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Application No:
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Exam Date: **05-Oct-2020**
Exam Time: **09:00-12:00**
Examination: **1. Course Code - Ph.D.**
2. Field of Study - INTERNATIONAL TRADE AND DEVELOPMENT (ITDH)

SECTION 1 - SECTION 1

Question No.1 (Question Id - 13)

Consider a model with core inflation, $\pi_t = \pi^* + \lambda[Y_t - Y^f]$ where π_t is period t inflation, π^* is core inflation, Y_t is period t output and Y^f is full employment output. If core inflation is set at the previous (t - 1) period's inflation, then :

(A) ○ When unemployment changes from 0 to a positive number, inflation becomes negative.
(B) ○ **When unemployment changes from 0 to a positive number, inflation falls but may be positive. (Correct Answer)**
(C) ○ The relation between unemployment and inflation definitely becomes positive.
(D) ○ Output always remains at full employment output.

Question No.2 (Question Id - 10)

Consider the following system of 2 differential equations :

$$\frac{dx}{dt} = \alpha x - \beta xy$$

$$\frac{dy}{dt} = \delta xy - \gamma y$$

Let V denote a constant. Then the solution to this system is :

(A) ○ **$V = \delta x - \gamma \ln x + \beta y - \alpha \ln y$ (Correct Answer)**
(B) ○ $V = \delta xy - \gamma + \beta xy - \alpha$
(C) ○ $V = \delta x - \gamma + \beta y - \alpha$
(D) ○ $V = \delta x - \gamma e^x + \beta y - \alpha e^y$

Question No.3 (Question Id - 17)

Let X and Y be random variables with joint probability density function $f(x,y) = x + y$, where X in [0, 1] and Y in [0, 1]. Then the covariance of X and Y is :

(A) ○ - 1/3
(B) ○ - 1/21
(C) ○ - 7/144
(D) ○ **- 1/144 (Correct Answer)**

Case Study - 4 to 6 (Question Id - 48)

Suppose you want to examine if fertility rates change overtime. Consider a regression of the number of children a woman has, on the mother's characteristics such as age and education. You have data for years 2005, 2010 and 2015 and therefore include year dummies to check for changes over time. Consider the following models :

Model I : Children = $\beta_0 + \beta_1$ age + β_2 age^2 + β_3 education + β_4 $year_{2010}$ + β_5 $year_{2015}$ + ϵ_1;

Model II : Children = $\gamma_0 + \gamma_1$ age + γ_2 age^2 + γ_3 education + γ_4 $year_{2010}$ + γ_5 $year_{2015}$ + γ_6 education*$year_{2010}$ + γ_7 education*$year_{2015}$ + ϵ_2

Question No.4 (Question Id - 49)

Refer to the previous question. Assume that model II above satisfies the assumptions of the classical regression model. To test whether the effect of education for a woman is the same in 2010 and 2015, the Null hypothesis is :

(A) ○ **$\gamma_6 = \gamma_7$ (Correct Answer)**

(B) ○ $\acute{Y}_3 = \acute{Y}_6 = \acute{Y}_7$

(C) ○ $\acute{Y}_4 = \acute{Y}_5$

(D) ○ $\acute{Y}_4 = 0$

Question No.5 (Question Id - 50)

Refer to the previous question. Assume model I satisfies the classical regression model. To test that the effect of age on the number of children is constant, the Null hypothesis is :

(A) ○ $\beta_1 + \beta_2 = 0$

(B) ○ $\beta_1 = \beta_2 = 0$

(C) ○ **$\beta_2 = 0$ (Correct Answer)**

(D) ○ $\beta_2 - \beta_1 = 0$

Question No.6 (Question Id - 51)

Refer to question no. 48. Assume model II satisfies the classical regression model. To test that year does not affect the number of children, the Null hypothesis is :

(A) ○ $\acute{Y}_6 = \acute{Y}_7 = 0$

(B) ○ $\acute{Y}_4 = \acute{Y}_5 = \acute{Y}_6 = \acute{Y}_7$

(C) ○ $\acute{Y}_4 + \acute{Y}_5 = 0$

(D) ○ **$\acute{Y}_4 = \acute{Y}_5 = \acute{Y}_6 = \acute{Y}_7 = 0$ (Correct Answer)**

Question No.7 (Question Id - 45)

The wage productivity model (Mirrlees, 1971),which states that worker's productivity is positively related to his/her level of consumption, explains :

A. Persistence of involuntary unemployment and wage rigidity in surplus labour economies.

B. Persistence of voluntary unemployment and wage rigidity in surplus labour economies.

C.Wage dispersion.

