and C (weight 40 kg) as shown in Figure 4. The angle formed at the apex of the wedge is 20° . What is the amount of force P required to resist the downward motion of wedge A. Find also the reactions from the planes and contact surfaces (contact surface between the wedges and block, contact surfaces of the blocks with horizontal and vertical plane). All the surfaces are smooth and assume all forces to be concurrent. (15 $\frac{1}{3}$)

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE** questions.

5. (a) Determine the centroid of the area shown in Figure 05. (13)
- (b) Determine the moment of inertia about 'x'-axis (I_x) of the inverted T-section shown in Figure 06. (10 $\frac{1}{3}$)
6. (a) Determine the deformation of the steel rod shown in Figure 07 under the given load. (14 $\frac{1}{3}$)
- (b) Write short notes on- (9)
- (i) Young's Modulus
 - (ii) Tangential Modulus
 - (iii) Secant Modulus
- Show these parameters on a qualitative stress-strain curve of mild steel.
7. (a) What should be the minimum cross sectional area of members "ab", "bc", and "bd" in the truss shown in Figure 08 for applied vertical forces. For each member, the allowable tensile stress is 140 MPa and allowable compressive force is 170 MPa. (18 $\frac{1}{3}$)
- (b) Define Normal stress, Shear stress, and Bearing stress. Show the acting planes of these stresses with neat sketches. (8)
8. (a) Block "A" weighing 500 N rests over block "B" which weighs 100 N on an inclined plane as shown in Figure 09. Block "A" is tied to wall with a string parallel to the plane. If the coefficient of friction between block "A" and "B" is 0.25 and between "B" and floor is $\frac{1}{3}$, what should be the value of P to move the block ("B"). Assume the direction of P is parallel to the resting plane. (18 $\frac{1}{3}$)
- (b) State the laws of friction between two surfaces. (5)
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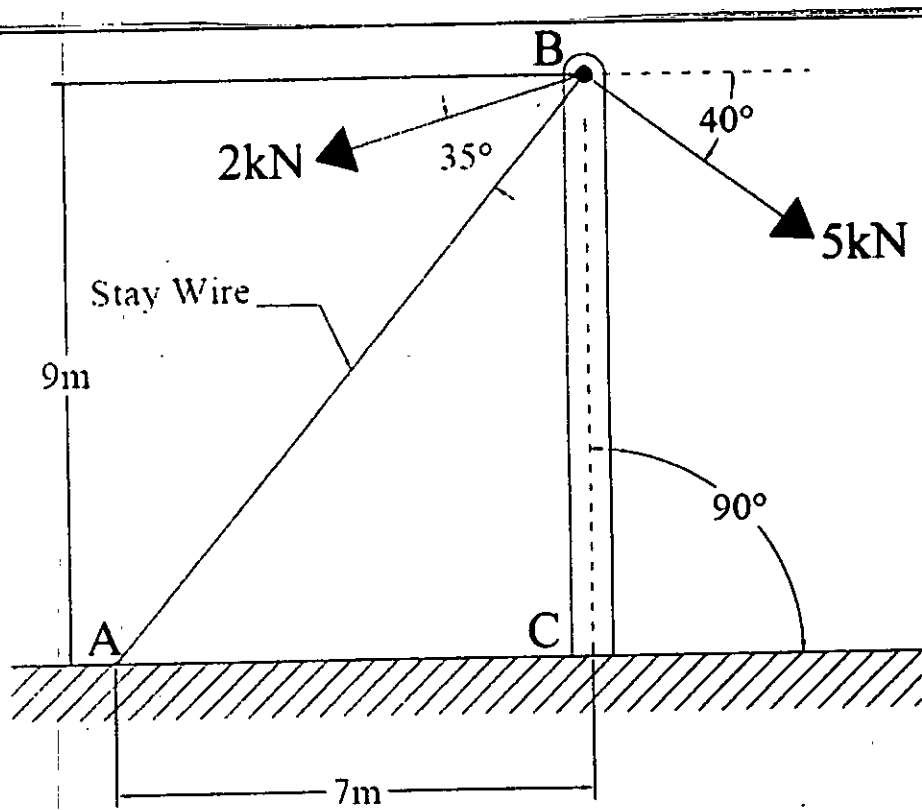


