BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-2   B. Arch. Examinations 2015-2016

Sub : **ARCH 255** (Architectural Acoustics)

Full Marks: 140   Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

SECTION – A

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

1. (a) Why acoustics is an important aspect in architecture?   **(10)**

    (b) Write about architect's scope of work in architectural acoustics.   **(12)**

2. "The human ear is an organ of marvelous sensitivity, complexity and robustness" —
    explain with necessary illustrations.   **(16)**

3. (a) Write about acoustic treatments of the Roman amphitheatres. Use necessary
    sketches.   **(12)**

    (b) Why sounding vases were used in Roman theater?   **(4)**

4. Write about "source characterization" in acoustics through explaining point source,
    spherical spreading, directionality, directivity and directivity index.   **(16)**

5. Write short notes on the following (any two)   **(8×2=16)**

    (a)   Noise

    (b)   The acoustic impedance

    (c)   Sound pressure level
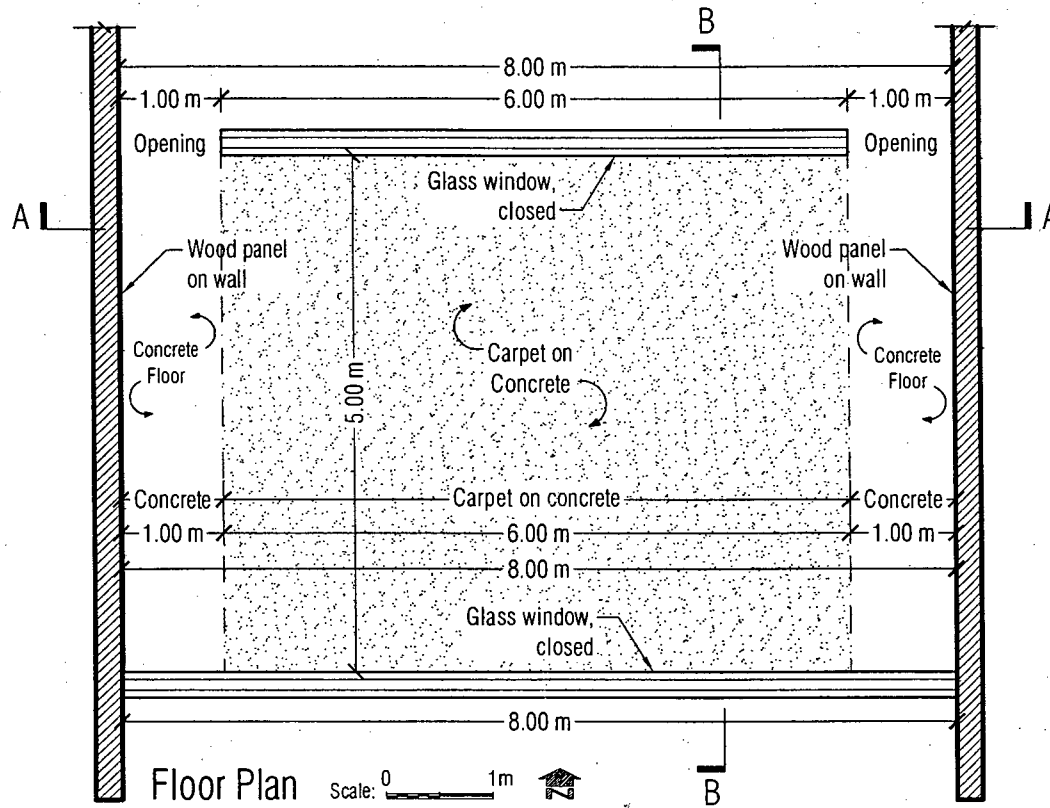
SECTION – B

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

6. (a) (i) Calculate the Reverberation Time (TR) at 500 Hz for the room shown in Fig.
        for Q 6(a).   **(12)**