Choose the **most appropriate** answer from the options given below :

(A) ○ A only

(B) ○ B only

(C) ○ B and C only

(D) ○ **A and C only (Correct Answer)**

Question No.8 (Question Id - 1)

Consider the following system of equations, where functions f and g are differentiable :

$f(x_1, x_2, x_3)=0$

$g(x_1, x_2, x_3)=0$

Suppose there exist functions

$x_1=X_1(x_3)$ and

$x_2=X_2(x_3)$

such that $(X_1(x_3), X_2(x_3), x_3)$ solves the above system of equations. Suppose

$$A=\begin{bmatrix} f_1 & f_2 \\ g_1 & g_2 \end{bmatrix}, b=\begin{bmatrix} dX_1/dx_3 \\ dX_2/dx_3 \end{bmatrix} \text{ and } c=\begin{bmatrix} f_3 \\ g_3 \end{bmatrix},$$

where A is a non-singular matrix. Which of the following is true ?

(A) ○ $b=A^{-1} c$

(B) ○ **$b= - A^{-1} c$ (Correct Answer)**

(C) ○ $Ac=b$

(D) ○ $Ac= -b$

Question No.9 (Question Id - 47)

Refer to the previous question. Suppose the farmer needs to borrow 'L' at interest rate 'i'. The total debt is R = (1 + *i*)L. Assume that effort is not verifiable and not contractible, and the farmer does not repay anything if the

output fails. If the farmer offers his wealth W < L as collateral then the optimum choice of effort is :

(A) ○ $x^* = \ln(Q + W - R)$

(B) ○ $x^* = \frac{1}{a}\ln a(Q+W-R)$ **(Correct Answer)**

(C) ○ $x^* = (Q + W - R)e^{ax}$

(D) ○ x^* is indeterminate

Question No.10 (Question Id - 33)

A price normalization is required while solving for a competitive equilibrium because of :

(A) ○ The Walras law.

(B) ○ **The homogeneity properties of the Marshallian demands of the consumers and the supplies of profit maximizing firms. (Correct Answer)**

(C) ○ Both 1 and 2.

(D) ○ Monotonicity properties of consumer preferences.

Question No.11 (Question Id - 4)

Consider the profit maximization problem :
$\pi(p)=\max_y py-C(y)$
Where y is the output, p is price of the output and $C(y)$ is the minimum cost function. Let the profit maximizing supply function be denoted by $y=Y(p)$. Which of the following is true :

(A) ○ $Y'(p) = \frac{1}{C'(y)}$ and $\pi'(p)=Y(p)$

(B) ○ $Y'(p) = \frac{1}{C'(y)}$ and $\pi'(p)= - Y(p)$

(C) ○ $Y'(p) = \frac{1}{C''(y)}$ and $\pi'(p)=Y(p)$ **(Correct Answer)**

(D) ○ $Y'(p) = \frac{1}{C''(y)}$ and $\pi'(p) = - Y(p)$

Question No.12 (Question Id - 42)

Consider the following regression model $y = X\beta + u$, where $E(X^Tu \neq 0)$. Suppose it is possible to find a data matrix Z such that :

A. The variables in Z are correlated with those in X

B. $E(Z^Tu = 0)$. A consistent estimator of β will be :

Choose the **correct** answer from the options given below :

(A) ○ $\hat{\beta} = (Z^TZ)^{-1}Z^Ty$

(B) ○ $\hat{\beta} = \left[X^TZ(Z^TZ)^{-1}Z^TX\right]^{-1}X^TZ\left(Z^TZ\right)^{-1}Z^Ty$ **(Correct Answer)**

(C) ○ $\hat{\beta} = \left[X^T(Z^TZ)^{-1}X\right]^{-1}X^Ty$

(D) ○ $\hat{\beta} = \left[X^TZ(Z^TZ)^{-1}Z^TX\right]^{-1}X^Ty$

Question No.13 (Question Id - 28)

"The presence of menu costs ensures that AD policy is able to affect output." This statement :

