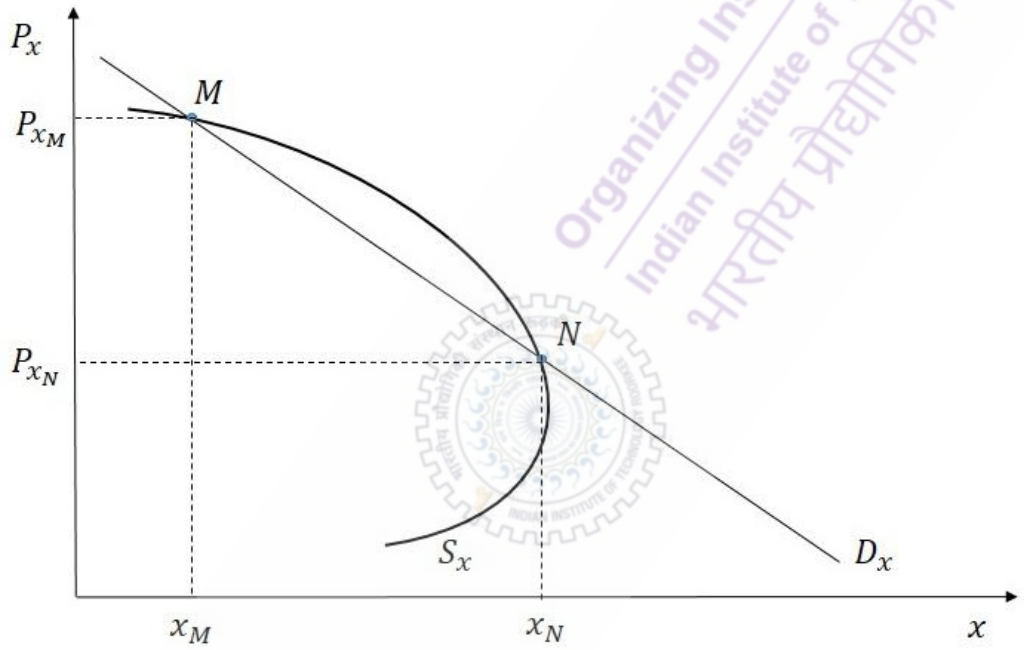
Section A: Q.1 – Q.10 Carry ONE mark each.

Q.1 When the supply curve S_x is backward bending and the demand curve D_x is downward sloping as shown in the figure, there are two equilibria M and N, respectively. Which of the following statements is CORRECT?



(A) Only M is stable equilibrium

(B) Only N is stable equilibrium

(C) Both M and N are stable equilibria

(D) Both M and N are unstable equilibria

Q.2	Which of the following deficits indicates the true current fiscal position of the Indian Economy?
(A)	Revenue Deficit
(B)	Capital Deficit
(C)	Current Account Deficit
(D)	Primary Deficit

Q.3	Which of the following CORRECTLY defines the relationship between the variances of sample means for simple random samples drawn with and without replacement from a normal population?
(A)	$\frac{\sigma^2}{n} > \frac{\sigma^2}{n}\left(\frac{N-n}{N-1}\right)$
(B)	$\frac{\sigma^2}{n} \leq \frac{\sigma^2}{n}\left(\frac{N-n}{N-1}\right)$
(C)	$\frac{\sigma^2}{n} < \frac{\sigma^2}{n}\left(\frac{N-n}{N-1}\right)$
(D)	$\frac{\sigma^2}{n} = \frac{\sigma^2}{n}\left(\frac{N-n}{N-1}\right)$

Q.4	Suppose that one million unemployed persons in a country are receiving Rs. 6000 per month per person as an unemployment allowance. If the government, instead of paying unemployment allowance, hires all of them at the same amount (Rs. 6000 per month per person) and engages them in digging the pits and filling the same pits. What will be the effect on GDP?
(A)	No effect on GDP
(B)	GDP will rise.
(C)	GDP will fall.
(D)	The effect on GDP will be uncertain.