    (ii) Make comments on suitability of the room for speech in Bangla.   **(2)**

    (b) Write short notes (any TWO):   **(4+4=8)**

        (i)   Absorption Coefficient

        (ii)   Reverberation Time

        (iii) Signal to Noise Ratio

ARCH 255

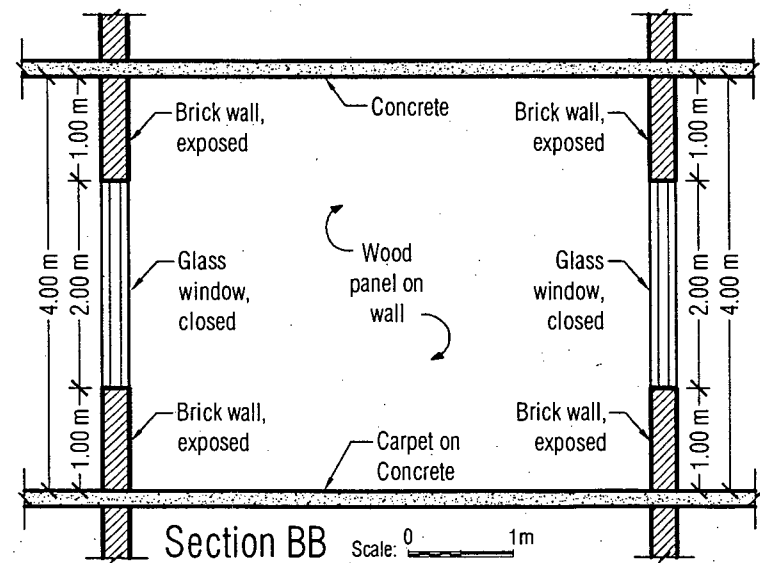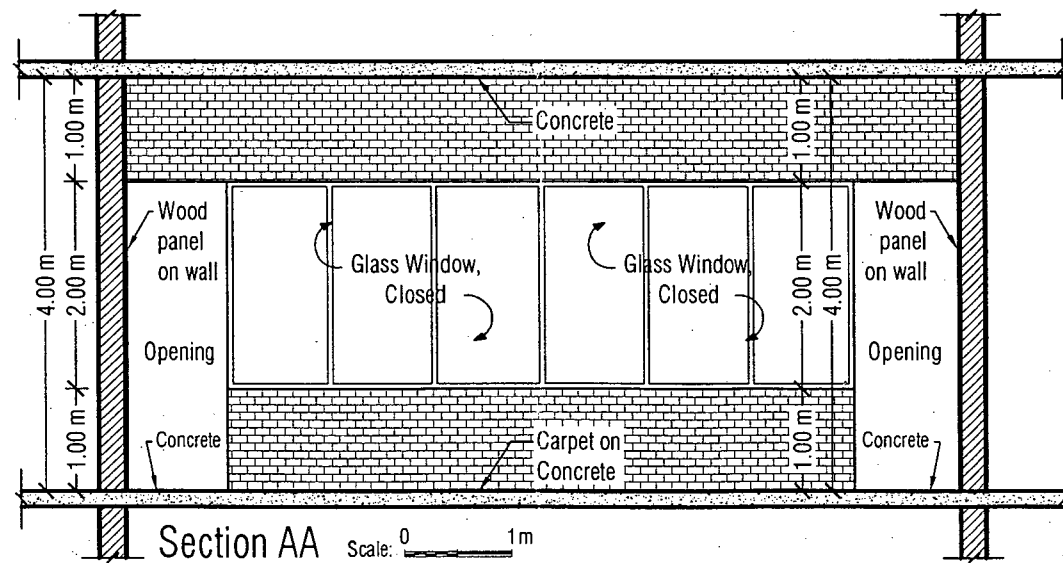7. Explain with figures, how does sound behave in an enclosed space for absorption, reflection, transmission and diffusion? (4×4=16)