(A) ○ Is always true

(B) ○ Is always false

(C) ○ **Is only true if firms have relatively acyclical marginal cost curves and relatively steep marginal revenue curves (Correct Answer)**

(D) ○ Is only false if firms have relatively acyclical marginal cost curves and relatively steep marginal

revenue curves

Question No.14 (Question Id - 25)

If the nominal rate of interest on a bond is 18%, the inflation rate is 10% and the individual is in 50% tax bracket, the after-tax real return on the bond would be equal to :

(A) ○ 13%
(B) ○ 8%
(C) ○ 4%
(D) ○ **- 1% (Correct Answer)**

Question No.15 (Question Id - 16)

Involuntary unemployment can occur :

(A) ○ In a model where only prices are rigid, whenever there is a negative AD shock.
(B) ○ **In a model where only nominal wages are rigid, whenever there is a negative AD shock. (Correct Answer)**
(C) ○ In a pure classical "quantity theory of income" model.
(D) ○ When workers' reservation wage is higher than the market wage.

Question No.16 (Question Id - 3)

Which of the following statements is/are consistent with Hirschman's theory of unbalanced growth ?

A. A country should selectively promote the development of the key sectors of the economy.

B. Backward and forward linkages induce the development of new industries.

Choose the **most appropriate** answer from the options given below :

(A) ○ A only
(B) ○ B only
(C) ○ **A and B both (Correct Answer)**
(D) ○ None of the above

Question No.17 (Question Id - 26)

Consider the cash-in-advance economy with the national income identity, $y_t = c_t + g_t$, and the cash-in-advance constraint as $m_t = c_t$. The government budget constraint is :
$\Delta B_{t+1} + \Delta M_{t+1} + P_t T_t = P_t g_t + R_t B_t$. Here, c_t is consumption, y_t is exogenous national income, B_t is nominal bond holdings, $(1 + \pi_{t+1}) = P_{t+1}/P_t$ is the price change as P_t is the general price level, $b_t = B_t/P_t$ is the bond holdings in real terms, $m_t = M_t/P_t$ are real money balances, T_t are lumpsum taxes, R_t is the nominal rate of return, and government consumes a random real amount $g_t = g + e_t$, where et is independently and identically distributed random shock with zero mean. If the households are assumed to maximize $\sum_{s=0}^{\infty} \beta^s \ln c_{t+s}$, where $\beta = 1/\theta$ is the discount factor, the optimal solutions for consumption and money holding will be :

(A) ○ $c_t = m_t = \frac{r}{1+R}\sum_{s=0}^{\infty}\left(\frac{y_{t+s} - T_{t+s}}{(1+r)^s}\right); r = R - \pi$ for R and π constant.

(B) ○ $c_t = m_t = \frac{r}{1+R}\sum_{s=0}^{\infty}\left(\frac{y_{t+s} - T_{t+s}}{(1+r)^s}\right) + rb_t; r = R - \pi$ for R and π constant. **(Correct Answer)**

(C) ○ $c_t = m_t = \frac{r}{1+R}\sum_{s=0}^{\infty}\left(\frac{T_{t+s} - y_{t+s}}{(1+r)^s}\right) + rb_t; r = R - \pi$ for R and π constant.

(D) ○ $c_t = m_t = \frac{1+R}{r}\sum_{s=0}^{\infty}\left(\frac{y_{t+s} - T_{t+s}}{(1+r)^s}\right) + rb_t; r = R - \pi$ for R and π constant.

Question No.18 (Question Id - 12)

Calculate $\lim_{x \to 0} \frac{xa^x}{x^2 + x}$

(A) ○ ∞
(B) ○ 0
(C) ○ **1 (Correct Answer)**
(D) ○ a

Question No.19 (Question Id - 19)

Given the regression model :
$y_t = \alpha + \beta x_{1t} + \Upsilon x_{2t} + u_t$
which of the following auxiliary regressions would be most appropriate to test for autocorrelation using an auxiliary regression ?