Q.5	Which amendments to the constitution have provided constitutional status to the rural and urban local bodies in India?
(A)	80^{th} and 81^{st} Amendments
(B)	73^{rd} and 74^{th} Amendments
(C)	92^{nd} and 93^{rd} Amendments
(D)	71^{st} and 72^{nd} Amendments

Q.6	Let W be a subspace of a vector space $\Re^3$. Then, which of the following sets of vectors forms a basis of W?
(A)	$(1, 2, 1)$ and $(1, -2, 5)$
(B)	$(1, 3, 2), (1, -1, 0), (4, -1, 0)$ and $(3, 1, -3)$
(C)	$(1, 1, 1), (1, 2, 3)$ and $(2, -1, 1)$
(D)	$(1, -2, 1), (2, 1, -1)$ and $(7, -4, 1)$

Q.7	From the following, who first examined the close negative relationship between the unemployment rate and the output ratio?
(A)	Alban W. Phillips
(B)	James Tobin
(C)	Arthur M. Okun
(D)	Robert M. Solow
Q.8	In the hypothesis testing, which of the following defines the size of power of the test?
(A)	1 – (Probability of accepting null hypothesis when it is true)
(B)	1 – (Probability of rejecting null hypothesis when it is true)
(C)	1 – (Probability of accepting null hypothesis when it is false)
(D)	1 + (Probability of rejecting null hypothesis when it is not true)

Q.9	Which of the following is NOT a postulate of the Classical Model of full-employment equilibrium?
(A)	Wage-Price flexibility
(B)	Perfect information about the market
(C)	Consumption and saving functions depend on income.
(D)	The price level moves proportionately with the quantity of money.
Q.10	A long-run cost function for a product exhibits economies of scale if
(A)	average cost of production increases when the output increases.
(B)	the production function has decreasing returns to scale.
(C)	average cost of production falls as the output increases.
(D)	average cost of production remains constant as the output increases.

Section A: Q.11 – Q.30 Carry TWO marks each.	
Q.11	Let $x^3 + 3y^2 = 4$ for all $x, y \in \Re$, $y' = \frac{dy}{dx}$ and $y'' = \frac{d^2y}{dx^2}$. Then
(A)	$x^2 + y\,y'' + (y')^2 = 0$
(B)	$2x + y'' + 2(y')^2 = 0$
(C)	$x + (y')^2 = 0$
(D)	$x + y\,y'' + (y')^2 = 0$

Q.12 Match **List I** with **List II** and choose the CORRECT option.

List I	**List II**
a. Second Five Year Plan (1956-61)	i. Towards Faster and More Inclusive Growth
b. Fourth Five Year Plan (1969-74)	ii. Removal of Poverty and Attainment of Self-reliance
c. Fifth Five Year Plan (1974-79)	iii. Rapid Industrialization–Heavy and Basic Industries
d. Eleventh Five Year Plan (2007-12)	iv. Family Planning Programmes

(A) (a, ii), (b, i), (c, iv), (d, iii)

(B) (a, iii), (b, iv), (c, i), (d, ii)

(C) (a, iv), (b, iii), (c, ii), (d, i)

(D) (a, iii), (b, iv), (c, ii), (d, i)

Q.13	Let $f:[0,\infty)\to\Re$ be a function defined by $f(x)=\frac{x+1}{x+2}$ for all $x\in\Re$. Then f is
(A)	one-one and onto.
(B)	one-one but not onto.
(C)	onto but not one-one.
(D)	neither one-one nor onto.

Q.14	An economy is characterized by the Solow model, with the production function $y = \sqrt{k}$, where y is output per worker and k is capital per worker. The steady-state level of output per worker is $y^{ss} = A^{1/(1-\alpha)} \left(\frac{\gamma}{\delta}\right)^{\alpha/(1-\alpha)}$, where A, γ, δ and α denote productivity, share of output invested (in %), depreciation rate (in %) and capital's share in income (in fraction), respectively. Suppose that $A = 1$, $k = 400$, $\gamma = 50\%$, $\delta = 5\%$ and $\alpha = 1/2$. Then the current output, using the above information, is
(A)	above the steady-state level of output per worker.
(B)	at the steady-state level of output per worker.
(C)	below the steady-state level of output per worker.
(D)	at the Golden Rule level.