8. Elucidate following singular phenomena with necessary sketches and examples: (4×4=16)
    (i) Echo (ii) Flutter Echo (iii) Sound focus and dead spot (iv) Whispering Gallery

9. (a) Discuss general requirements of acoustic design and how those differ in spaces for speech, music and multipurpose. (12)
    (b) Explain the statement: "Architectural means should ensure acoustic performance of a space, while electro-acoustics would only supplement." (4)

10. (a) Describe the principles of speech privacy between enclosed spaces with any four examples of sound isolation descriptors. (8+4=12)
    (b) In schematic plans, show examples of 'poor' and 'good' acoustic treatments for a space of circular plan. (4)

Floor Plan

B

8.00 m

1.00 m — 6.00 m — 1.00 m

Opening

Opening

Glass window, closed

A | | A

Wood panel on wall

Wood panel on wall

Concrete Floor

Carpet on Concrete

Concrete Floor

5.00 m

Concrete 1.00 m — Carpet on concrete — 6.00 m — Concrete 1.00 m

8.00 m

Glass window, closed

8.00 m

Floor Plan Scale: 0 — 1m

B

	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 by the volume of air in the room

Section AA

Concrete

1.00 m

1.00 m

4.00 m

2.00 m

Wood panel on wall

Glass Window, Closed

Glass Window, Closed

Wood panel on wall

2.00 m
4.00 m

Opening

Opening

1.00 m

Concrete

Carpet on Concrete

Concrete

1.00 m

Section AA Scale: 0 — 1m

Section BB

Brick wall, exposed

Concrete

Brick wall, exposed

1.00 m
4.00 m
2.00 m

Glass window, closed

Wood panel on wall

Glass window, closed

2.00 m
4.00 m
1.00 m

Brick wall, exposed

Carpet on Concrete

Brick wall, exposed

Section BB Scale: 0 — 1m

Fig. for Q 6(a)

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-2   B. Arch. Examinations 2015-2016

Sub : **ARCH 235** (Art and Architecture V)

Full Marks: 140   Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

SECTION – A

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

1. What according to Kenneth Frampton is "Romantic Classicism"? Give description of an exemplary work by E.L. Boullee to explain the concept.   **(20)**

2. Describe Barcelona Pavilion to explain the famous dictum "Less is More" by Mies Van der Rohe.   **(20)**

3. Describe "Robie House" as the finest example of Prairie Houses.   **(20)**

4. Write short notes on any TWO from the followings: **(15×2)**
    (a) Prison Series by Piranesi.
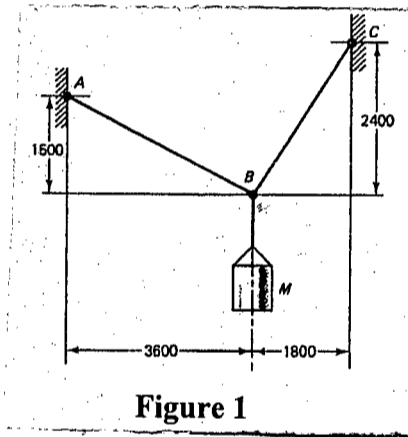   (b) Expressionism.
    (c) Bauhaus.

SECTION – B

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

5. What do you understand by the term 'Promenade Architecture' with reference to the early houses designed by Le Corbusier. Explain with the help of an example of built work by this Master Architect.   **(20)**

6. What are the 10 paradigms of Enlightenment? Briefly describe any three of them.   **(20)**

7. Describe 'Crystal Palace' and discuss its significance for the architecture of the 20th century.   **(20)**

8. Write short notes on any TWO from the followings: **(15×2)**
    (a) Primitive Hut.
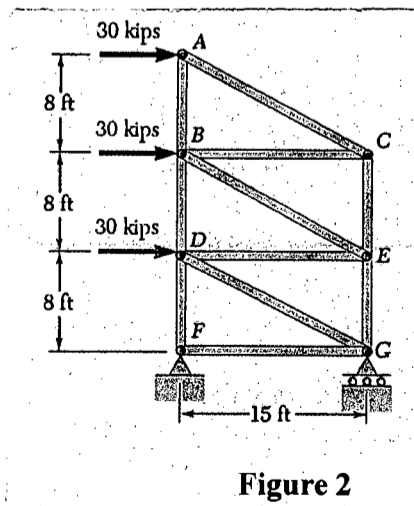   (b) Cubism.
    (c) Chicago School of Architecture.