(A) ○ $u_t^2 = a + bu_{t-1} + v_t$
(B) ○ **$u_t = a + bu_{t-1} + v_t$ (Correct Answer)**
(C) ○ $u_t = a + bx_{1t} + cx_{2t} + v_t$
(D) ○ $u_t = a + bx_{1t} + cx_{2t} + dx_{1t}x_{2t} + v_t$

Question No.20 (Question Id - 22)

Under the assumption of uncovered interest parity, suppose the domestic interest rate increases from 5% to 15% , and there is a fixed exchange rate system. This can happen if :

(A) ○ The level of the international interest rate increases by 5%.
(B) ○ Agents are expecting a nominal appreciation of 5%.
(C) ○ Agents are expecting a nominal depreciation of 5%.
(D) ○ **Both (1) and (3) above hold. (Correct Answer)**

Question No.21 (Question Id - 32)

Assuming that all consumers are identical if cross price elasticities of demand are zero, then minimizing dead-weight losses due to commodity taxes involves :

(A) ○ Lower rates of taxes on commodities with more inelastic demands.
(B) ○ **Higher rates of taxes on commodities with more inelastic demands. (Correct Answer)**
(C) ○ Higher rates of taxes on commodities which are disproportionately consumed by the rich.
(D) ○ None of the above.

Question No.22 (Question Id - 8)

Two firms in a duopoly have the option of colluding or competing with regard to price setting. Suppose their payoff matrix from the 2 strategies is as follows (firm 1 is the row player and firm 2 is the column player) :

	Collude	Compete
Collude	20, 20	5, 35
Compete	35, 5	10, 10

Which of the following is true ?

(A) ○ **The unique Nash equilibrium in a one shot game is for both firms to compete. (Correct Answer)**
(B) ○ The unique Nash equilibrium in a one shot game is for both firms to collude.
(C) ○ The game only has a mixed strategy equilibrium.
(D) ○ This game has multiple pure strategy equilibria.

Question No.23 (Question Id - 24)

Let the per capita production function be defined as $f(k) = 3k^{1/2}$, where $k = \frac{K}{L}$ is the aggregate capital-labor ratio. The depreciation rate, δ, is 10%, and the population growth rate, n, is 5%. Individuals save 30% of their income. Then, the steady state (SS) values of capital per worker, k_t, output per worker, y_t, and consumption per worker, c_t are :

(A) ○ $k^{SS} = 35$, $y^{SS} = 22$, $c^{SS} = 14.4$
(B) ○ $k^{SS} = 30$, $y^{SS} = 15$, $c^{SS} = 10.2$
(C) ○ $k^{SS} = 40$, $y^{SS} = 20$, $c^{SS} = 15.2$

(D) ○ $k^{SS} = 36, y^{SS} = 18, c^{SS} = 12.6$ **(Correct Answer)**

Question No.24 (Question Id - 37)

A closed economy consists of a representative household with instantaneous utility function $u_t = \log c_t$. The representative firm produces aggregate output using capital stock, K_t and a government funded infrastructure input, G_t as follows: $Y_t = AK_t^{\alpha}G_t^{1-\alpha}$. Government finances infrastructure by taxing the rental income of households, $G_t = \tau.(r_tK_t)$, where τ is the rate at which income is taxed. The household spends the after-tax rental income on current consumption and to invest in physical capital according to : $C_t + I_t = (1-\tau)\, r_tK_t$ and $K_{t+1} = I_t + (1-\delta)K_t$. Then, the growth maximizing tax rate is :

(A) ○ $\tau^* = \left[\frac{\alpha}{1-\alpha}\right]^{\frac{1}{1-\alpha}}$

(B) ○ $\tau^* = \alpha^{\frac{1}{\alpha}}$

(C) ○ $\tau^* = \frac{1}{\frac{1}{\beta}+\delta-1}$

(D) ○ **$\tau^* = 1 - \alpha$ (Correct Answer)**

Question No.25 (Question Id - 18)

A candidate is taking a multiple choice examination with four choices given in the answer. The probability that the candidate has knowledge of the correct answer is 0.5. When the candidate has no knowledge of the answer, he/she chooses one answer at random. If the question is answered correctly, then the probability that the candidate knew the correct answer is :

(A) ○ 1/2

(B) ○ 3/4

(C) ○ **4/5 (Correct Answer)**

(D) ○ 1/4

Question No.26 (Question Id - 38)