Q.15	Which of the following is NOT related to the structural adjustment programmes implemented in India after 1991?
(A)	Deregulation
(B)	Quantitative restrictions on trade
(C)	Fiscal austerity
(D)	Reduction of subsidies

Q.16	Let a second order difference equation be $$y_{n+2} + 4y_n = 4y_{n+1}, \quad n = 2, 3, 4, \ldots, \; y_0 = 1, \; y_1 = 4.$$ Then the general solution is
(A)	$(1 + n^2)\, 2^n$
(B)	$(1 + n)\, 2^n$
(C)	$\left(1 + \frac{1}{n}\right) 2^n$
(D)	$(n^2 + n + 1)\, 2^n$

Q.17	Suppose that two random samples of sizes n_1 and n_2 are selected without replacement from two binomial populations with means $\mu_1 = n_1 p_1$, $\mu_2 = n_2 p_2$ and variances $\sigma_1^2 = n_1 p_1 q_1$, $\sigma_2^2 = n_2 p_2 q_2$, respectively. Let the difference of sample proportions $\bar{P}_1$ and $\bar{P}_2$ approximate a normal distribution with mean ($p_1 - p_2$). Then the standard deviation of the difference of sample proportions $\bar{P}_1$ and $\bar{P}_2$ is
(A)	$\sqrt{\left(\frac{p_1 q_1}{n_1}\right)\left(\frac{N_1 - n_1}{N_1 - 1}\right) + \left(\frac{p_2 q_2}{n_2}\right)\left(\frac{N_2 - n_2}{N_2 - 1}\right)}$
(B)	$\sqrt{\left(\frac{p_1 q_1}{n_1}\right) + \left(\frac{p_2 q_2}{n_2}\right)}$
(C)	$\sqrt{\left(\frac{p_1 q_1 - p_2 q_2}{n_1 + n_2}\right)}$
(D)	$\sqrt{\left(\frac{p_1 q_1}{n_1 + n_2}\right)\left(\frac{N_1 - n_1}{N_1 - 1}\right) + \left(\frac{p_2 q_2}{n_1 + n_2}\right)\left(\frac{N_2 - n_2}{N_2 - 1}\right)}$

Q.18	Which of the following statements is NOT correct in the context of quantity theory of money?
(A)	The quantity of money available determines the price level in the economy.
(B)	The growth rate in the quantity of money available determines the inflation rate in the economy.
(C)	The velocity of money must rise with the increase in the quantity of money in the economy.
(D)	The economy's output is determined by factor supplies and technology, because money is neutral.

Q.19	Let the function $f : \Re^2 \to \Re$ be $f(x, y) = \dfrac{x y^2}{x^3 + 2x^2 y + y^3}$, $f(0, 0) = 0$. Then
(A)	f is differentiable at (0, 0).
(B)	f_x does not exist at (0, 0).
(C)	f_y does not exist at (0, 0).
(D)	f is not continuous at (0, 0).

Q.20	Which of the following measures was announced by the Government of India in the year 1994?
(A)	Full convertibility on capital account
(B)	Full convertibility on current account
(C)	Constitution of the Narasimham Committee on banking sector reforms
(D)	Constitution of the Abid Hussain Committee on trade policies

Q.21	An analyst at the Green Car Co. Ltd. estimated the following demand function for the electric vehicles it sells: $$Q_E = 0.75 - 1.5P_E + 2.5P_F - 0.5P_B + 3.2\,I$$ where Q_E = Number of electric vehicles (in thousand per year), P_E = Unit price of electric vehicle (Rs. in Lakh), P_F = Average unit price of vehicle using fossil fuels (Rs. in Lakh), P_B = Unit price of battery used in electric vehicle (Rs. in Lakh), I = Personal disposable income (Rs. in Lakh). Let P_E = Rs. 6.5 Lakh, P_F = Rs. 4.5 Lakh, P_B = Rs. 0.5 Lakh and I = Rs. 10 Lakh. Then the income elasticity of demand (e_{Q_EI}) and the cross price elasticity of demand ($e_{Q_EP_F}$) satisfy
(A)	$0.98 \leq e_{Q_EI} \leq 0.99$ and $0.33 \leq e_{Q_EP_F} \leq 0.34$
(B)	$0.94 \leq e_{Q_EI} \leq 0.95$ and $0.45 \leq e_{Q_EP_F} \leq 0.46$
(C)	$0.98 \leq e_{Q_EI} \leq 0.99$ and $0.45 \leq e_{Q_EP_F} \leq 0.46$
(D)	$0.94 \leq e_{Q_EI} \leq 0.95$ and $0.33 \leq e_{Q_EP_F} \leq 0.34$

