

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

1. (a) What is philosophy? In what sense are we all philosophers? (8)  
(b) Discuss different factors related to the origin of philosophy. (15 1/3)
2. (a) Discuss epistemology, cosmology and ethics as scope of philosophy. (12)  
(b) Show the relation between philosophy and science. (11 1/3)
3. (a) What is knowledge? What are the different sources of knowledge? (8)  
(b) Discuss rationalism as a source of knowledge. (15 1/3)
4. (a) What is truth? How does it differ from validity? (8)  
(b) Critically explain different theories of truth. (15 1/3)

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

5. (a) Explain with example the distinction between judgment of fact and judgment of value. (10)  
(b) Give a critical exposition of different types of value. (13 1/3)
6. (a) What are the issues we need to address in order to show the relation between body and mind? (8)  
(b) Discuss different theories regarding the relation between body and mind. (15 1/3)
7. (a) Are we always responsible for our actions? Justify your position. (10)  
(b) Who is responsible for the death of Mr. Stefan Golab and why? (13 1/3)
8. (a) What is profession? How does it differ from occupation? (10)  
(b) Discuss different characteristics of profession. (13 1/3)

**SECTION – A**

There are **FIVE** questions in this section. Answer Q. No. 1 and any **THREE** form the rest.

1. (a) (i) Calculate the Reverberation Time (RT) at 500 Hz for the room shown in Fig. for Q.1(a).  
(ii) Do you think that the room is appropriate for speech in both Bangla and English? **(12+2=14)**  
(b) Write short notes on any TWO of the following.  
(i) Loudness level (ii) Signal to Noise Ratio (SNR) (iii) Sound Transmission Class (STC) **(4+4=8)**
2. A bedroom of a residence is placed at the side of a noisy road. The average noise level of that road is 80 dBA at the position of the bedroom. In reference to Table for Q. 2 and 3, answer the following. **(2+6+8=16)**
  - (i) What should be the allowable upper limit of background noise level for the bedroom?
  - (ii) Will the bedroom background noise level be within allowable limit, if a solid brick wall of STC 30 dBA is placed at the road side?
  - (iii) With necessary drawings, propose different options to achieve desired background noise level.
3. Prepare acoustical design requirements for any TWO of the following spaces.  
[Reference: Table for Q. 2 and 3; and Fig. 3] **(8+8=16)**
  - (i) Library (ii) Mosque (iii) Kitchen
4. Discuss general requirements of acoustical design and those differ in spaces for speech, music and multipurpose. **(16)**
5. (a) Explain the statement: "Architectural means should ensure acoustical performance of a space, while Sound Reinforcement System (SRS) may only supplement." **(8)**  
(b) Schematically show a common layout of Sound Reinforcement System (SRS). **(4)**  
(c) What are the types of microphones based on sensitivity and directivity? **(4)**