A closed economy is characterized by the following dynamic IS curve : $\tilde{y}_t = E_t\{\tilde{y}_{t+1}\} - \frac{1}{\sigma}\left[i_t - E_t\{\pi_{t+1}\} - r_t^n\right]$, and the expectations augmented Phillips curve : $\pi_t = \beta E_t\{\pi_{t+1}\} + k\tilde{y}_t$. Here, $\tilde{y}_t$ is the output gap, π_t denotes current inflation rate, r_t^n is the natural rate of interest and i_t is the nominal interest rate set by the central bank of the country. The central bank sets the nominal interest rate as follows: $i_t = r_t^n + \phi_\pi \pi_t + \phi_y \tilde{y}_t$. The equilibrium dynamics of output gap is :

(A) ○ $\tilde{y}_t = \frac{\sigma}{\sigma+\phi_y+k\phi_\pi}E_t\{\tilde{y}_{t+1}\} + \frac{1-\beta\phi_\pi}{\sigma+\phi_y+k\phi_\pi}E_t\{\pi_{t+1}\}$ **(Correct Answer)**

(B) ○ $\tilde{y}_t = kE_t\{\tilde{y}_{t+1}\} + \left[k+\beta(\sigma+\phi_y)\right]E_t\{\pi_{t+1}\}$

(C) ○ $\tilde{y}_t = E_t\{\tilde{y}_{t+1}\} + \frac{1}{\sigma}E_t\{\pi_{t+1}\}$

(D) ○ $\tilde{y}_t = \frac{\sigma}{\sigma+\phi_y+k\phi_\pi}E_t\{\tilde{y}_{t+1}\} + (1-\beta\phi_\pi)E_t\{\pi_{t+1}\}$

Question No.27 (Question Id - 35)

Let $f : A \to A$ be a continuous function whose domain and range are both set $A \subset \mathbf{R}^n$. Then the Brouwer's fixed point theorem says that f has a fixed point, that is, there exists $x \in A$ such that $f(x) = x$ if :

(A) ○ Set A is non-empty, closed, and convex

(B) ○ Set A is non-empty, bounded, and convex

(C) ○ **Set A is non-empty, compact, and convex (Correct Answer)**

(D) ○ Set A is non-empty, open, and bounded

Question No.28 (Question Id - 34)

Consider a technology of a thermal power plant that uses coal as an input to produce a bad output CO_2 along with a good output, electricity. As usage of coal increases, the maximum amount of electricity and the minimum amount of CO_2 that the thermal power plant can produce, increase. This implies that the technology of the thermal power plant violates :

(A) ○ Output free disposability of the good output
(B) ○ Output free disposability of the bad output
(C) ○ Input free disposability of coal
(D) ○ **Both 2 and 3 above (Correct Answer)**

Question No.29 (Question Id - 9)

Consider the same payoff matrix as in the previous question. Suppose the interaction between the firms is repeated indefinitely. What is the threshold value of δ (the discount factor) needed for a grim trigger strategy to ensure collusion ?

(A) ○ 1
(B) ○ 0.5
(C) ○ 0.8
(D) ○ **0.6 (Correct Answer)**

Question No.30 (Question Id - 15)

Suppose money is neutral only in the long run. This implies :

(A) ○ **If the economy is open, the nominal exchange rate in the long run will depreciate in the same proportion as money supply expands. (Correct Answer)**
(B) ○ If the economy is open, the real exchange rate in the long run will depreciate in the same proportion as money supply expands.
(C) ○ There will be no short run changes in exchange rates.
(D) ○ The AS curve is vertical in the short run and upward sloping in the long run.

Question No.31 (Question Id - 20)

Assume that the consumption function is $C = c_0 + c_1(Y - T)$, where c_0 is autonomous consumption, c_1 is marginal propensity to consume, Y is output and T is taxes. Suppose both taxes and money supply increase in a manner that output is constant in equilibrium (assume further that $c_1 < 1$). These policy changes will lead to :

(A) ○ An increase in investment and a decline in government spending.
(B) ○ An increase in investment and an increase in private saving.
(C) ○ **An increase in investment and a decrease in private consumption. (Correct Answer)**
(D) ○ A decrease in investment and an increase in public saving.

Question No.32 (Question Id - 31)

Suppose $x \in R^n$ denotes an input vector, $y > 0$ denotes the amount of output, and $T \subset R^{n+1}$ denotes the production technology. Which of the following is true if the technology satisfies non-decreasing returns to scale ?

