Applied Economics

Answer all the questions each of which carries 2 marks

<u>TICK THE CORRECT ALTERNATIVE IN THE QUESTION PAPER</u>

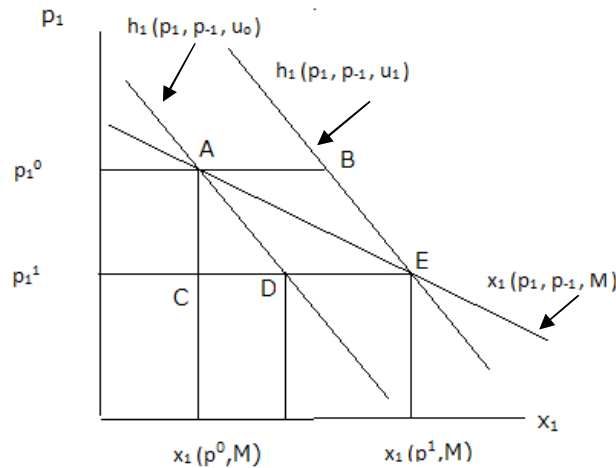**The booklet is meant <u>only for</u> rough work. No extra sheets will be provided.**

Full Marks: 100   Time: 2 Hours

Group A (Microeconomics)

1.

Consider a normal good x_1 with price p_1. From the above diagram, compensating and equivalent variations are respectively:
(a) $p_1^0 A D p_1^1$ and $p_1^0 B E p_1^1$ (b) $p_1^0 A C p_1^1$ and $p_1^0 B E p_1^1$ (c) $p_1^0 A D p_1^1$ and $p_1^0 A E p_1^1$ (d) ACD and ABE

2. Consider the following two lotteries: L_1 = (200, 0; p=0.7. 0.3) and L_2 = (1200, 0 ; p = 0.1, 0.9). Let x_1 and x_2 be the sure amounts of money that an individual finds indifferent to L_1 and L_2. If his   preferences are transitive and monotonic the individual must prefer L_1 to L_2
(a) if $x_1 \geq x_2$ (b) if and only if $x_1 > x_2$ (c) if and only if $x_1 \geq x_2$ (d) if $x_1 < x_2$

3. For a pair of goods X and Y, if the income elasticity of demand for X is -2 and the cross-price elasticity of demand for X with respect to Y is 0 then, what is the nature of the commodity X?
(a) Necessary   (b) Giffen good   (c) Luxury   (d) Inferior but not Giffen

4. Consider the market for apple juice. In this market the supply curve is given by $Q_J^S = 10P_J - 5P_A$ and the demand curve is given by $Q_J^D = 100 - 15P_J + 10P_T$, where J denotes apple juice, T denotes tea and A denotes apples. Assume that per unit price of apple and tea are fixed at Re.1 and Rs.5, respectively. Calculate the change in equilibrium quantity in the apple juice market when the juice vendors are subjected to a Re. 1 per unit quantity tax.
(a) 7.5   (b) 5   (c) 4.5   (d) 9

5. Abhik's utility function is given by $U(x_1, x_2) = \max\{x_1, x_2\}$. His preference structure violates axiom **Z** while his demand function for either x_1 or x_2 resembles the case where x_1 and x_2 are **W** goods.
(a) Z = monotonicity, W = perfect complements *(b) Z = convexity, W = perfect substitutes*
(c) Z = convexity, W = perfect complements *(d) Z = monotonicity, W = perfect substitutes*

6. If $p_1 = a - b_1 q_1$ and $p_2 = a - b_2 q_2$ (such that $b_1 > b_2$), are the market demand curves of a monopolist in two markets between which communication is not possible, then in equilibrium:
(a) $p_1^* = p_2^*$ *(b)* $p_1^* > p_2^*$ *(c)* $p_1^* < p_2^*$ *(d) no systematic relation between* p_1^* *and* p_2^* *exists.*

7. Amit's preference is given by the utility function $U = Min\{(x + 2y), 4y\}$. Amit has chosen 5 units each of X and Y when price of X is 2 units. Amit's total spending on X and Y is
(a) 30   *(b) 4*   *(c) 25*   *(d) Insufficient data*

8. Arun and Burun have identical utility function $U = x + y$. The endowments (x, y) for A and B are given by $(0,1)$ and $(2,0)$ respectively. In competitive equilibrium:
(a) Arun consumes 0.5 unit each of X and Y *(b) Arun consumes 1 unit of X and none of Y*
(c) Both (a) and (b) are possible   *(d) (c) is wrong*