Q.22 Choose the option that represents the original linear programming problem based on the initial simplex tableau given below, where S_i represents slack/surplus variables and A_i represents the artificial variables corresponding to the i^{th} constraint:

C_j			15	25	0	$-M$	$-M$	0
	X_b	b	x	y	S_1	A_1	A_2	S_3
$-M$	A_1	20	7	6	-1	1	0	0
$-M$	A_2	18	3	-2	0	0	1	0
0	S_3	30	8	5	0	0	0	1
	Z_j	$-38M$	$-10M$	$-4M$	M	$-M$	$-M$	0
	$C_j - Z_j$		$15 + 10M$	$25 + 4M$	$-M$	0	0	0

(A) Minimize $Z=15x+25y$
subject to $7x + 6y \geq 20,\ 3x - 2y \leq 18,\ 8x + 5y \leq 30\ ;\ x, y \geq 0.$

(B) Maximize $Z=15x+25y$
subject to $7x + 6y \geq 20,\ 3x - 2y = 18,\ 8x + 5y \leq 30\ ;\ x, y \geq 0.$

(C) Minimize $Z=15x+25y$
subject to $7x + 6y \geq 20,\ 3x - 2y = 18,\ 8x + 5y \geq 30\ ;\ x, y \geq 0.$

(D) Maximize $Z=15x+25y$
subject to $7x + 6y = 20,\ 3x - 2y = 18,\ 8x + 5y \leq 30\ ;\ x, y \geq 0.$

Q.23	Let a production function be given by $\log Q = \frac{\beta}{\alpha} \log(L^{\alpha} + K^{\alpha})$, where $\alpha \in (-\infty, 1] - \{0\}$ and $\beta > 0$. Then identify the statement that is NOT correct.
(A)	The ratio β/α helps in identification of returns to scale factors.
(B)	For $\beta > 1$, the function exhibits increasing returns to scale, and for $\beta < 1$, it shows decreasing returns to scale.
(C)	The elasticity of substitution is $\frac{1}{1-\alpha}$.
(D)	The elasticity of substitution is $\frac{1}{1-\beta}$.

Q.24	Which of the following statements is NOT correct under the IS-LM (Fixed Price) model?
(A)	The LM curve represents the combinations of income and interest rate, where money market is in equilibrium.
(B)	The IS curve represents the combinations of income and interest rate, where product market (goods and services) is in equilibrium.
(C)	An increase in money supply raises income and reduces interest rate when the IS curve has negative slope and the LM curve has positive slope.
(D)	Monetary policy has a relatively weak effect on income when the interest responsiveness of the demand for money is relatively low.

Q.25	The probability of getting head in a toss of a biased coin is $\frac{2}{3}$. Let the coin be tossed three times independently. Then the probability of getting head in the first two tosses and tail in the final toss is
(A)	$\frac{4}{27}$
(B)	$\frac{1}{8}$
(C)	$\frac{2}{27}$
(D)	$\frac{23}{27}$

Q.26	Consider a pure exchange economy with two goods x and y. Ravi and Suraj are two individuals with utility functions $U_R = \beta \log(xy)$ and $U_S = \left(\frac{x}{y}\right)^{\alpha}$, respectively. The endowments are x_R and y_R for Ravi and x_S and y_S for Suraj such that $x_R + x_S = A$ and $y_R + y_S = B$. Then their contract curve is
(A)	$Ay_R - Bx_R = 0$
(B)	$Ay_R + Bx_R - 2y_R x_R = 0$
(C)	$Ay_R + Bx_R - y_R x_R = 0$
(D)	$Ay_R - Bx_R + 2y_R x_R = 0$

Q.27	Which of the following is NOT correct regarding *R*-squared (R^2) and Adjusted *R*-squared $\left(\bar{R}^2\right)$?
(A)	R^2 is a scale invariant statistic.
(B)	$\bar{R}^2$ is always positive.
(C)	R^2 tends to increase if we add an additional explanatory variable.
(D)	$\bar{R}^2 = 1-\left(1-R^2\right)\left(\frac{n-1}{n-k}\right)$, where k is the number of parameters and n is the number of observations.