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-2   B. Arch. Examinations 2015-2016

Sub : **CE 267** (Structure II: Basic Mechanics of Solid)

Full Marks: 140   Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

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

1.   (a) What is Stress Tensor?   **(4)**

(b) Two high-strength steel rods of different diameters are attached at A and C and support a mass M at B, as shown in the Figure 1. What mass M can be supported? The ultimate strength of the rods is 800 Mpa and the factor of safety is to be 2. Rod AB has $A = 200$ mm^2; rod BC has $A = 400$ mm^2. (The ends of the wires in such applications require special attachments.)   **(8⅓)**

Figure 1

(c) For the steel truss ($E = 29 \times 10^6$ psi) and loading shown in the figure 2, determine the deformations of members BD and DE, knowing that their cross-sectional areas are 2 in^2 and 3 in^2, respectively.   **(11)**

Figure 2

CE 267

2. (a) What is Factor of Safety? **(4)**

(b) A column in a two-story building is fabricated from square structural steel tubing having a modulus of elasticity $E = 210$ GPa. The cross-sectional dimensions of the two segments are shown in Figure 3. Axial loads PA 200 kN and PB 300 kN are applied to the column at levels A and B, as shown in Figure 3. (i) Determine the axial stress in segment AB of the column and the axial stress in segment BC of the column. (ii) Determine the amount δ by which the column is shorten. **(10)**

Figure 3

(c) Find the stress in the mast of the derrick shown in the Figure 4. All members are in the same vertical plane and joined by pins. The mast is made from an 8-in standard steel pipe weighing 28.55 lb/ft. Neglect the weight of the members. **(9⅓)**
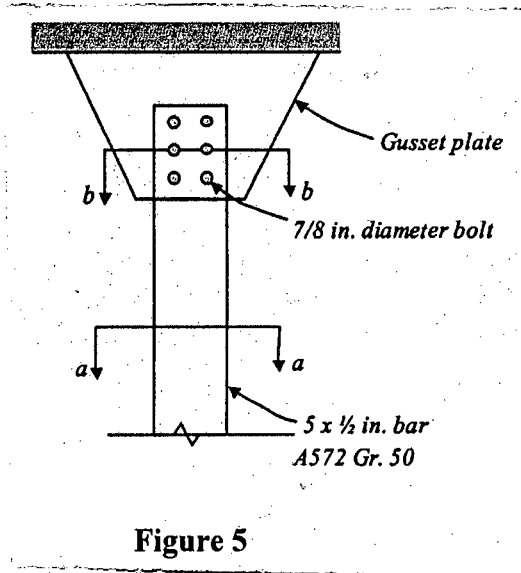