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### SECTION – B

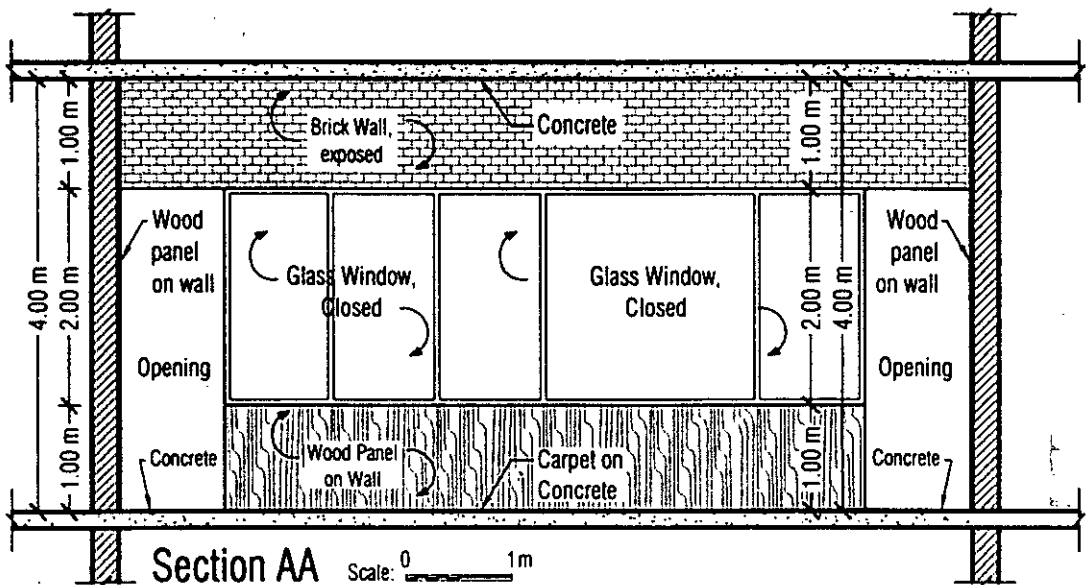
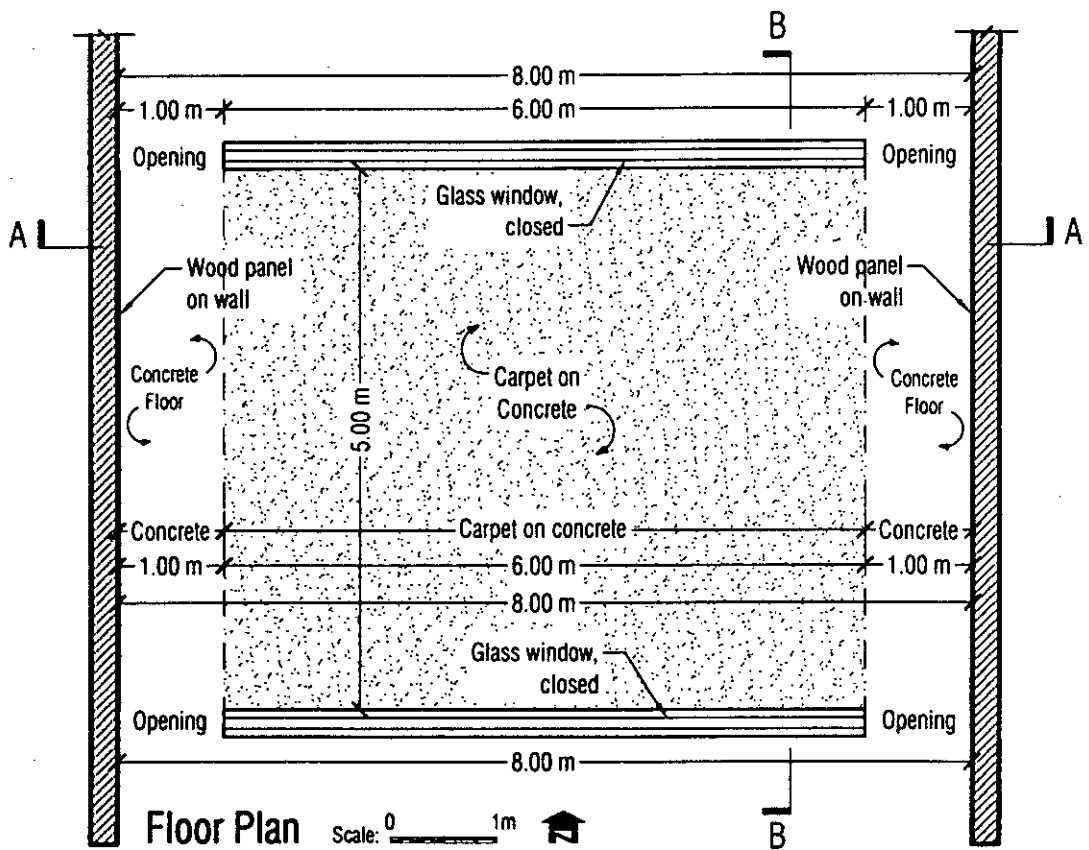
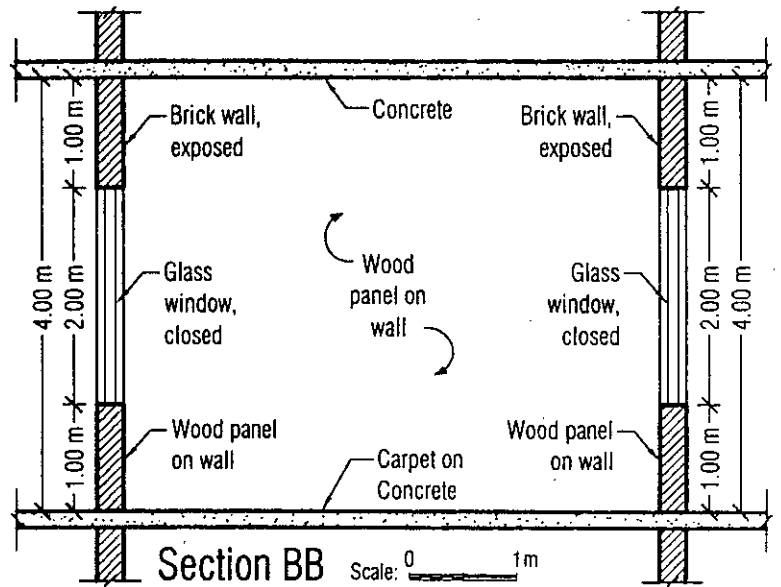
There are **FIVE** questions in this Section. Answer Q. No. 6 and any **THREE** from the rest.