Q.28	The technical change in the endogenous growth model is endogenized by
(A)	providing incentives to firms to innovate.
(B)	making the saving function dependent on income.
(C)	introducing constraints in capital accumulation.
(D)	assuming a perfectly competitive market structure.

Q.29 Which of the following statements is CORRECT for **Game A** and **Game B**?

Game A: Mary wants to watch a movie and John is interested in watching a football match. Both wish to be together. The payoff matrix is:

		John	
		Movie	*Football*
Mary	*Movie*	(2,1)	(0,0)
	Football	(0,0)	(1,2)

Game B: The Prisoner's dilemma problem is shown below:

		Convict 2	
		Do not confess	*Confess*
Convict 1	*Do not confess*	(-1,-1)	(-9,0)
	Confess	(0,-9)	(-5,-5)

(A) In **Game A**, (Movie, Football) and (Football, Movie) represent Nash equilibrium. In **Game B**, (Do not confess, Do not confess) is the Nash Equilibrium.

(B) In **Game B**, (Confess, Confess) is not a Nash equilibrium but in **Game A**, both (Movie, Football) and (Football, Movie) represent Nash equilibrium.

(C) In **Game B**, the Nash equilibrium is (Do not confess, Do not confess).

(D) In **Game A**, both (Movie, Movie) and (Football, Football) represent Nash equilibrium. In **Game B**, the Nash equilibrium is (Confess, Confess).

Q.30	The short-run production function of a firm is $Q = 200 + 0.2L^2 - 0.0004L^3$. If wage rate equals Rs. 140 and the number of labours (L) is 100, then the Marginal Cost and the Average Variable Cost, respectively, are
(A)	5 and 7.78
(B)	6 and 7.78
(C)	5 and 6.68
(D)	6 and 6.68

Section B: Q.31 – Q.40 Carry TWO marks each.	
Q.31	Let $X \sim N\left(\mu_X, \sigma_X^2\right)$ and $Y \sim N\left(\mu_Y, \sigma_Y^2\right)$. Which of the following is/are NOT correct?
(A)	The area $F(X) = \dfrac{1}{\sigma_X \sqrt{2\pi}} \int_{-\infty}^{\mu_X} e^{-\frac{1}{2}\left(\frac{X-\mu_X}{\sigma_X}\right)^2} dx$ is 1.
(B)	The areas under the normal probability curve between the ordinates at $\mu_X \pm 3\sigma_X$ and $\mu_Y \pm 2\sigma_Y$ are 0.9544 and 0.9973, respectively.
(C)	For variable *X*, Quartile Deviation : Mean Absolute Deviation : Standard Deviation $\cong \dfrac{2}{3}\sigma_X : \dfrac{4}{5}\sigma_X : \sigma_X$
(D)	If *X* and *Y* are independent, then $(X - Y) \sim N\left(\mu_X - \mu_Y, \sigma_X^2 + \sigma_Y^2\right)$.

Q.32 Matching **List I** and **List II**, choose the CORRECT option(s).

List I	List II
a. Bombay Plan	i. J. P. Narayan
b. People's Plan	ii. J. R. D. Tata
c. Sarvodaya Plan	iii. M. N. Roy

(A) (a, i), (b, iii)

(B) (a, ii), (b, iii)

(C) (b, iii), (c, i)

(D) (a, ii), (c, iii)

Q.33	Suppose that the regression model is $Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \mu_i$, $i = 1, 2, \ldots, n$. Which of the following null hypotheses could be tested using the F-test?
(A)	$\beta_1/\beta_2 = 0$
(B)	$\beta_0 = 0$
(C)	$\beta_1 \beta_2 = 0$
(D)	$\beta_1 = \beta_2 = 0$

Q.34	Let f be defined by $f(x) = \lvert x \rvert + \left\lvert \cos\left(\frac{\pi}{2} - x\right) \right\rvert$, $x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$. Then
(A)	f is continuous on $\left(-\frac{\pi}{2}, 0\right) \cup \left(0, \frac{\pi}{2}\right)$.
(B)	f is differentiable at $x = 0$.
(C)	f is differentiable everywhere except $x = 0$.
(D)	$\lim_{x \to 0} f(x) = 0$.