Figure 4

3. (a) A $5 \times \frac{1}{2}$ bar of A572 Gr. 50 steel is used as a tension member. It is connected to a gusset plate with six 7/8 in. diameter bolts as shown in Figure 5. Assume that the effective net area A_e equals the actual net area A_n and compute the tensile design strength of the member. **(10)**
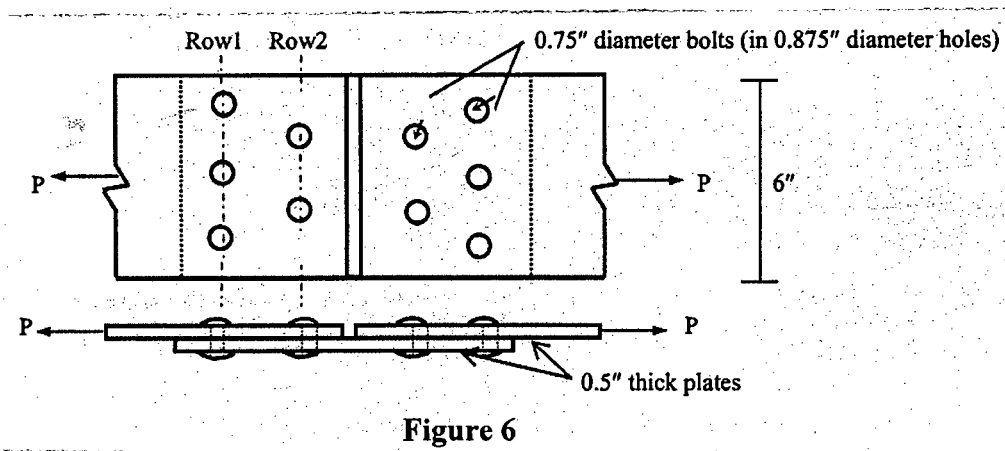
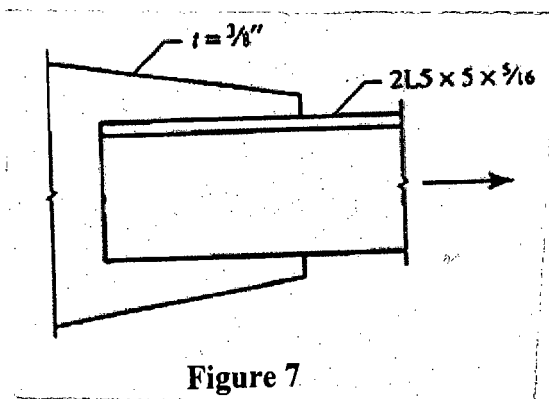**CE 267**

Contd... Q. No. 3(a)

Figure 5

(b) Calculate the maximum shearing, tearing and bearing stresses in the riveted joint shown in Figure 6, when subjected to a force $P = 40$ k. Also comment on the adequacy of the joint if the allowable shearing, tearing and bearing stresses are 17, 22 and 27 ksi respectively.

$(13\frac{1}{3})$

Figure 6

4.   (a) Design a double angle tension member shown in Figure 7 and connection system to carry a factored load of 300 kips. All steel are A36 steel ($f_y = 36$ ksi, $f_u = 50$ ksi)   **(15)**
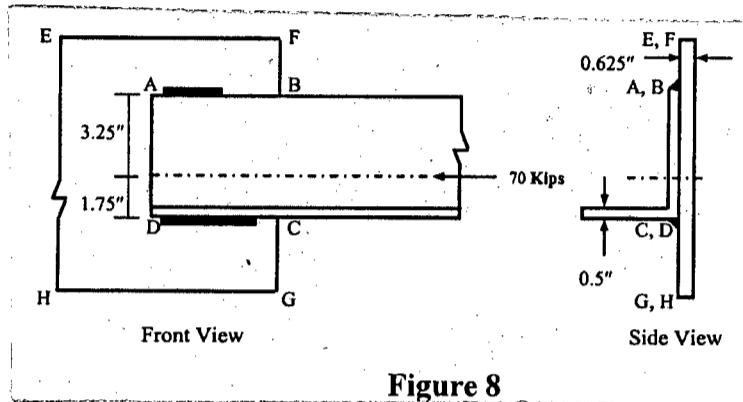

Figure 7

CE 267

Contd... Q. No. 4

(b) In Figure 8 shown below, calculate the length of 3/8-inch weld joints required on sides *AB* and *CD* only to connect the 0.5″ thick channel section *ABCD* to the 0.625″ thick plate EFGH. Axial force of 70 kips passes through centroid of *ABCD* [Given: Allowable shear stress = 16 ksi]