Figure 1

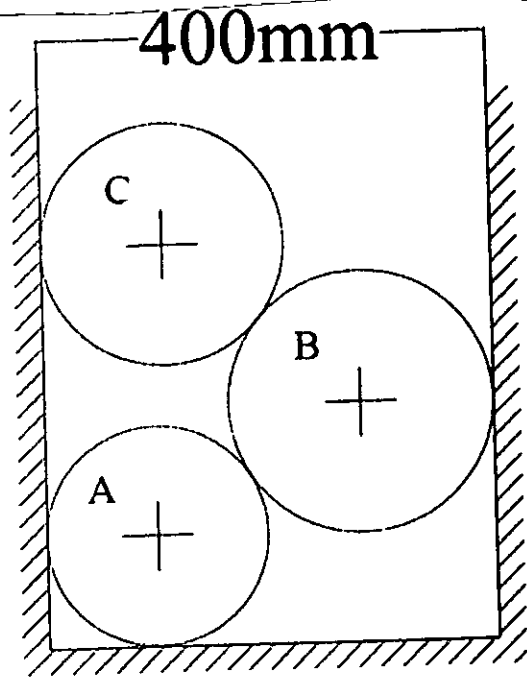


Figure 2

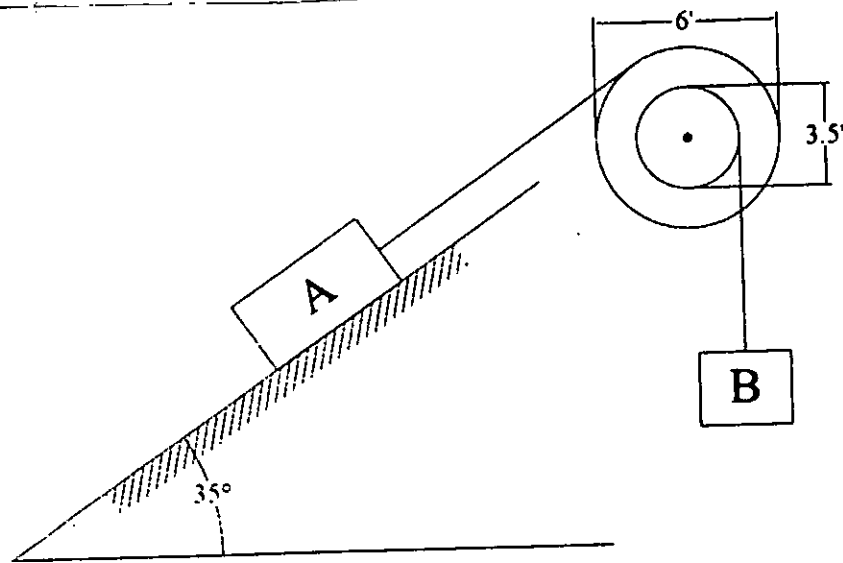
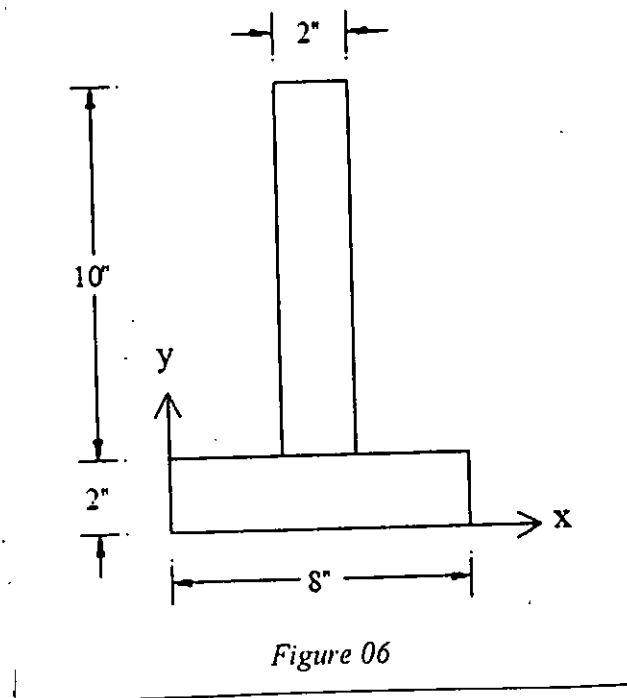
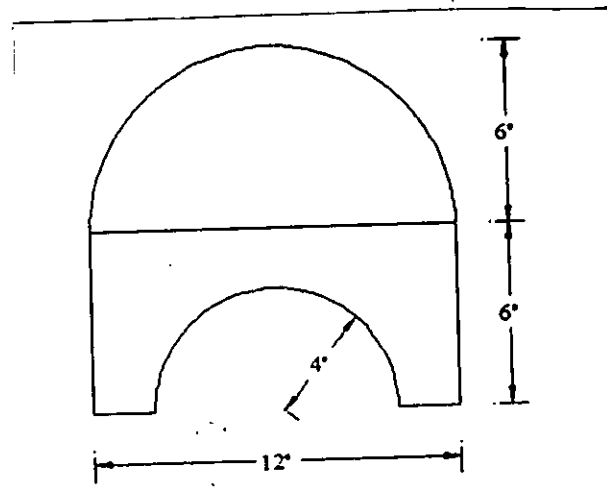
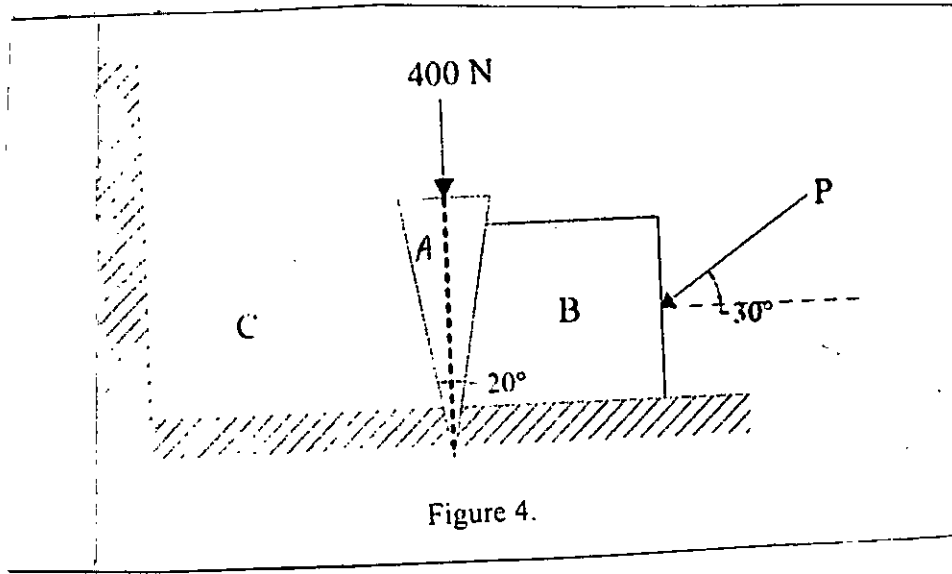