6. (a) (i) Define sound physically and psychophysically. (4)  
(ii) Briefly narrate works of any two contributors for laying foundation of acoustics. (4)  
(ii) Mention briefly the properties of sound. (6)  
(b) Write short notes (any TWO): (4×2=8)  
(i) Intensity of Sound  
(ii) Octave Bands  
(iii) Frequency of Sound
7. Explain with schematic drawings, how sound behaves in terms of the following. (4×4=16)  
(i) Diffraction  
(ii) Refraction  
(iii) Diffusion  
(iv) Absorption
8. Elucidate following singular phenomena with necessary sketches and examples. (4×4=16)  
(i) Reverberation of Time  
(ii) Echo  
(iii) Sound Absorption Coefficient  
(iv) Whispering Gallery
9. (i) Define noise and mention its types in terms of source and transmission path. (2+2=4)  
(ii) Draw a plan and a section to show how air-borne noise transmits from a room to another in a building. (6)  
(iii) Explain how building elements can behave as reflectors for transmitting outdoor noise to indoor. (6)
10. (i) Show in schematic section, how to control noise transmission through air-condition ducts. (8)  
(ii) Explain with necessary sketches, how noise can be controlled for mechanical equipments installed on a building floor. (8)
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Fig. for Q 1(a)

Materials	Absorption Coefficient		
	250 Hz	500 Hz	1 kHz
1 Concrete	0.01	0.02	0.02
2 Carpet on concrete	0.06	0.14	0.37
3 Glass	0.06	0.04	0.03
4 Wood panel on wall	0.22	0.17	0.09
5 Brick, exposed	0.03	0.03	0.04