Q.35	The real exchange rate is given by $e = EP/P^{\star}$, where e is the price of domestic goods in terms of foreign goods, E is the price of domestic currency in terms of foreign currency, P is the domestic price level, $P^{\star}$ is the foreign price level. If the Indian Rupee depreciates vis-à-vis the Japanese Yen, and the Marshall-Lerner condition holds, then
(A)	India's imports will increase.
(B)	India's trade balance will improve.
(C)	foreign demand for Indian goods will increase.
(D)	foreign demand for Indian goods will decrease.

Q.36	The demand function (Q_x^D) and supply function (Q_x^S) are given as: $Q_x^D = f(P_x, I)$ and $Q_x^S = g(P_x, A)$ where I (Income) and A (Advertisement expenses) are the exogenous factors affecting quantity demanded and supplied, respectively. Further, $\frac{\partial f}{\partial P_x} < 0, \frac{\partial g}{\partial P_x} > 0$ but $\frac{\partial f}{\partial I}$ and $\frac{\partial g}{\partial A}$ may have any sign. Considering that there exists an equilibrium ($Q_x^D = Q_x^S = Q$), which of the following is/are CORRECT?
(A)	$e_{P_x A} = \left(\frac{\partial g}{\partial A}\frac{A}{Q}\right) / \left(\frac{\partial f}{\partial P_x}\frac{P_x}{Q} - \frac{\partial g}{\partial P_x}\frac{P_x}{Q}\right)$
(B)	$\frac{dP_x}{dA} = \left(\frac{\partial g}{\partial A}\right) / \left(\frac{\partial f}{\partial P_x} - \frac{\partial g}{\partial P_x}\right)$
(C)	$e_{P_x I} = \left(\frac{\partial g}{\partial I}\frac{I}{Q}\right) / \left(\frac{\partial f}{\partial P_x}\frac{P_x}{Q} - \frac{\partial g}{\partial P_x}\frac{P_x}{Q}\right)$
(D)	The sign of $\frac{dP_x}{dA}$ does not depend on $\frac{\partial g}{\partial A}$.

Q.37	Which of the following statements is/are CORRECT under the Keynesian Cross (Fixed Price) Model?
(A)	The product market and factor market independently determine the full-employment level of output.
(B)	Output is determined in the product market by the aggregate expenditure.
(C)	Money market determines the price level, given the quantity of money and the level of output.
(D)	Employment is determined in the factor market by the output level determined in the product market.

Q.38	Which of the following functions is/are homogeneous?
(A)	$x\cot^{-1}\left(\frac{y}{x}\right)$
(B)	$\sqrt{\frac{x}{y}}+\frac{3x}{y}+7$
(C)	$\frac{x^3+y^3}{3x+4y}$
(D)	$3x^5y+2x^2y^4-3x^3y^4$

Q.39	In the context of Indian agriculture, which of the following statements is/are CORRECT?
(A)	NABARD was established in 1982.
(B)	One of the objectives of setting up of the CACP was to ensure remunerative prices to farmers.
(C)	The APMC Act is related to institutional credit supply in agriculture.
(D)	The National Commission on Agriculture was chaired by V. M. Dandekar.

Q.40	Let a monopolist demand curve be given by $Q = P^e$, where Q is output, P is price, e is the price elasticity of demand $(e < -1)$, and Marginal Cost = Average Cost = α. If P_C and P_M represent the price under perfect competition and monopoly, respectively, then which of the following is/are NOT correct? (CS_M and CS_C represent the consumer surplus under monopoly and perfect competition, respectively.)
(A)	$P_C = \alpha\left(\frac{e}{1+e}\right)$
(B)	$P_M = \alpha\left(\frac{e}{1+e}\right)$
(C)	For $e = -2$, $CS_M = CS_C$.
(D)	For e closer to -1, the ratio CS_M/CS_C increases.