(A) ○ $(x, y) \in T \Rightarrow (\lambda x, \lambda y) \in T$ for all $\lambda \in [0, 1]$
(B) ○ **$(x, y) \in T \Rightarrow (\lambda x, \lambda y) \in T$ for all $\lambda \geq 1$ (Correct Answer)**
(C) ○ $(x, y) \in T \Rightarrow (\lambda x, \lambda y) \in T$ for all $\lambda \geq 0$
(D) ○ None of the above

Question No.33 (Question Id - 44)

Suppose a firm hires labourers to do 5000 units of work and the labourers spend all their income on food. The capacity curve of the labourers is such that for all payments up to ₹ 100, capacity is zero and then begins to rise by 2.5 units for every additional Rupee paid until an income of ₹ 600 is paid. After ₹ 600, an additional Rupee paid out increases the capacity by only 1 unit until total income paid out is ₹ 1000. After ₹ 1000, additional payments have no effect on work capacity. To minimize costs, the number of workers hired by the firm and the amount it pays to each of them respectively, is :

(A) ○ **4; 600 (Correct Answer)**

(B) ○ 5; 500
(C) ○ 10; 300
(D) ○ 20; 200

Question No.34 (Question Id - 6)

Let the price of good 1 be fixed at one and price of good 2 be denoted by p. Consider the expenditure function E(p, u) = $2\sqrt{up}$, where u is the level of utility. Let income be denoted by m. The Marshallian demands for goods 1 and 2 are given, respectively, by :

(A) ○ $D_1(p, m) = \frac{1}{4p^2}$ and $D_2(p, m) = m - \frac{1}{4p}$

(B) ○ $D_1(p, m) = \frac{m}{2}$ and $D_2(p, m) = \frac{m}{2p}$ **(Correct Answer)**

(C) ○ $D_1(p, m) = m - \frac{1}{4p}$ and $D_2(p, m) = \frac{1}{4p^2}$

(D) ○ $D_1(p, m) = \frac{m}{2p}$ and $D_2(p, m) = \frac{m}{2}$

Question No.35 (Question Id - 30)

Which of the following is/are true when a production technology satisfies the assumption of input free disposability ?

A. Holding all other inputs fixed, using more of a given input does not reduce production of outputs.

B. Isoquants of the technology are non-positively sloped.

C. Some inputs can be unproductive.

D. At a competitive equilibrium, price of all inputs are non-negative.

Choose the **correct** answer from the options given below :

(A) ○ A only
(B) ○ B only
(C) ○ **A, B and D only (Correct Answer)**
(D) ○ A, B, C and D

Question No.36 (Question Id - 7)

Consider a 2-good world. Goods X and Y have prices P_X and P_Y. Amrit consumes only good X.
Which of the following statements must be true ?

(A) ○ Amrit's indifference curves between X and Y must be concave to the origin.
(B) ○ **Amrit's MRS (marginal rate of substitution) between X and Y must be greater than P_X/P_Y for positive X and Y. (Correct Answer)**
(C) ○ Amrit's indifference curves between X and Y must be L-shaped.
(D) ○ X must be cheaper than Y.

Question No.37 (Question Id - 21)

Consider the following two-period overlapping generations model. Individuals consume in both periods 1 and 2, but work only in period 2. The inter-temporal utility of the representative individual in period 1 is given as :
$U=\ln c_1+\beta[\ln c_2 + \alpha\ln(1 - n_2)+Y\ln g_2]$,
where c_1 and c_2 are consumption in two periods. k_1 (which is given) and k_2 are the stocks of capital in periods 1 and 2, n_2 is work and g_2 is government expenditure in period 2. g_2 is funded by a lumpsum tax in period 2. Production in periods 1 and 2 are : $y_1=Rk_1=c_1+ k_2$, and $y_2=Rk_2+\varphi n_2=c_2+g_2$. Then, the private sector equilibrium solutions for c_1 and c_2 will be :

(A) ○ $c_2 = \beta R c_1 = \frac{\varphi}{\alpha}(1 - n_2)$ **(Correct Answer)**

(B) ○ $c_1 = \beta R c_2 = \frac{\varphi}{\alpha}(1 - n_2)$

(C) ○

(D) ○ $c_1 = \beta R c_2 = \frac{\varphi}{\alpha}(1 - g_2)$

$c_2 = \frac{c_1}{\beta R} = \frac{\varphi}{\alpha} g_2$

Question No.38 (Question Id - 11)

In the previous question, which of the following statements holds true ?