9. Your utility function is given by $U = x - \alpha s; \alpha > 0$ where x is the distance you drive and s is the pollution you suffer. The pollution you suffer as a result of driving a distance x is given by the equation $s = \frac{1}{\beta}x; \beta > 0$. The amount you spend per unit distance is $p_x > 0$. You will definitely spend your entire income on driving if:
(a) α > β   *(b) α = β*   *(c) α < β* *(d) None of the above*

10. Let the production function be $Q = (L/K)^{32/50}$, where L and K stand for labor and capital, respectively. If both L and K are increased by 190 times, what will be the change in Q?
(a) 190 times *(b) More than 190 times* *(c) No change* *(d) Less than 190 times*

11. Consider a symmetric duopoly where the two firms either engage in Cournot quantity competition (**C**) or Stackelberg quantity competition (**S**).
(a) Consumers prefer S over C   *(b) Consumers prefer C over S*
(c) Insufficient data   *(d) Consumers are indifferent between C and S*

12. In a model of monopolistic competition, in the long-run equilibrium:
(a) the dd curve (the perceived demand curve) is tangent to the LAC curve of the typical firm
(b) the DD curve (the actual sales curve) is tangent to the LAC curve of the typical firm
(c) neither is tangent to the LAC curve of the typical firm
(d) both are tangent to the LAC curve of the typical firm

13. In a two good consumer model, if both the consumption goods are rationed then, the resulting budget set could resemble a
(a) triangle   *(b) pentagon*   *(c) trapezium*   *(d) all of the above*

Group B (Macro Economics)

14. Between year 1 and year 2, while production in all other sectors remained unchanged, government increased working days in government offices from 5 to 6. As a consequence:
(a) personal income increased, national income remaining unchanged
(b) both personal income and national income increased
(c) both personal income and national income remained unchanged
(d) national income increased , personal income remaining unchanged

15. When the economy is in equilibrium, we know with certainty that:
(a) private saving equals investment   (b) public saving equals investment
(c) the government budget is balanced   (d) none of the above

16. Consider the open economy version of the simple Keynesian model without government, where both consumption and import are proportional functions of income (Y).Suppose that average propensities to consume and import are 0.8 and 0.3 respectively. The investment (I) function and the level of export (X) are given by: $I = 100 + 0.4Y$ and $X = 100$. Maximum possible level of imports is 450. Equilibrium for this model:
(a) exists   (b) does not exist
(c) will exist if the limit to import is raised to 600   (d) cannot be computed with certainty

17. Keynesian theory of liquidity preference
(a) focuses on income as the main determinant of speculative money demand
(b) stresses the role of potential capital gains/losses in the individual's portfolio decision
(c) assumes that bond prices fall when interest rates fall
(d) argues that there is a direct relationship between demand for speculative balances and the interest rate.

18. According to Permanent Income Hypothesis, consumption depends only on permanent   income because:
(a) transitory income is very small   (b) transitory income may be negative
(c) people don't want to earn transitory income   (d) people want smooth consumption pattern

19. In an economy with consumption function $C = 100 + 0.6 Y$ and the investment function $I = 1000 – 5r$ (C, Y, I and r having their usual meanings), slope of the IS curve is:
(a) -0.06   (b) -0.08   (c) 0.06   (d) -0.6

20. Which policy would you recommend for an economy with interest-insensitive investment schedule?
(a) fiscal policy   (b) monetary policy   (c) fiscal policy and monetary policy   (d) none of the above

21. Full crowding – out effect is observed on:
(a) Vertical part of LM curve   (b) Horizontal part of LM curve
(c) Upward rising part of LM curve   (d) Horizontal part of IS curve

22. The view that firms sometimes deliberately pay above-market wage to their workers is established by:
(a) insider-outsider hypothesis   (b) efficiency wage hypothesis
(c) both insider-outsider hypothesis and efficiency wage hypothesis (d) none of the above

23. Under rational expectations hypothesis systematic demand management policies are effective in
(a) short run   (b) long run   (c) both short run and long run (d) neither short run nor long run

24. The imperfect – information model assumes that producers find it difficult to distinguish between changes in:
(a) real wages and nominal wages
(b) the overall level of prices and relative prices
(c) the overall level of prices and the expected level of prices
(d) cost push inflation and demand pull inflation

25. Let a Solow type economy's aggregate production function be given by $Q = 2L^{1/2}K^{1/2}$. The golden rule capital-labour ratio for this economy will be given by:
(a) $(K/L)^* = 20/3$ (b) $(K/L)^* = 400/9$ (c) $(K/L)^* = 20/9$ (d) $(K/L)^* = 400/3$

