L-1/T-2/URP **Date:20/01/2021**

BANGLADESH UNIVERSITY OF ENINEERING AND TECHNOLOGY, DHAKA

BURP Examinations (Term: January-2020)

Sub: **ARCH 145** (Elements of Architecture)

Full Marks: 60+60=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 any **THREE**.
(Special Instruction: **Open Book** Examination)

Q.1. Define 'architecture' according to the philosophy of D.K Ching. Explain the key components of architectural system and order that constitute an architectural work. Use appropriate example and illustrations. (5+15=20)

Q.2. How do you differentiate between 'form' and 'shape' in relation to their physical characteristics? Discuss how vertical element can define a space? Explain with illustrations in relation to the human scale. (5+15=20)

Q.3. What are the basic criteria for selecting the type of organization to be used in a specific situation? Discuss the organization type of buildings in the Master Plan of Jahangir Nagar University at Savar, Dhaka using appropriate illustration. (5+15=20)

Q.4. What is the significance of achieving 'order' in architecture? According to D.K Ching discuss how we can achieve order in architectural design. Use appropriate example and illustrations. (5+15=20)

SECTION-B (60 Marks)

There are **FOUR** questions in this section. Answer **Q.5** and any **TWO** from the rest.
(Special Instruction: **Open Book** Examination)

Q.5 Which Architectural Analogy would you choose to define the design of Architecture Building in BUET? – explain briefly. (20)

Q.6 Discuss two key limitations of the 'Tree of Architecture' diagram by Banister Fletcher showing the growth of various Architectural Styles. (20)

Q.7 Illustrate the major architectural features of Roman Forum which had given the Emperors both notoriety and immortality. (20)

Q.8 Despite being Modernist in principle, which architectural elements have made our National Parliament Building to be deeply rooted in its context? (20)

L-1/T-2/URP Date: 24-01-2021

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 BURP Examinations 2018-19

Sub: MATH 103 (Mathematics II)

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** questions

1. **(a)** Discuss the continuity and differentiability of the function **(10)**

$$f(x)=\begin{cases}5x-4, 0<x\le 1\\ 4x^2-3x, 1<x<2\end{cases}$$ at the point $x=1$.

Also, sketch the graph of the function.

(b) If $y=x\cos(\ln x)$, then show that **(10)**

$$x^2y_{n+2}+(2n-1)xy_{n+1}+(n^2-2n+2)y_n=0.$$

2. **(a)** Discuss the concavity and hence find the point of inflection of **(10)**

the function $f(x)=x^3-3x^2+x-2.$

(b) If $u=f(x-y,y-z,z-x)$, evaluate: $\dfrac{\partial u}{\partial x}+\dfrac{\partial u}{\partial y}+\dfrac{\partial u}{\partial z}$. **(10)**

3. **(a)** Evaluate: $\int e^{2x}\dfrac{1+\sin 2x}{1+\cos 2x}dx.$ **(10)**

(b) Evaluate: $\underset{n\to\infty}{Lim}\left[\left(\dfrac{1}{nm}\right)+\left(\dfrac{1}{nm+1}\right)+\left(\dfrac{1}{nm+2}\right)+\cdots\cdots\cdots+\left(\dfrac{1}{nb}\right)\right]$. **(10)**

4. **(a)** Find the value of $\int_0^{\frac{\pi}{2}}\dfrac{\sin^2 x}{1+\cos x\sin x}dx.$ **(10)**

(b) Find the area of the region bounded the curve $y^2(2a-x)=x^3$ and its asymptote. **(10)**

SECTION -B

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

5. (a) Form a differential equation for a cardioid $r = a(1 + \cos\theta)$. **(5)**

   (b) Solve: $\frac{dy}{dx} = \frac{x(2\ln x+1)}{\sin y+y\cos y}$ **(5)**

   (c) Solve: $2y^3dx + (x^2 - 3y^2)xdy = 0$ **(10)**

6. (a) Find the integrating factor of the following differential equation $(12y + 4y^3 + 6x^2)dx + 3(x + xy^2)dy = 0$ and solve it. **(10)**

   (b) A certain culture of bacteria grows at a rate proportional to its size. If the size doubles in 4 days, find the time required for the culture to increase 10 times to its original size. **(10)**

7. (a) Solve: $xdx + ydy = \frac{a^2(xdy-ydx)}{x^2+y^2}$. **(10)**

   (b) Reduce the equation to standard form and solve for, $\frac{dy}{dx} + \frac{y}{2x} = \frac{x}{y^3}$ **(10)**

   at $y(1) = 2$.