(A) ○ There is no fixed point

(B) ○ The only fixed point is $\left(\frac{\gamma}{\delta}, \frac{\alpha}{\beta}\right)$

(C) ○ The only fixed point is (0,0)

(D) ○ Both $\left(\frac{\gamma}{\delta}, \frac{\alpha}{\beta}\right)$ and (0, 0) are fixed points **(Correct Answer)**

Question No.39 (Question Id - 41)

Pick the correct statement :

The underlying equation for Augmented Dickey-Fuller (ADF) test is :

(A) ○ $\Delta Y_t = -(1-\rho) Y_{t-1} + \sum_{j=1}^{p} \delta_j \Delta Y_{t-j} + \epsilon_t$ with null hypothesis that $H_0 : Y_t$ has unit root, that is $\rho = 1$.
(Correct Answer)

(B) ○ $\Delta Y_t = -(1-\rho) Y_{t-1} + \sum_{j=1}^{p} \delta_j \Delta Y_{t-j} + \epsilon_t$ with null hypothesis that $H_0 : Y_t$ is stationary, that is $\rho = 0$.

(C) ○ $Y_t = -(1-\rho) Y_{t-1} + \sum_{j=1}^{p} \delta_j \Delta Y_{t-j} + \epsilon_t$ with null hypothesis that $H_0 : Y_t$ has unit root, that is $\rho = 1$.

(D) ○ $\Delta Y_t = -(1-\rho) \Delta Y_{t-1} + \sum_{j=2}^{p} \delta_j \Delta Y_{t-j} + \epsilon_t$ with null hypothesis that $H_0 : Y_t$ has unit root, that is $\rho = 1$.

Question No.40 (Question Id - 27)

In the Keynesian view :

(A) ○ The short-run and long-run Phillips curves are downward sloping.

(B) ○ The short-run Phillips curve is vertical but the long-run Phillips curve is downward sloping.

(C) ○ **The short-run Phillips curve is downward sloping but the long-run Phillips curve is vertical. (Correct Answer)**

(D) ○ Both the short-run and long-run Phillips curves are vertical.

Question No.41 (Question Id - 2)

Consider the optimization problem :

Max $f(x, y, z)$ subject to $4x + 2y + 2z \leq 12$ and $2x + 3y + z \leq 12$

Suppose $x=1$, $y=2$ and $z=2$ is a solution. Then at this solution,

(A) ○ Constraint 1 is non-binding while constraint 2 is binding

(B) ○ Both constraints 1 and 2 are binding

(C) ○ **Constraint 1 is binding while constraint 2 is non-binding (Correct Answer)**

(D) ○ Both constraints 1 and 2 are non-binding

Question No.42 (Question Id - 5)

The ethical principles of inequality measurement - anonymity, population, relative income, and transfers :

(A) ○ Are enough to compare any two income distributions in terms of relative inequality.

(B) ○ **Are not enough to compare any two income distributions in terms of relative inequality. (Correct Answer)**

(C) ○ Only anonymity and population principles are enough.

(D) ○ Relative income and transfers principles are enough .

Question No.43 (Question Id - 39)

A time series y_t is an AR(2) process if :

A. The autocorrelation function of y_t decays exponentially.

B. The partial autocorrelation function of y_t becomes insignificant after two lags.

C. The autocorrelation function of y_t becomes insignificant after two lags.

D. The partial autocorrelation function of y_t decays exponentially.

E. None of the above.

Choose the **correct** answer from the options given below :

(A) ○ E only
(B) ○ B and C only
(C) ○ **A and B only (Correct Answer)**
(D) ○ A and D only

Question No.44 (Question Id - 46)

Suppose the output of a self-financed and risk-neutral farmer is stochastically related to the effort level x. Output is Q with the probability $p(x) = 1 - e^{-ax}$ and 0 otherwise. The utility cost to the farmer of providing the effort is x. The farmer requires 'L' amount of funds. The optimal choice of effort x^* by the farmer will be :