Note: Ignore absorption due to the volume of air in the room



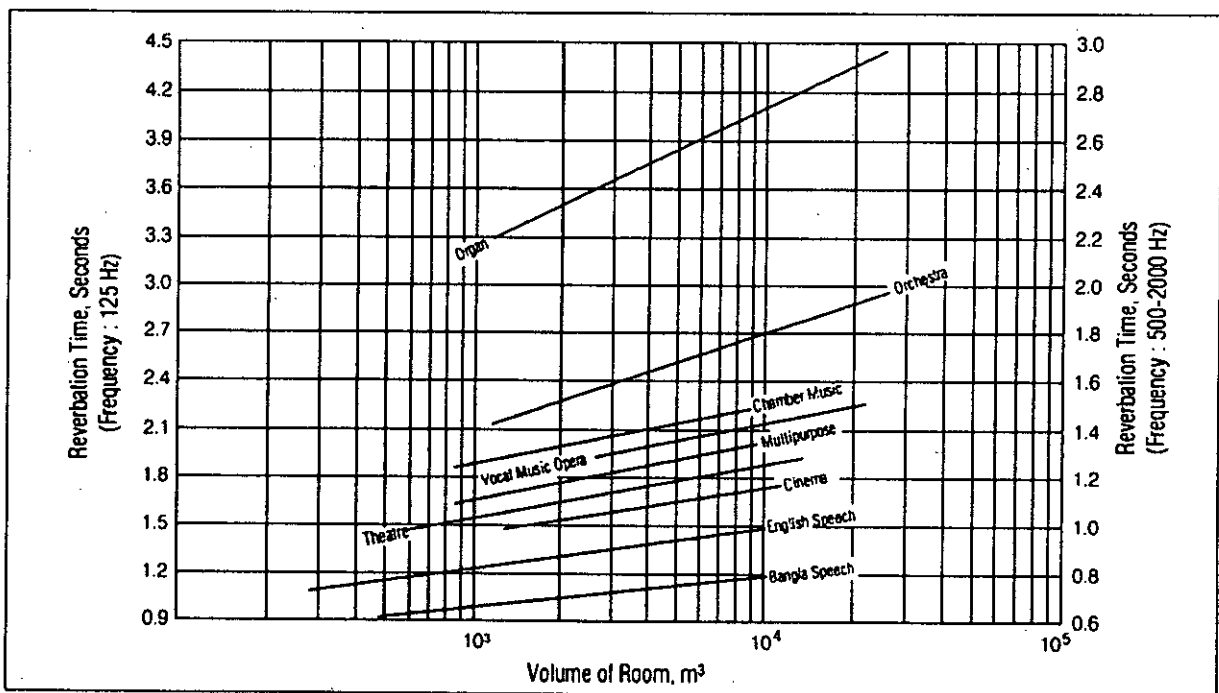
**Table for Q. 2 and 3**

**Allowable Upper Limit of Indoor Background Noise Levels and Recommended Range of NCB Curves**

(Source: Maekawa Z., Lord P. 1994. *Environmental and Architectural Acoustics*. E&FN SPON, UK)

Type of space	dBA	NCB Curve
Broadcast and recording studios (distant microphone used)	18	10
Concert halls, opera houses, and recital halls	18-23	10-15
Large theatres and auditoriums, mosques, temples, churches and other prayer spaces	<28	<20
Television and recording studio (close microphone used)	<33	<25
Small theatres, auditoriums, music, rehearsal rooms, large meeting and conference rooms	<38	<30
Bedrooms, hospitals, hotels, residences, apartments, etc.	33-48	25-40
Classrooms, libraries, small offices and conference rooms. Living rooms, and drawing rooms in dwellings	38-48	30-40
Large offices, receptions, retail shops and stores, cafeterias, restaurants, indoor stadiums, gymnasium, large seating-capacity spaces with speech amplification	43-53	35-45
Lobbies, laboratory, drafting rooms, and general offices	48-58	40-50
Kitchens, laundries, computer and maintenance shops	53-63	45-55
Shops, garages, etc. (for just acceptable telephone conversation)	58-68	50-60
For work spaces where speech is not required	63-78	55-70

**Fig. for Q. 3**



**Fig. Recommended optimum Reverberation Time (RT) for spaces of various uses**

Notes:

1. The optimum RT for speech is shown here for English and Bangla language. It might be noted that the recommended optimum RT for speech in Bangla ranges from 0.5 s to 0.8 s.
2. The figure shows optimum RT for Western music and English vocals. For local music of Bangladesh, optimum RT might be assumed from its typological similarity to that of Western music.

**SECTION – A**

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

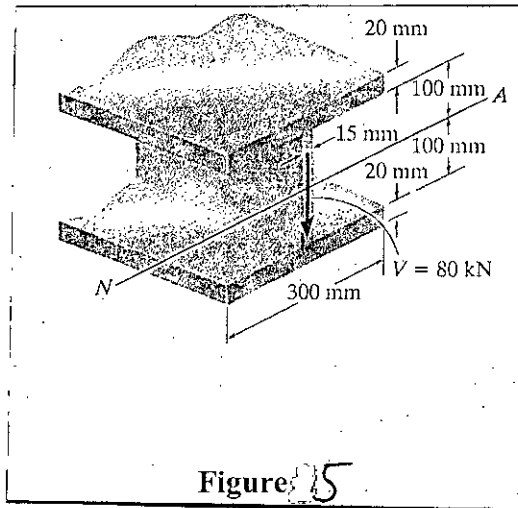
1. (a) Draw shear force and bending moment diagram for the beam shown in Fig. 1. (17)  
 (b) Write down four fundamentals of deformable body mechanics. Define stress, strain and Poisson's ratio. (6 1/3)
  