26. Suppose $u_n = 7\%$ and $\pi_{t-1} = 4\%$. If $u_t = 6\%$ (u_n, π_{t-1} , u_t having their usual meanings), we know that
(a) inflation in period t will be less than 4%   (b) inflation in period t will be equal to 4%
(c) inflation in period t will be more than 4%   (d) more information is needed to answer this question

Group C (Statistics and Econometrics)

27. Suppose that initially there were 9 workers, all being paid a uniform wage. Later a 10th worker is added whose wage rate is Rs. 20 less than for the others. The standard deviations of the wages of the initial group of 9 workers and the group of 10 workers after the addition of the new worker are
(a) 2, 8   (b) 1, 6   (c) 0, 6   (d) 6, 7

28. For a symmetric distribution if the first quartile is 142 and the semi-interquartile range is 18, then the median is
(a) 160   (b) 165   (c) 140   (d) 150

29. Which of the following is correct?
(a) Kurtosis means lack of symmetry   (b) For a symmetric distribution Mean>Median>Mode
(c) Variance is the second central moment (d) Bowley's coefficient of skewness lies between -3 & +3

30. The arithmetic mean of runs scored by three batsmen X, Y and Z in the same series of 10 innings are 50, 48 and 10 respectively. The standard deviation of their runs are 15, 12 and 2 respectively. Hence
(a) X, Y and Z are equally consistent
(b) X is most consistent of the three
(c) Y is more consistent compared to Z, but less consistent compared to X
(d) Z is most consistent of the three

31. If X_1, X_2 and X_3 are three variables with each having variance s^2 and the correlation coefficient between any two of them is 'r' and if $\overline{X} = \dfrac{X_1 + X_2 + X_3}{3}$ then var($\overline{X}$) will be equal to

(a) $\dfrac{s^2(1-2r)}{3}$ (b) $\dfrac{s^2(1+2r)}{3}$ (c) s^2 (d) $s^2/3$

32. Suppose a point is picked at random in the unit square. Let A be the event that it is in the triangle bounded by the lines y=0, x=1 and x=y, and B be the event that it is in the rectangle with vertices (0, 0), (1, 0), (1,1/2), (0,1/2). P(A∩B) and P(A∪B) are
(a) 3/8, 5/8   (b) 3/8, 7/8   (c) 5/8, 3/8   (d) 7/8, 3/8

33. In a class of 500 students. 200 have Economics, 200 have Mathematics and 150 have Statistics. Out of them, 62 have both Economics and Mathematics, 120 have Mathematics and Statistics and, 58 have Economics and Statistics. Find the number of students who have all three?
(a) 190   (b) 95   (c) 310   (d) 180

34. X is normally distributed with mean 70 and standard deviation 4. In a sample of 12000 observation, how many will have their (X<70), (X>70) and (X=70)?
(a) 6000, 0, 120   (b) 6000, 6000, 0   (c) 7000, 6000, 1   (d) 7000, 0, 0

35. A random variable Y has the distribution function $Y=e^x$, where x has the normal distribution N(0, 1). The value of E(Y) is
(a) 1/e   (b) $1/\sqrt{e}$ (c) $\sqrt{e}$ (d) e

36. Suppose the critical region for a test statistics S in a given test of significance is given by $S_1 \leq S \leq S_2$. Suppose that the probability $(S<S_1) =0.03$ and probability $(S>S_2)=0.45$. What is the level of significance being used in carrying out this test?
(a) 0.03   (b) 0.42   (c) 0.48   (d) 0.52

37. In a two variable regression model of y_i on x_i if the regression line passes through the origin, then the regression coefficient is given by

(a) $\dfrac{\bar{x}}{\bar{y}}$
(b) $\dfrac{\sum_i x_i y_i}{\sum x_i^2}$
(c) $\dfrac{\sum_i (x_i - \bar{x})(y_i - \bar{y})}{\sum (x_i - \bar{x})^2}$
(d) $\dfrac{\sum_i x_i y_i}{\sum y_i^2}$

38. Which of the following is correct?
(a) To test proportional relation between y_i and x_i, in a two variable regression model, $y_i = \alpha + \beta x_i + u_i$ one should test H_0: $\beta=0$ against H_1: $\beta\neq0$
(b) In presence of heteroskedasticity OLS estimates of regression coefficients become biased and hence unacceptable
(c) AR(1) process is equivalent to MA(∞) process
(d) If e_i is the residual in a two variable regression of y_i on x_i, then $\sum_i e_i x_i = 0$

39. Which of the following is incorrect?
(a) In a least square regression of y_i on x_i, $\sum_i (y_i - \bar{y})^2 = \hat{\beta}^2 \sum_i (x_i - \bar{x})^2 + \sum_i e_i^2$