Section C: Q.41 – Q.50 Carry ONE mark each.

Q.41 The sum of the eigen values of the square matrix

$$\begin{pmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{pmatrix}$$ is _____ (*in integer*).

Q.42 Monthly per capita consumption expenditure (MPCE) of 10 households in a region is given below.

Households	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
MPCE (in Rs.)	2800	3000	1200	3500	1400	2500	4000	1000	900	1300

Assuming the poverty cutoff (Z) of MPCE to be Rs. 2000, the squared poverty gap ratio is _____ (*round off to 3 decimal places*).

Q.43 Suppose that the full employment level of output of an economy is Rs. 2200 million, expenditure determined level of output is Rs. 2163 million, and the marginal propensity to consume is 0.75. The deflationary gap equals Rs. _____ million (*round off to 2 decimal places*).

Q.44	Let $a, b \in \Re$. If $f(x) = ax + b$ is such that $a + b = 4$ and $f(x + y) = f(x) + f(y) - 2$ for all $x, y \in \Re$, then $\sum_{n=1}^{50} f(n) =$ _____ (*in integer*).
Q.45	The Total Variable Cost (TVC) for a firm is given by $TVC = x^3 - bx^2$. The Total Fixed Cost is 848. The value of b for which the Marginal Cost is minimum at $x = 16$ is _____ (*in integer*).
Q.46	Let the consumption function, tax function, and income identity be given by $C = C_0 + b(Y - T)$, $T = T_0 + tY$, and $Y = C + I_0 + G_0$, respectively, where C_0, I_0, G_0, and T_0 are autonomous consumption, investment, government expenditure, and tax, respectively. If $b = 0.75$ and $t = 0.1$, then an increase in G_0 by Rs. 20 million will increase Y by Rs. _____ million (*round off to 2 decimal places*).

Q.47	Let the system of equations be $\alpha u + w = 0,\ u + \alpha v = 0,\ v + \alpha w = 0$, where $\alpha \in \Re$. Then the system has infinite solutions if $\alpha =$_____ (*in integer*).
Q.48	Assume that the cost function for the i^{th} firm in an industry is given by $$C_i = 0.25q_i^2 + 2q_i + 5, \quad i = 1, 2, \ldots, 150,$$ where C_i and q_i are cost and output for the i^{th} firm, respectively. Let the aggregate inverse demand function be $P = 10 - 0.01Q$, where P is the unit price and Q is the aggregate output. Assuming perfect competition, the equilibrium quantity is _____ (*in integer*).

Q.49

The following table presents the national income related aggregates (at current prices) for the year 2019-20:

National income related aggregates	Rs. Lakh Crores
Net factor income earned abroad	10
Private income	175
GNP at factor cost	210
NNP at factor cost	195
Retained earnings of Nation's private sector	10
Corporate tax	25
Household direct tax	28
Personal income	140
Miscellaneous receipts of government administrative departments	0

The personal disposable income for the year 2019-20 is Rs. _____ Lakh Crores (*in integer*).

Q.50

The following table provides a list of countries selling Big Mac and market exchange rates in January 2019.

Country	**Big Mac** (Price in local currency)	**Market Exchange Rate** (Local currency per USD)
United States	5.58 USD	1.00
Norway	50.00 Kroner	8.53 Kroner/USD
Japan	390.00 Yen	108.44 Yen/USD
Mexico	49.00 Pesos	17.31 Pesos/USD
China	20.90 Yuan	6.85 Yuan/USD
Russia	110.17 Rubles	66.69 Rubles/USD
India	178.00 Rupees	69.69 Rupees/USD

Using the above information, the cheapest price (in USD) of Big Mac is _____ (*round off to 2 decimal places*).