2. (a) Derive the shear formula  $\tau = \frac{VQ}{It}$ , where  $\tau$  represents the shear stress,  $V$  the shear force,  $I$  the moment of inertia and  $t$  the width of the member cross section. What are the limitations on the use of the shear formula? (6 1/3)  
 (b) The rigid beam shown in Fig. 2 is fixed to the top of the three posts made of A992 steel and 2014-T6 aluminum. The posts each have a length of 250 mm when no load is applied to the beam, and the temperature is  $T_1 = 20^\circ\text{C}$ . Determine the force supported by each post if the bar is subjected to a uniform distributed load of 100 kN/m and the temperature is raised to  $T_2 = 80^\circ\text{C}$ . Given, thermal expansion coefficients of steel and aluminum are  $12 \times 10^{-6}/^\circ\text{C}$  and  $23 \times 10^{-6}/^\circ\text{C}$  respectively. Modulus of elasticity of steel and aluminum are 200 GPa and 73 GPa respectively. (17)
  
3. (a) Derive the formula to determine the elastic deformation of elastic bars. (5)  
 (b) State two conditions that must be satisfied if the principle of superposition is used to determine the stress or displacement at a point in a member when the member is subjected to complicated loading. (5 1/3)  
 (c) The steel rod shown in Fig. 3 has a diameter of 12 mm. It is fixed to the wall at  $A$ , and before it is loaded, there is a gap of 0.2 mm between the wall at  $B'$  and the rod. Determine the reactions on the rod separately for  $P = 5$  kN, 10 kN and 20 kN. Neglect the size of the collar at  $C$ . Take  $E_{st} = 200$  GPa. (13)
  
4. (a) State Hooke's law. Draw a qualitative stress-strain diagram of mild steel showing its various mechanical properties. Define the terms (i) elastic limit, (ii) proportional limit, (iii) ultimate strength, (iv) modulus of elasticity, (v) modulus of rigidity. (11 1/3)  
 (b) The 5 kN object is suspended from the crane boom shown in Fig. 4. Determine the resultant internal loadings acting on the cross section of the boom at point E. (12)

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**SECTION – B**

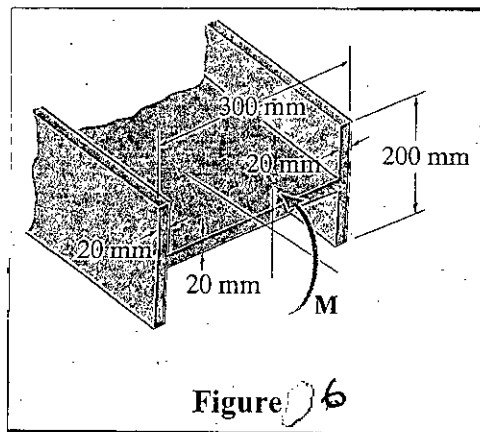
There are **FOUR** questions in this section. Answer any **THREE** questions.

5. (a) A steel wide-flange beam has the dimensions shown in Fig. 5. If it is subjected to a shear of  $V = 80 \text{ kN}$ , plot the shear-stress distribution acting over the beam's cross section. (13  $\frac{1}{3}$ )



- (b) Show  $\tau_{\max} = 1.5 \frac{V}{A}$  for rectangular section. (10)

