BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1, B.Arch Examinations (Term: January-2020)

Sub: **ARCH 131** (Architecture of Ancient Civilization)

Full Marks: 120   Time: 2 Hours

The figures in the margin indicate full marks

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION-A (60 Marks)

There are FOUR questions in this section. Answer Q.1 and any Two from the rest.

(Special Instruction: This is an **Open Book** examination.)

1. (a) What is civilization? What were the elementary components that   (10 x 2 =20)
    were necessary for the inception of civilization?

    (b) Write a short note on 'Mastaba' with necessary illustrations.

2. Elaborate on the relationship between the rivers and the cities of Indus   (20)
    Valley Civilization.

3. Distinguish between the precincts/ complexes of Stepped Pyramid and   (20)
    Pyramid of Giza in terms of their components with necessary
    illustrations.

4. Focusing on the social aspects, differentiate between the settlements of   (20)
    Khirokitia and Catal Hüyük.

SECTION-B (60 Marks)

There are FOUR questions in this section. Answer Q.5 and any Two from the rest.

5. (a) What do you mean by 'Iron Age'? 'The economic importance of   (10x2=20)
    Mesopotamia and Egypt was lessened during the iron age'- elaborate.

    (b) Write a short note on 'The Etruscan Temples' with necessary
    illustrations.

6. Compare the Minoan Palace of Knossos and the Mycenaean Palace of   (20)
    Pylos in terms of their contextual and architectural characteristics.

7. Show the noticeable differences between the Egyptian cult temples   (20)
    during the New Kingdom and the Ptolemaic period using necessary
    sketches.

8. Explain the principle shift of Chinese Architecture from the 'Zhou   (20)
    dynasty' to the 'warring states period' with illustrations.

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

Level-1/Term-1   B. Arch Examinations: January 2020

Sub: ARCH 133 (Design Theory)

Full Marks: 120   Time: 2 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. 1** and any **TWO** from the rest.

(Special Instruction: **Open Book** Examination)

1)   Write short notes on the following.

    i)   Related color scheme   (10)
    ii) Contrasting color scheme   (10)

2)   'Families of form' – Explain with necessary diagrams.   (20)

3)   'Hierarchy as a principle of design' – Describe with required illustrations.   (20)

4)   Explain effect and use of Tactile texture and Visual texture in the field of art and architecture. (20)

SECTION – B

There are **FOUR** questions in this section. Answer **Q.5** and any **TWO** from the rest.

(Special Instruction: **Open Book** Examination)

5.   Explain how 'L-shaped plane' and 'U-shaped plane' as vertical space defining
    elements define spaces.   (20)

6.   (a) What are the Visual properties of form? Discuss them briefly.   (8)
    (b) Describe how Form and Surface can be articulated.   (12)

7.   Write short notes on the following.   (10x2=20)
    a.   Platonic Solids
    b.   Scale
8.   What are the types of Additive forms? Discuss them briefly.   (20)

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1, B.ARCH Examinations (Term: January-2020)

Sub: ARCH 607 (Fire Safety Design)

Full Marks: 120   Time: 2 Hours

The figures in the margin indicate full marks

USE SEPARATE SCRIPTS FOR EACH SECTION

(Special Instruction: **Open Book** Examination)

SECTION-A

There are **FOUR** questions in this section. Answer **Q.1** and any **TWO** from the rest.

1. What do you understand by direct, surface, and root causes of a fire incident? Explain with an example.   (20)

2. Give your opinion on how fire drills can ensure the life safety of building occupants. Narrate what will you do and don't do in case of a fire incident.   (20)

3. Describe characteristics of a safe evacuation route. Why occupant load, total number and sum of the width of exit doors are important to architects for fire safety design. Explain with an example.   (20)

4. Why it is important to take photographs of all non-confirmations of code during fire safety audit visits. Explain with practical examples with reference to BNBC 2006.   (20)

SECTION-B

There are **FOUR** questions in this section. Answer **Q.5** and any **TWO** from the rest.

5. What is fire? Explain the principles and methods of fire extinguishment. What are the basic reasons for fire incidents in the context of Bangladesh?   (20)

6. What is a means of egress? Write down the basic requirements for means of egress. Differentiate between exit access, exit and exit discharge with sketches.   (20)

7. How to use a fire extinguisher. Describe different types of portable fire extinguishers.   (20)

8. How a fire alarm system (FAS) can protect fire. Describe fire detection, sprinkler, and standpipe and hydrant system briefly.   (20)

L-1/T-1/ARCH   Date:25/01/2021

BANGLADESH UNIVERSITY OF ENINEERING AND TECHNOLOGY, DHAKA

L-1/T-1, B.ARCH Examinations (Term: January-2020)

Sub: **ARCH 703** (Art Appreciation)

Full Marks: 120   Time: 2 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 **Q.1** and any **TWO** from the rest.