Section C: Q.51 – Q.60 Carry TWO marks each.	
Q.51	An individual faces an uncertain prospect, where wealth could be Rs. 10 Lakh with probability 0.75 and Rs. 7 Lakh with probability 0.25. Let the utility function be $U(w) = w^3$. Then the individual will buy full insurance by paying a premium of Rs. _____ Lakh (*round off to 2 decimal places*).
Q.52	Suppose that per capita GDP of India and USA are growing at annual average rates of 8.8% and 1.8%, respectively. Further, consider that in 2019-20, per capita GDP of USA was USD 41099 and per capita GDP of India was USD 1570. Assuming that the two countries continue to grow at the above rates, India's per capita GDP will be equal to the per capita GDP of USA in _____ years (*round off to 2 decimal places*).
Q.53	If $\int t \log\left(1+\frac{2}{t}\right)dt = g(t)\left(\frac{t^2}{2}-2\right) + f(t)\frac{t^2}{2} + Kt + C$, where C is an arbitrary constant, then $2K$ is _____ (*in integer*).

Q.54	ACD Bank holds a total deposit of Rs. 256412. To expand the money supply in the economy during the COVID-19 pandemic period, the Reserve Bank of India reduces the cash reserve ratio (CRR) from 4.5% to 3.5%. Due to this policy change, the additional money supply generated by ACD Bank is Rs. _____ (*in integer*).
Q.55	Suppose that the regression model is $Y_{n\times 1} = X_{n\times 3}\beta_{3\times 1} + U_{n\times 1}$ with $\beta_{3\times 1} = \begin{bmatrix}\beta_1 & \beta_2 & \beta_3\end{bmatrix}^T$. A random sample of size $n = 23$ on Y and X is drawn from the normal population. Using the data, if a researcher obtains $(X^TX)^{-1} = \begin{bmatrix}0.3 & 0.5 & 0.8\\ 0.4 & -0.6 & 0.2\\ 0.4 & 0.5 & 0.3\end{bmatrix}$, $X^TY = \begin{bmatrix}0.3 & 0.2 & 0.1\end{bmatrix}^T$ and $e^Te = 0.7$, where e denotes the vector of estimated residuals, then the t-statistic to test the null hypothesis $\beta_3 = 0$ is _____ (*round off to 2 decimal places*).
Q.56	Given the production function $Q = 6\sqrt{L}$ and the supply of labour $L = \sqrt{w}$, where L and w denote the number of labours and wage rate, respectively. If the unit price of the product is Rs. 243, then the profit maximizing value of w is Rs. _____ (*in integer*).

Q.57	Given the following information related to product and money markets, **Product Market** $C = 300 + 0.8(Y - T)$ $T = 200 + 0.2(Y)$ $I_0 = 300; G_0 = 400$ **Money Market** $\frac{M_o}{P} = 0.4Y - 200i$ $M_0 = 900; P = 1$ (Fixed) where Y = Income, C = Consumption, T = Tax, I_0 = Autonomous Investment, G_0 = Autonomous Government Expenditure, M_0 = Nominal Money Demand, P = Price, and i = Interest Rate. The equilibrium level of interest rate (in %) is _____ (*round off to 2 decimal places*).
Q.58	Let the linear programming problem be Maximize $Z = -0.2x_1 + x_2$ subject to $2x_1 + 5x_2 \leq 70$, $x_1 + x_2 \leq 20$, $x_1, x_2 \geq 0$. If $x_1 = a$ and $x_2 = b$ is the optimal solution, then $a + b =$ _____ (*in integer*).

Q.59	Let the production function be $Q = \sqrt{L^2 + K^2}$, the unit price of labour (L) and capital (K) be Rs. 30 and Rs. 40, respectively, and the total cost be Rs. 580. Then the maximum value of Q subject to the cost constraint is _____ (*round off to 2 decimal places*).
Q.60	In a market, two firms F_1 and F_2 are producing homogenous products. The inverse demand function is given by $p = 120 - 0.5(q_1 + q_2)$, where p is the unit price of the product, and q_1 and q_2 are the outputs from F_1 and F_2, respectively. Suppose the cost functions of F_1 and F_2 are $C_1 = 20q_1$ and $C_2 = 10 + 0.5q_2^2$, respectively. Then the total profit earned by both the firms assuming a competitive situation is _____ (*in integer*).