8. Find $y = f(x)$ for which both sides of the following equations are equal: **(10+10)**

   (a) $(D^3 - 3D^2 + 4D - 2)y = e^x + \cos x$

   (b) $(x^2D^2 - xD + 4)y = \cos(\ln x) + x\sin(\ln x)$

L-1/T-2/URP Date: 17/01/2021

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 BURP Examination, January 2020

Sub: **HUM 177** (Macroeconomics)

Full Marks: 180 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 any **THREE**

All the symbols have their usual meanings

Assume reasonable values for missing data.

1. Consider the economy of Bangladesh. The investment function is

$I = I_n [MPK - (P_K/P)(r + \alpha)] + \alpha K$.

Where, I = Investment

MPK = Marginal product of capital,

α = Depreciation rate

P_K/P = Relative price of a capital good,

r = Real interest rate.

Based on the above investment function, answer questions 'a', 'b' and 'c'

a. What is the effect of an increase in the MPK on the investment function? Show graphically and mathematically. (10)

b. What is the effect of an increase in the real interest rate on the investment function? Show graphically and mathematically. (10)

c. Consider the Bangladesh government levies a tax on gas companies equal to a proportion of the value of the company's oil reserves. (The government assures the firms that the tax is for one time only.) According to the neoclassical models, what effect will the tax have on investment by these firms? What if these firms face financing constraints? (10)

2. (a) Using the following table create Consumer Price Index (CPI) in 2017, 2018, 2019 and 2020 (Currency in Taka). (15)

Product	Base Year (2010) Quantity	Base Year (2010) Per Unit Price	2017 Expenditures (on base-year quantities)	2018 Expenditures (on base-year quantities)	2019 Expenditures (on base-year quantities)	2020 Expenditures (on base-year quantities)
Vaccination	1	500	1000	1500	2000	2500
Masks	20	50	1500	2000	2700	10000
Hand sanitizer	15	20	400	600	900	5000
Pulse Oximeter	500	10	9000	10000	12000	30000
Books	30	100	5000	7000	8000	20000
Lemons	100	4	800	900	1200	3000

(b) Using the CPI you created in question 2(a), calculate inflation rate from 2017 to 2018, from 2018 to 2019, and from 2019 to 2020. (15)

3. (a) Given: $Y = C+I+G$, $C = C_0 - bY$, $I = I_0$, and $G = G_0$, where $C_0 = 135$, $b = 0.7$, $I_0 = 75$, and $G_0 = 30$. Find the equation for the equilibrium level of income. Solve for the equilibrium level of income and show it graphically. (15)

(b) Two identical countries, Country A and Country B, can each be described by a Keynesian-cross model. The MPC is 0.8 in each country. Country A decides to increase spending by $ 5 billion, while Country B decides to cut taxes by $ 5 billion. In which country will the new equilibrium level of income be greater? (15)

4. Consider the economy of Bangladesh.

The consumption function is given by

$C = 300 + 0.6(Y - T)$.

The investment function is

$I = 700 - 80r$.

Government purchases and taxes are both 500.

The money demand function is

$(M/P)^d = Y - 200r$.

The money supply M is 3,000 and the price level P is 3.

(a) For this economy, derive the IS (goods market equilibrium) and LM (money market equilibrium) equations and graph the IS and LM curves for r ranging from 0 to8. Find the equilibrium interest rate r and the equilibrium level of income Y. (14)

(b) Suppose that government purchases are increased from 500 to 700. How does the *IS* curve shift? What are the new equilibrium interest rate and level of income? (8)

(c) Suppose instead that the money supply is increased from 3,000 to 4,500. How does the *LM* curve shift? What are the new equilibrium interest rate and level of income? (8)

SECTION – B

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

All the symbols have their usual meanings

5. (a) What are components of GDP? Briefly explain. (15)

   (b) How is GDP calculated for Bangladesh? What are the major drawbacks of GDP calculation in Bangladesh? (15)

6. (a) What are the functions of Money? 'Credit card is not money'. Do you agree? Explain. (15)

   (b) Explain how commercial banks create money using the concept of money multiplier. (15)

7. (a) Using quantity theory of money show how money supply causes inflation. (15)

   (b) Briefly explain money supply and money demand, real and nominal interest rate. If expected inflation is greater than actual inflation, how are the gains distributed between borrowers and lenders? (15)

8. (a)What is the argument for and against active stabilization policy of macro economy? (15)

   (b) Briefly explain automatic stabilizers. Do you support active or passive stabilization policy during Covid-19 pandemic? Explain your reasons. (15)