(A) ○ $x^* = \frac{1}{a}\ln(aQ)$ **(Correct Answer)**
(B) ○ $x^* = \ln Q$
(C) ○ $x^* = Qe^{ax}$
(D) ○ None of the above

Question No.45 (Question Id - 36)

A closed economy consists of a representative household with instantaneous utility function : $u_t = a.\log c_t + b.\log(1-L_t)$, where c_t is current consumption, L_t is labor supply by household in period t. The household supplies labor and capital to the representative firm in the economy producing a single aggregate commodity : $Y_t = A_t K_t^{\alpha} L_t^{1-\alpha}$. The household earns wages and rent by supplying labor and capital to the firm. The household uses wage and rental income for current consumption and to invest in capital stock in every period. The law of motion of capital stock is defined as: $K_{t+1} = I_t + (1 - \delta)K_t$, where δ is the depreciation rate. The steady state capital stock for this economy is :

(A) ○ $K^* = \left[\frac{\alpha}{1-\alpha}\right]^{1/1-\alpha}$
(B) ○ $K^* = \frac{\alpha}{\frac{1}{\beta} + \delta - 1}$
(C) ○ $K^* = \left[\frac{a/b}{1/1-\alpha + a/b}\right]\left[\frac{\alpha}{1/\beta + \delta - 1}\right]^{\frac{1}{1-\alpha}}$ **(Correct Answer)**
(D) ○ $K^* = \frac{a}{b(1-\alpha)}\left[\frac{\alpha}{1-\beta-\delta}\right]^{\frac{1}{1-\alpha}}$

Question No.46 (Question Id - 40)

Consider a covariance stationary AR(2) process : $Y_t = C + \phi_1 Y_{t-1} + \phi_2 Y_{t-2} + \varepsilon_t$, where ε is iid$(0, \sigma^2)$; $|\phi_1| < 1$, $|\phi_2| < 1$. Then, the covariance of Y_t is :

(A) ○ $\frac{1-\phi_2}{1-\phi_1-\phi_2}$
(B) ○ $\frac{(1-\phi_2)\sigma^2}{(1+\phi_2)\left[(1-\phi_2)^2-\phi_1^2\right]}$ **(Correct Answer)**
(C) ○ $\frac{\phi_1\phi_2}{1-\phi_1^2-\phi_2^2}$
(D) ○

$$\frac{\sigma^2}{1-\phi_1-\phi_2}$$

Question No.47 (Question Id - 43)

Which of the following is/are used as an indicator in calculating the global Multidimensional Poverty Index (MPI) ?

A. Maternal mortality

B. Nutrition

C. Electricity

D. School attendance

Choose the **most appropriate** answer from the options given below :

(A) ○ A, B and C only
(B) ○ A, C and D only
(C) ○ **B, C and D only (Correct Answer)**
(D) ○ All four indicators

Question No.48 (Question Id - 14)

Consider the Lucas imperfect information model assuming unit price elasticity of demand. Let V_M and V_Z denote the variances of monetary and preference shocks respectively. Let ′ϒ - 1 denote the elasticity of marginal disutility of labor supply. Then as the producer observes a change in the price of his own product,

(A) ○ **His labor supply response increases as V_M/V_Z falls and ′ϒ falls (Correct Answer)**
(B) ○ His labor supply response increases as V_M/V_Z rises and ′ϒ falls
(C) ○ His labor supply response increases as V_M/V_Z falls and ′ϒ rises
(D) ○ His labor supply response increases as V_M/V_Z rises and ′ϒ rises

Question No.49 (Question Id - 23)

According to supply-side economists, a permanent increase in the saving rate will :

(A) ○ **Lead to permanent increase in output per worker. (Correct Answer)**
(B) ○ Lead to a temporary increase in output per worker.
(C) ○ Lead to a decline in output per worker.
(D) ○ No change in output per worker.

Question No.50 (Question Id - 29)

Consider the following linear differential equation system :

$$\dot{x} = Ax + b$$

where $\dot{x} = \begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix}$, $x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$, $b = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix}$

and A is a 2 x 2 full-ranked matrix with real and distinct eigenvalues. Suppose the determinant of A is negative. Then the steady state of the above system is :

(A) ○ Stable
(B) ○ Unstable
(C) ○ **Saddle-path stable (Correct Answer)**
(D) ○ Either stable or unstable