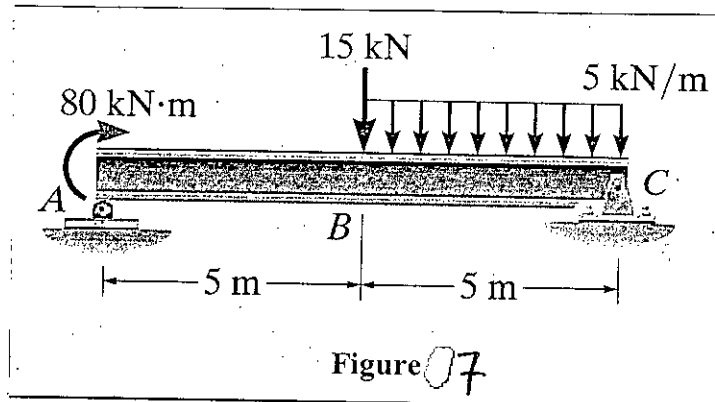
6. (a) If the beam is subjected to a bending moment of  $M = 20 \text{ kN}\cdot\text{m}$ , determine the maximum bending stress in the beam Fig. 6. (8)



- (b) Derive flexural formula. (10)

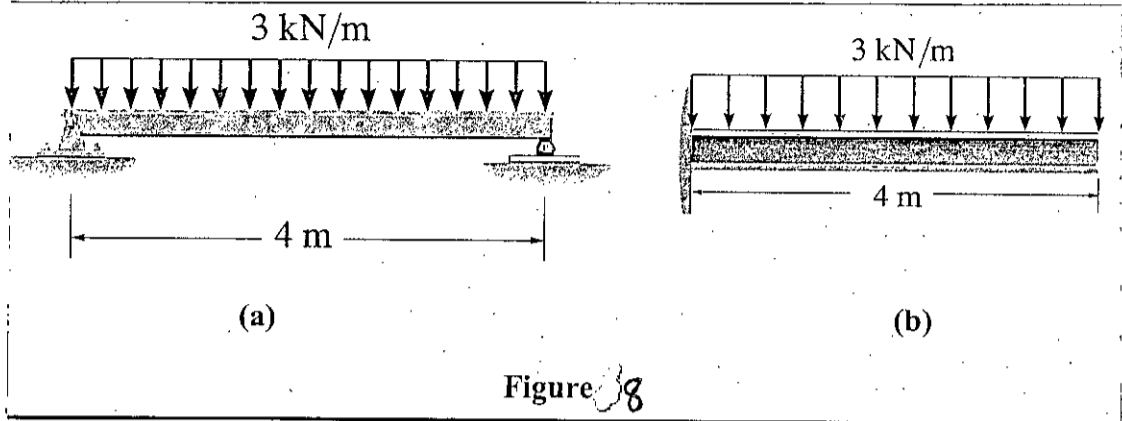
- (c) What are the assumptions for flexural formula? (5  $\frac{1}{3}$ )

7. (a) Draw the shear force and bending moment diagrams for the beam shown in Fig. 7 by the method of section. (13  $\frac{1}{3}$ )

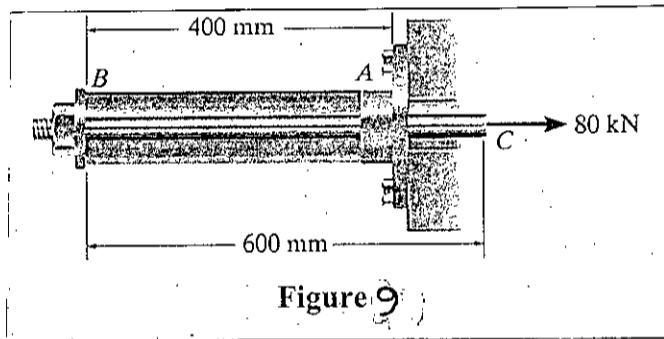


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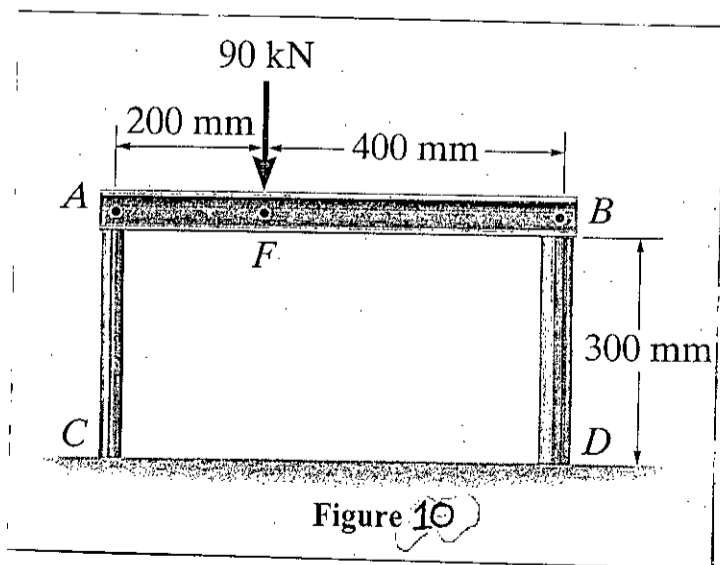
(b) Find the maximum bending moment for the beams shown in Fig. 8 by the method of section. (10)