(8⅓)

Figure 8

SECTION-B

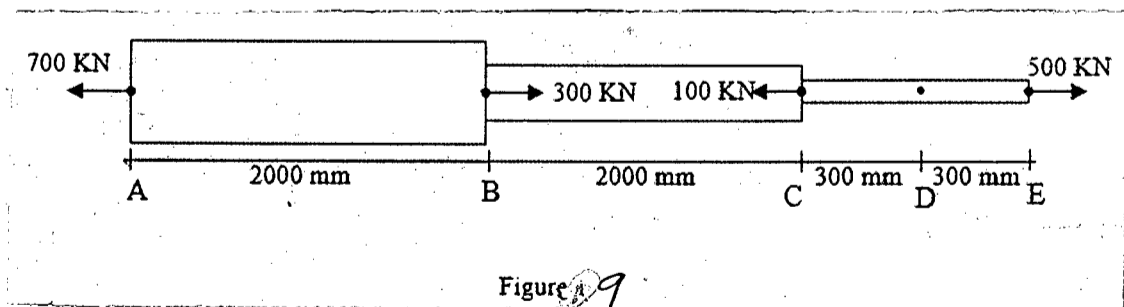There are **FOUR** questions in this section. Answer any **THREE**.

Assume reasonable values for missing data.

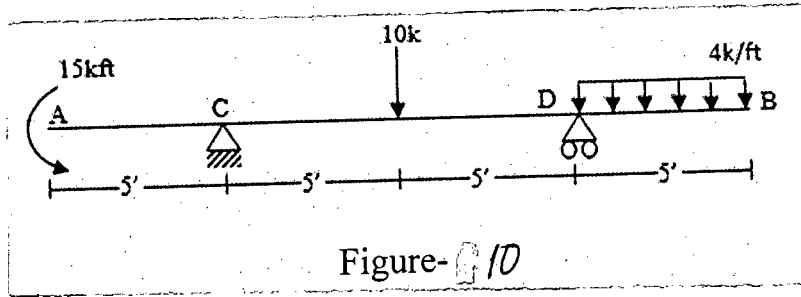5. (a) Draw a qualitative stress strain diagram of mild steel showing its various components.

(7⅓)

(b) Draw Axial Force Diagram of the following elastic steel beam (Figure 9). Determine the relative displacement of point D from point A for the elastic steel bar of variable cross sections shown in Figure 9 caused by the application of concentrated forces. Areas A_{AB} = 3000 mm^2, A_{BC} = 1500 mm^2, A_{CE} = 750 mm^2. Modulus of Elasticity, E = 200 GPa.
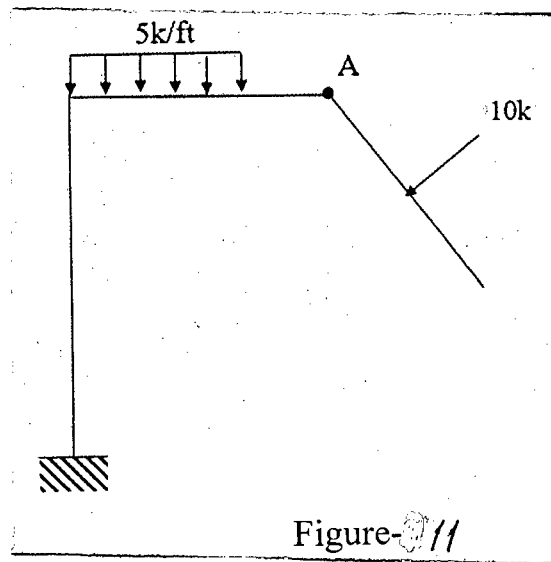
(6+10)

Figure 9

CE 267

6. (a) Calculate the reaction at the supports in the following beam (Figure 10).   **(8)**