(Special Instruction: **Open Book** Examination)

1. Mention the classification of Visual Art with examples.   (20)

2. Define Watercolor. Describe the history and the evolution of Watercolor.   (4+8+8=20)
    What are the differences between Watercolor & Acrylic Paint?

3. Write short notes on the following process of printmaking: (4x5=20)
    a. Relief
    b. Intaglio
    c. Lithography
    d. Dry point

4. Creativity is not limited to those with inborn "talent". We all have the   (5+15=20)
    potential to be creative, yet most of us have never been encouraged to
    develop our creativity.
    What is Creativity? What are the characteristics of a creative person?

SECTION-B

There are **FOUR** questions in this section. Answer **Q.5** and any **TWO** from the rest.

(Special Instruction: **Open Book** Examination)

5. Define art from your point of view. Why art is important? Explain.   (20)
6. What is Performance Art? Which techniques are used in Performance Art? Describe an
    example of Performance Art.   (4+8+8=20)
7. What are the points that you need to look for while approaching to Visual Art? Explain
    with examples.   (20)
8. Write short notes on any TWO of the following.   (10+10=20)
    a.   Interactive Art
    b.   Algorithmic Art
    c.   Nano Art

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1 B. Arch. Examinations January- 2020

Sub: HUM 705 (English)

Full Marks: 120   Time 2 Hours

The Figures in the margin indicate full marks

USE SEPARATE SCRIPTS FOR EACH SECTION

There are 04 page(s) in this question paper.

SECTION – A

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

1.   Read the following passage carefully and answer all the questions that follow: (20)

Three passions, simple but overwhelmingly strong, have governed my life: the longing for love, the search for knowledge, and unbearable pity for the suffering of mankind. These passions, like great winds, have blown me hither and thither, in a wayward course, over a deep ocean of anguish, reaching to the very verge of despair.

I have sought love, first, because it brings ecstasy so great that I would often have sacrificed all the rest of life for a few hours of this joy. I have sought it, next, because it relieves loneliness—that terrible loneliness in which one shivering consciousness looks over the rim of the world into the cold unfathomable lifeless abyss. I have sought it, finally, because in the union of love, I have seen, in a mystic miniature, the prefiguring vision of the heaven that saints and poets have imagined. This is what I sought and, though it might seem too good for human life, this is what at least I have found. With equal passion, I have sought knowledge. I have wished to understand the hearts of

men. I have wished to know why the stars shine. And I have tried to apprehend the Pythagorean power by which number holds sway over the flux. A little of this, but not much, I have achieved.

Love and knowledge, so far as they were possible, led upward toward the heavens. But always pity brought me back to earth. Echoes of cries of pain reverberate in my heart. Children in famine, victims tortured by oppressors, helpless old people a hated burden to their sons, and the whole world of loneliness, poverty and pain make a mockery of what human life should be. I long to alleviate the evil, but I cannot, and I too suffer.

This has been my life. I have found it worth living, and would gladly live it again if the chances were offered to me.

(Extracted from Bertrand Russell's Autobiography)

Questions:

a)   Why has the writer compared three passions to great winds?

b)   What changes have the passions brought in the life of the writer?

c)   What, according to the writer, is the importance of love in life?

d)   What are the three things you are passionate about?

2.   You have received some products in a damaged condition from your suppliers.   (20)
Now write a letter of complaint emphasizing the need of greater care in complying with the orders. (Provide necessary details of your own)

3.   Write an essay on any one of the following: (20)

a)   Positive Thinking: A Key to Success in Life.

b)   Juvenile Delinquency: A Social Curse

4.   Describe the characteristic features of a formal report.   (20)

SECTION – B

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

5. Answer **any one** of the following questions: (20)

    (a) Who according to you won the bet? Justify your answer according to the story 'The Bet'.

    (b) How did the loss of the necklace change the life of the Loisel couple?

6. (a) Explain with reference to the context **any one** of the following: (10)

    i.   "All that the unresting thought of man has created in ages is compressed in a small compass in my brain. I know that I am wiser than all of you."

    ii.   "Yes, I have had some hard days since I saw you; and some miserable ones – and all because of you."

                                                                                       (10)

    (b). Answer **any two** of the following questions:

    i.   Describe the night on which the banker proceeded to kill the lawyer.

    ii.   In spite of being a charming young lady why was Mrs. Loisel so unhappy?

    iii. How was Laura Sheridan affected by the death of her neighbour?