Figure 3.



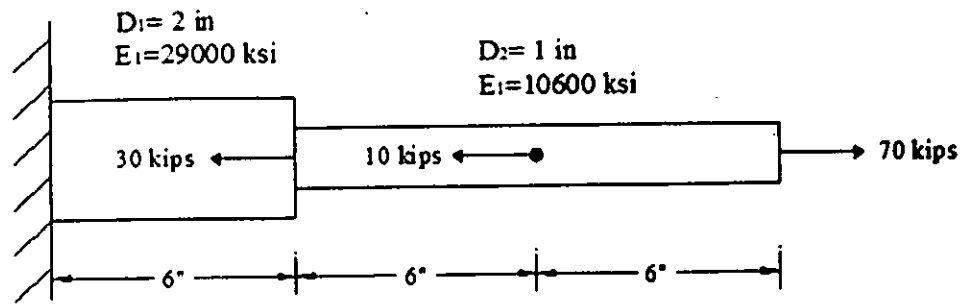


Figure 07

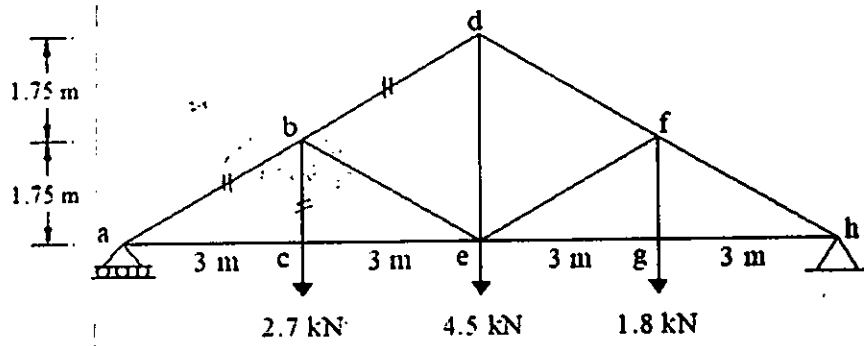


Figure 08

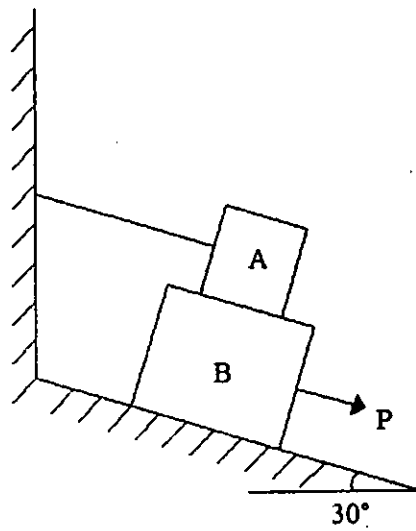


Figure 09