Figure-10

(b) Draw shear force and bending moment diagrams for the beam shown in Figure 10.   **(15⅓)**

7. (a) Define shear force and bending moment with brief discussion on their sign convention.   **(5)**

(b) Determine shear force and bending moment at Point 'A" of the following frame (Figure 11).   **(8)**

Figure-11

(c) Draw shear force and bending moment diagrams for the frame shown above (Figure 11).   **(10⅓)**

8. (a) Write short notes on engineering stress and true stress.   **(6⅓)**

(b) State Hooke's law and write down the definition of Poisson's Ratio.   **(7)**

(c) Prove that, for a simply supported beam $M = \int_{0}^{x} V dx + C$:   **(10)**

Where the symbols have their usual meaning.

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-2   B. Arch. Examinations 2015-2016

Sub : **HUM 231** (Philosophy)

Full Marks: 140   Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

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.   **(15⅓)**

2. (a) What is knowledge? What are the sources of knowledge?   **(8)**

    (b) Discuss rationalism and empiricism as sources of knowledge.   **(15⅓)**

3. (a) What are the questions we need to address in order to show the relation between body and mind?   **(7)**

    (b) Discuss interactionism, parallelism and physicalism as theories of mind—body relation.   **(16⅓)**

4. (a) Explain with example the distinction between judgment of fact and judgment of value.   **(7)**

    (b) Discuss the different types of value. Show that values are both subjective and objective.   **(16⅓)**

SECTION-B

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

5. (a) What is anthropocentrism? How does it differ from non anthropocentrism?   **(8)**

    (b) Critically discuss different arguments in favour of the anthropocentric domination over nature.   **(15⅓)**

6. (a) What is profession? Do you think that all skilled people are professionals?   **(10)**

    (b) Discuss different characteristics of professional.   **(13⅓)**

7. (a) What are the fundamental canons of the professional code of conduct?   **(8)**

    (b) Explain and evaluate different code of conduct related to professional engineering.   **(15⅓)**

8. (a) Who is a whistle blower?   **(5)**

    (b) Discuss classification, conditions and factors of whistle blowing.   **(18⅓)**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNO
L-2/T-2   B. Arch. Examinations 2015-2016
Sub : **HUM 315** (Logic and Philosophy)
Full Marks: 140   Time : 3 Hours
The figures in the margin indicate full marks.
USE SEPARATE SCRIPTS FOR EACH SECTION

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

1. (a) Explain with example the distinction between simple and compound statements. Why is simple statement called atomic statement? (8)

    (b) Explain with truth table conjunctive, disjunctive and implicative compound statement. **(15)**

2. (a) What is argument? Show that premiss and conclusion of argument are relative terms. **(13⅓)**

    (b) Construct a truth table technique to determine the validity of the following argument form: **(10)**

$$p \supset q$$
$$q \supset r$$
$$\therefore p \supset r$$

3. (a) Define definition. What are the rules of definition? **(6)**

    (b) Explain with example different types of definition. **(17⅓)**

4. (a) Show the distinction between mediate and immediate inference. **(6)**

    (b) Explain with example the fallacy of undistributed middle fallacy of equivocation, fallacy of illicit major and fallacy of illicit minor. **(17⅓)**

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

5. (a) What are the misconceptions about philosophy? Do you agree with them? Give reasons for your answer. **(8⅓)**

    (b) Discuss different branches of philosophy. **(15)**

6. (a) Explain with examples different ideas introduced by Rene Descartes. **(8⅓)**

    (b) Explain the critical theory of Immanuel Kant. In what sense Kant is considered as an agnostic? **(15)**

7. (a) Show the distinction between formal truth and material truth. **(6⅓)**

    (b) Explain with example different theories of truth. **(17)**

8. (a) Discuss different contents of the idea of God. **(6⅓)**

    (b) Explain and evaluate different proofs for the existence of God. **(17)**