7. Write a dialogue between two Architecture students about the relation between   (20)
    Architecture and Literature.

8. Write a precis of the following passage with a suitable title: (20)

It is very easy to acquire bad habits, such as eating too many sweets or too much food, or drinking too much liquid of any kind, or smoking. The more we do a thing, the more we tend to like doing it; and, if we do not continue to do it, we feel unhappy. This is called the *force of habit*, and the force of habit should be fought against. Things, which may be very good when only done from time to time, tend to become very harmful when done too often and too much. This applies even to such good things as work or rest. Some people form a bad habit of working too much, and others of idling too much. The wise man always remembers that this is true about himself, and checks any bad habit. He says to himself, "I am now becoming idle" or "I like too many sweets" or "I smoke too much" and then says without further ado, "I will get myself out of this bad habit at once." One of the widely spread bad habits is the use of tobacco. Tobacco is smoked or chewed by men, often by women, and even by children, almost all over the world. It was brought into Europe from America by Sir Walter Raleigh, four centuries ago, and has thence spread everywhere. There are doubts whether there is any good in the habit, even when tobacco is not used to excess; and it is extremely difficult to get rid of this habit when once it has been formed.

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

B. Sc. Engineering Examinations January 2020

Sub: **PHY 115**   Physics (Light, Heat and Sound)

Full Marks: 180   Time: 2 Hours

The figures in the margin indicate full marks. Symbols have their usual meanings.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION-A

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

1. (a) A spring is vibrating in a medium where it experiences a damping force. A   **(20)**
   sinusoidal external force is applied to keep the spring vibrating. Establish the equation
   of motion of the vibrating spring and find out the equation of displacement of the
   spring. Discuss the consequence when the spring attains its maximum amplitude.

   (b) A body of mass 8.4 g is undergoing a forced oscillation with the force constant 75   **(10)**
   Nm^{-1}, in presence of a damping constant 0.3 $N\text{-}m^{-1}s$. The sinusoidal driving force with
   the angular frequency 75 rad/s is applied to keep the body oscillating. Determine the
   resonant frequency and response of the oscillating body.

2. (a) Consider a source is emitting sound in a room containing several absorber media.   **(20)**
   Find the expression of growth and decay of sound intensity in the room using Sabine's
   assumptions and hence derive the equation of reverberation time. How tuning of
   reverberation time can improve the acoustics of a building?

   (b) A sound source is emitting sound of frequency 0.5 kHz inside an auditorium having   **(10)**
   the area 280 m^2 and height 25 m. Total 1500 m^2 area of the auditorium walls and
   ceiling are covered with felts. The stairs and stage are covered with carpets of area 360
   m^2. The auditorium has the capacity of 350 audience. Each seat is covered with 0.7 m^2
   lather. Absorption coefficients of felt, carpet and lather are 0.15, 0.07 and 0.9 Sabines
   for the sound frequency of 0.5 kHz, respectively. Find out the reverberation time for the
   auditorium.

3. (a) A stretched string fixed at two ends is connected to a vibrator. The vibrator   **(20)**
   generates a sound wave, and a stationary wave is created on the string by reflection.
   Deduce the equations of particle displacement, particle velocity, acceleration and strain
   for the stationary wave. Discuss the conditions for which the amplitude of the wave is
   minimum and maximum. When stationary instant appears in the wave?

(b) A wave is propagating along positive X-direction in a fluid medium with density (10)
850 kgm^{-3}. The wave is travelling with the amplitude 0.07 m, velocity 175 m/s and
frequency 297 Hz. Evaluate the displacement of particle when the wave travels a
distance 0.15 m from the source after the time 8.2 s and intensity of the wave.

4. (a) Write some fundamental properties of thermal radiations. In point of view of a (16)
blackbody, state and explain Kirchhoff's law of heat radiation.

(b) Two large closely spaced concentric spheres of emissivity e are maintained at (14)
temperatures T_1 and T_2. The space in between the two is evacuated. State Stefan's law
of heat radiation and write down the equation of net rate of loss (or gain) of heat in
between these two spheres. If the temperatures are maintained at 250 K and 350 K,
calculate the net rate of energy transfer between the two spheres [$\sigma = 5.675 \times 10^{-8}$
M.K.S units].

SECTION-B

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

5. (a) Define specific humidity and relative humidity of air. Derive the equations for (14)
specific humidity and relative humidity of air and hence find the relation between them.

(b) Draw the experimental setup of Regnault's dew point hygrometer. Briefly explain (16)
the working principles and its advantages compared to other hygrometers.

6. (a) Discuss the rectilinear flow of heat along a bar of uniform cross-section and show (16)
that the general equation of the rectilinear flow of heat is a second order differential
equation.