(b) In a least square regression of y_i on x_i, $cov(\hat{\alpha}, \hat{\beta}) = 0$ if the sample mean of x_i is zero

(c) In a least square regression of y_i on x_i, $var(\hat{\beta}) = \dfrac{\sigma_u^2}{\sum_i (y_i - \bar{y})^2}$

(d) The degrees of freedom in a two variable regression model, $y_i = \alpha + \beta x_i + u_i$ is (n-2)

Group D (Mathematical Economics)

40. If $f(x) = |x - 1| + |x - 2| + |x - 3|$, then $f(x)$ is differentiable at

(a) 0
(b) 1
(c) 2
(d) 3

41. Given sets Y and Z, $Y \times Z = \{(y, z) | y \in Y, z \in Z\}$ and $Y - Z = \{y \in Y | -y \in Z\}$, which of the following formulae is generally correct for sets A, B and C ?
(a) (A-B) X C = (BXC) – (AXC)
(b) (A-B) X C = (AXC) – (BXC)
(c) (A-B) X C = (AXC) – B
(d) (A-B) X C = A - (BXC)

42. $f(x, y) = 2\ln x + 3\ln y$ is:
(a) a linear function   (b) a homogenous function   (c) a homothetic function   (d) None of the above

43. The function $y = x^2$, x>0, is:
(a) Quasi-concave and quasi-convex
(b) Quasi-concave but not quasi-convex
(c) Quasi- convex but not quasi-concave
(d) Neither quasi-concave nor quasi-convex

44. Consider the problem $Max. f(x, y) = 2x^3 - 3y^2$ subject to $(3 - x)^3 - y^2 = 0$

(a) Solution does not exist
(b) Solution involves complex number
(c) Multiple solutions exist
(d) Solution is $x = 3, y = 0$

45. Let the function y = f(x) be drawn as follows:
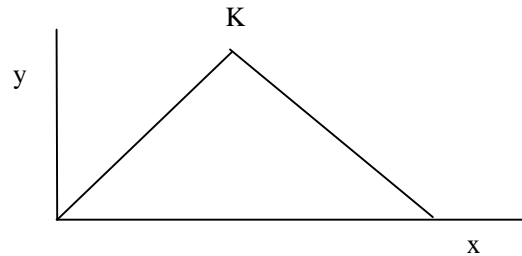
The value of $f''(x)$ at the point K is:
(a) Positive   (b) Negative   (c) Cannot be found   (d) zero

46. Find the phase-line for $dy/dt = 4 - (y/2)$ and indicate its implication for the long run equilibrium y (whether stable or unstable):
(a) $y_e = 8$, unstable   (b) $y_e = 8$, stable   (c) $y_e = 4$, unstable   (d) $y_e = 4$, stable

47. Consider the following model:
$D(t) = \alpha_1 - \beta_1 P(t)$; $S(t) = -\alpha_2 + \beta_2.P(t-1)$ and $D(t) = S(t)$, where $\alpha_1, \beta_1, \alpha_2$ and β_2 are positive constant. If $\beta_2 > \beta_1$, then P(t) will show:
(a) Steady convergence to the long-run price   (b) Steady divergence from the long-run price
(c) Damped oscillation around the long-run price   (d) explosive oscillation around the long-run price

48. If a 2-person-non-constant-sum game has a rationalizable pure strategy for a player, the game has:
(a) at least one pure-strategy Nash equilibrium   (b) multiple pure-strategy Nash equilibriums
(c) no pure-strategy Nash equilibrium   (d) exactly one pure-strategy Nash equilibrium

49. In a static input – output open model, indecomposability of the inter-industry transactions matrix requires strict positivity of the said matrix as:
(a) a necessary condition   (b) a sufficient condition
(c) neither necessary nor sufficient condition   (d) none of the above

50. Consider a hypothetical economy organised into three industries: lumber and wood products, paper and allied products, and machinery and transportation equipment. A consulting firm estimates that last year the lumber industry had an output valued at 50,000 in local currency, 5% of which is consumed by itself, 70% was consumed by final demand, 20% by the paper and allied products industry, 5% by the equipment industry. The paper and allied products industry produced output worth 50,000 in local currency, of which it consumed 10%, 80% went to final demand, 5% went to the lumber industry, and 5% to the equipment industry. Finally the equipment industry consumed 15% of its own products, out of a total of 1,00,000 in local currency, 25% went to final demand, 30% to the lumber industry, 30% to the paper and allied product industry. On the basis of these estimates, the diagonal elements of the technical coefficients matrix are:

(a) 0.05, 0.1, 0.15   (b) 0.95, 0.9, 0.85   (c) 0.5, 0.1, 0.15   (d) none of the above