8. (a) The assembly shown in Fig. 9 consists of an aluminum tube *AB* having a cross-sectional area of 400 mm<sup>2</sup>. A steel rod having a diameter of 10 mm is attached to a rigid collar and passes through the tube. If a tensile load of 80 kN is applied to the rod, determine the displacement of the end *C* of the rod. Take  $E_{st} = 200$  GPa,  $E_{al} = 70$  GPa. (11  $\frac{1}{3}$ )



(b) Rigid beam *AB* rests on the two short posts shown in Fig. 10. *AC* is made of steel and has a diameter of 20 mm, and *BD* is made of aluminum and has a diameter of 40 mm. Determine the displacement of point *F* on *AB* if a vertical load of 90 kN is applied over this point. Take  $E_{st} = 200$  GPa,  $E_{al} = 70$  GPa. (12)





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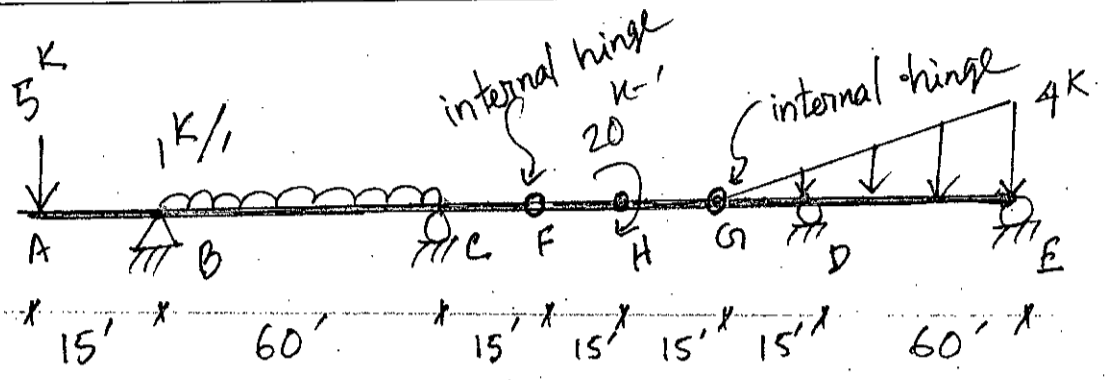