(b) Write down the equation of the Ingen-Hausz experiment and explain the physical (14)
significance of the equation. In an Ingen-Hausz experiment, wax melted over 15 cm
copper rod and 7 cm iron rod. What is the conductivity of the iron when the
conductivity of the copper is 0.93?

7. (a) Distinguish between constructive and destructive interference of light. Is there any (18)
loss of energy in the interference phenomenon? Why do you take monochromatic light
source instead of white light in order to observe the interference pattern clearly?

2

(b) Why do you observe the circular rings in Newton's rings experiment? Newton's **(12)** rings are observed in reflected light of wavelength 5.9×10^{-5} cm. The diameter of the 8th dark ring is 0.4 cm. Find the radius of curvature of the lens.

8. (a) State Malus' law. Why analyzer is used to identify polarized light? What happens **(22)** when a polarized light strikes an analyzer? If θ is the angle between the plane of transmission of the analyzer and the plane of the polarizer, at what angle a beam of light is reduced to 0.50 of its original intensity?

(b) How do you show that the intensity of the first maxima is about 4.90% of the central **(08)** maximum due to the Fraunhofer class of diffraction at a single slit?

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1   B ARCH Examinations 2019-20

Sub: **MATH 111** (Mathematics)

Full Marks: 120   Time: 2 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

Symbols used have their usual meaning.

SECTION – A

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

1. (a) Sketch the graph and discuss the continuity and differentiability of the function $f(x) = |x-2| + |x|$, at the point $x = 2$.   (10)

   (b) Find the nth derivative of the function $y = \cos(2\cos^{-1}x)$.   (10)

2. (a) Find the maximum and minimum values of the function $f(x) = 4x^3 - 15x^2 + 12x - 2$. Also find the points of inflection.   (10)

   (b) If $u = \ln r$ and $r^2 = (x-a)^2 + (y-b)^2 + (z-c)^2$, then evaluate:

   $$\left[\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} \right].$$ (10)

3. (a) Evaluate: $\displaystyle\int \frac{dx}{\sqrt[3]{x}\,\sqrt[3]{(1-x)^8}}$.   (10)

   (b) Evaluate: $\displaystyle\lim_{n\to\infty}\left[\left(1 + \frac{1}{n^2}\right)^{2/n^2} \left(1 + \frac{4}{n^2}\right)^{4/n^2} \cdots\cdots\cdots\cdots (2)^{2/n} \right]$.   (10)

4. (a) Evaluate: $\displaystyle\int_0^{\frac{\pi}{4}} \ln(1 + \tan x)\, dx$.   (10)

   (b) Find the area of the region bounded by the curve $\left(\dfrac{x}{3}\right)^{\frac{2}{3}} + \left(\dfrac{y}{2}\right)^{\frac{2}{3}} = 1$.   (10)

MATH 111(ARCH)

SECTION - B

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

5.   (a)   Find the angle between the lines whose direction cosines are given by the   (10)
relations: $l + m + n = 0$, $2lm + 2nl - mn = 0$.

     (b)   Find the equation of the plane containing the line $\frac{x+1}{-3} = \frac{y-3}{2} = \frac{z+2}{1}$ and   (10)
passing through the point $(0, 7, -7)$.

6.   (a)   Find the equation of the plane passing through the line of intersection of the   (10)
planes $2x - y = 0$ and $3z - y = 0$ and perpendicular to the plane $4x + 5y - 3z = 8$.

     (b)   Find the equation of the line passing through the point $(-2, 3, 4)$ and   (10)
parallel to the planes $2x + 3y + 4z = 5$ and $3x + 4y + 5z = 6$.

7.   (a)   Show that the lines $\frac{x+3}{2} = \frac{y+5}{3} = \frac{z-7}{-3}$ and $\frac{x+1}{4} = \frac{y+1}{5} = \frac{z+1}{-1}$ are coplanar and   (10)
find the equation of the plane containing them.

     (b)   Find the length and equation of the line of shortest distance between the lines   (10)
$\frac{x-3}{-1} = \frac{y-4}{2} = \frac{z+2}{1}$ and $\frac{x-1}{1} = \frac{y+7}{3} = \frac{z+2}{2}$.

8.   (a)   Find the equations of the tangent planes to the sphere $x^2 + y^2 + z^2 = 9$ (10)
which pass through the line $x + y - 6 = 0 = x - 2z - 3$.

     (b)   A variable plane passes through a fixed point (a, b, c) cuts the coordinate   (10)
axes at the points A, B, C. Find the locus of the centre of the sphere passing
through the points O, A, B, C; O being the origin.