Fig. 1

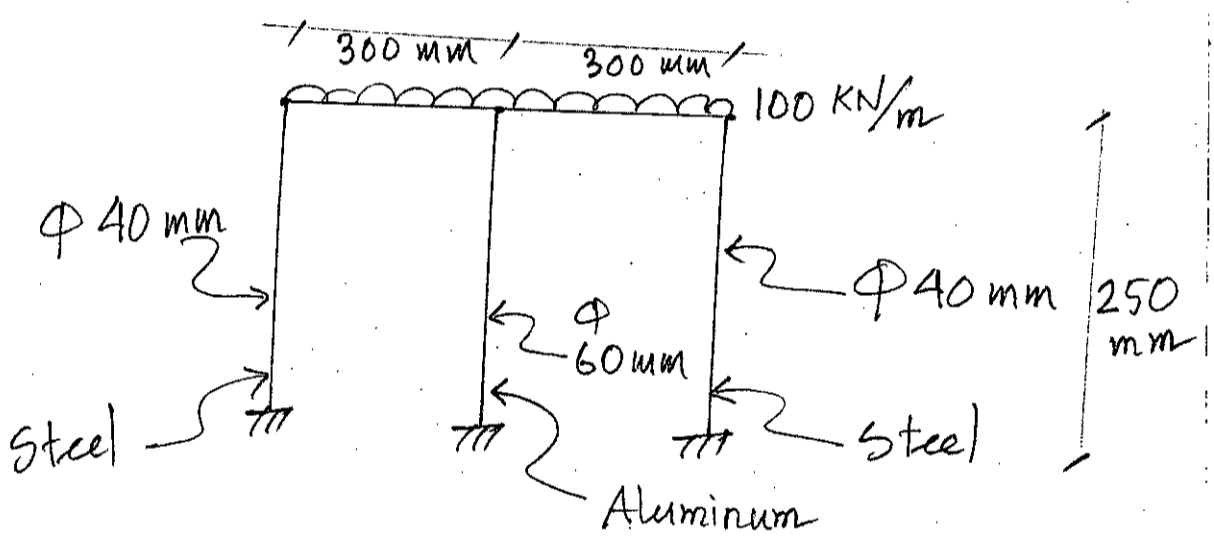


Fig. 2

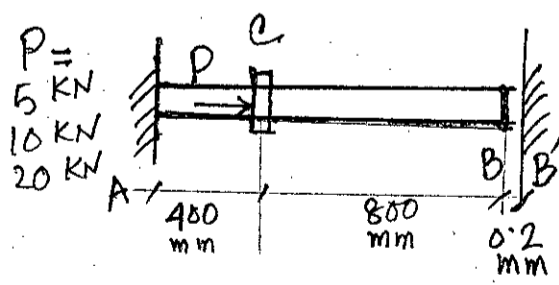


Fig. 3

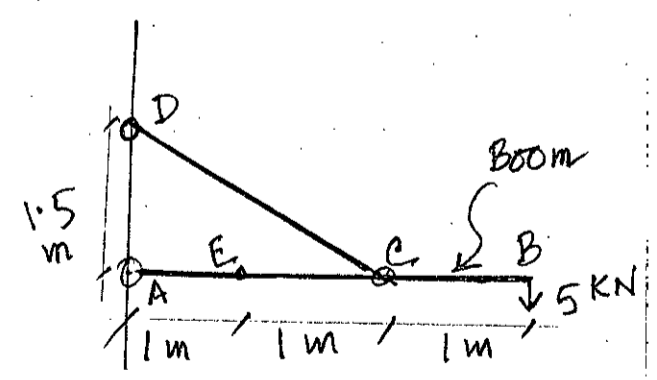


Fig. 4

L-2/T-2/ARCH

Date: 16/03/2019

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-2 B. Arch Examinations 2017-2018

Sub: **ARCH 235 (ARCH 441)** (Architecture of Modern Period)

Full Marks: 140

Time: 3 Hours

The figures in the margin indicate full marks

USE SEPARATE SCRIPTS FOR EACH SECTION

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**SECTION – A**

There are **FOUR** questions in this section. Answer **Q. No. 4** and any **TWO** from the rest.

1. Describe 'Johnson Wax Administration' building with emphasis on Frank Lloyd Wright's ideas regarding work place. (25)
2. What is 'structural classicism'? How is it related to the idea of 'Primitive hut' introduced by Laugier. (25)
3. What are the ten Paradigms of Enlightenment? Explain two of them in relation to concepts of modern architecture. (25)
4. Write short notes on any two: (10×2=20)
  - (a) Impressionism
  - (b) Newton's cenotaph
  - (c) Shortcomings of Modern Architecture.

**SECTION – B**

There are **FOUR** questions in this section. Answer **Q. No. 8** and any **TWO** from the rest.

5. Describe the main features of the 'Robie House' designed by Frank Lloyd Wright. (25)
  6. Discuss the significance of 'Chicago School of Architecture'. Describe Chicago Auditorium Building as the magnum opus of Architect Louis Sullivan. (25)
  7. Describe Barcelona Pavilion to clarify the well-known statement, "Less is more" by Mies Van Der Rohe. (25)
  8. Write short notes on any Two of the following: (10×2=20)
    - (a) International style
    - (b) Cubism
    - (c) 'Imaginary Prisons' by Piranesi
-