

RAVI MATHS TUITION CENTER ,GKM COLONY, CH- 82. PH: 8056206308

## QUARTERLY IMPORTANT 5 MARKS

Date : 15-Aug-19

12th Standard

Business Maths

Reg.No. :

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Total Marks : 300

5

Time : 05:00:00 Hrs

- The price of three commodities X,Y and Z are x,y and z respectively Mr.Anand purchases 6 units of Z and sells 2 units of X and 3 units of Y. Mr.Amar purchases a unit of Y and sells 3 units of X and 2units of Z. Mr.Amit purchases a unit of X and sells 3 units of Y and a unit of Z. In the process they earn ` 5,000/-, ` 2,000/- and ` 5,500/- respectively Find the prices per unit of three commodities by rank method.
- An amount of ` 5,000/- is to be deposited in three different bonds bearing 6%, 7% and 8% per year respectively. Total annual income is ` 358/-. If the income from first two investments is ` 70/- more than the income from the third, then find the amount of investment in each bond by rank method.
- A new transit system has just gone into operation in Chennai. Of those who use the transit system this year, 30% will switch over to using metro train next year and 70% will continue to use the transit system. Of those who use metro train this year, 70% will continue to use metro train next year and 30% will switch over to the transit system. Suppose the population of Chennai city remains constant and that 60% of the commuters use the transit system and 40% of the commuters use metro train this year.
  - What percent of commuters will be using the transit system after one year?
  - What percent of commuters will be using the transit system in the long run?
- Two products A and B currently share the market with shares 50% and 50% each respectively. Each week some brand switching takes place. Of those who bought A the previous week, 60% buy it again whereas 40% switch over to B. Of those who bought B the previous week, 80% buy it again where as 20% switch over to A. Find their shares after one week and after two weeks. If the price war continues, when is the equilibrium reached?
- Examine the consistency of the system of equations:  $x+y+z=7, x+2y+3z=18, y+2z=6$  .**
- The cost of 2kg. of wheat and 1kg. of sugar is Rs 100. The cost of 1kg. of wheat and 1kg. of rice is Rs 80. The cost of 3kg. of wheat, 2kg. of sugar and 1kg of rice is Rs 220. Find the cost of each per kg., using Cramer's rule.
- A salesman has the following record of sales during three months for three items A,B and C, which have different rates of commission.

Months	Sales of units			Total commission drawn (in Rs)
	A	B	C	
January	90	100	20	800
February	130	50	40	900
March	60	100	30	850

- Integrate the following with respect x.

$$x^3 + 3x^2 - 7x + 11$$

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- 9) Integrate the following with respect to x.

$$\frac{4x^2 + 2x + 6}{(x+1)^2(x-3)}$$

- 10) Integrate the following with respect to x.

$$\frac{3x^2 - 2x + 5}{(x-1)(x^2+5)}$$

- 11) Evaluate the following using properties of definite integrals:

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin^7 x}{\sin^7 x + \cos^7 x} dx$$

- 12) Evaluate the following using properties of definite integrals:

$$\int_0^1 \frac{x}{(1-x)^{\frac{3}{4}}} dx$$

- 13) Evaluate the following integrals as the limit of the sum:

$$\int_0^1 (x+4) dx$$

- 14) Evaluate the following integrals as the limit of the sum:

$$\int_1^3 (2x+3) dx$$

- 15) Evaluate the following integrals as the limit of the sum:

$$\int_0^1 x^2 dx$$

- 16) Evaluate the following integrals:

$$\int \frac{1}{\sqrt{x+2} - \sqrt{x+3}} dx$$

- 17) Evaluate the following integrals:

$$\int_0^3 \frac{xdx}{\sqrt{x+1} + \sqrt{5x+1}}$$

- 18) Elasticity of a function  $\frac{E_y}{E_x}$  is given by  $\frac{E_y}{E_x} = \frac{-7x}{(1-2x)(2+3x)}$ . Find the function when  $x=2$ ,  $y=\frac{3}{8}$

- 19) The elasticity of demand with respect to price for a commodity is given by  $\frac{(4-x)}{x}$ , where p is the price when demand is x. Find the demand function when price is 4 and the demand is 2. Also find the revenue function.

- 20) A firm's marginal revenue function is  $MR = 20e^{-x/10} \left(1 - \frac{x}{10}\right)$ . Find the corresponding demand function.

- 21) The marginal cost function of a commodity is given by  $MC = \frac{14000}{\sqrt{7x+4}}$  and the fixed cost is Rs.18,000. Find the total cost and average cost.

- 22) Under perfect competition for a commodity the demand and supply laws are  $P_d = \frac{8}{x+1} - 2$  and  $P_s = \frac{x-3}{2}$  respectively. Find the consumer's and producer's surplus.

- 23) The demand equation for a products is  $x = \sqrt{100-p}$  and the supply equation is  $x = \frac{p}{2} - 10$ . Determine the consumer's surplus and producer's surplus, under market equilibrium.

- 24) The marginal revenue function for a firm is given by  $MR = \frac{2}{x+3} - \frac{2x}{(x+3)^2} + 5$ . Show that the demand function is  $P = \frac{2x}{(x+3)^2} + 5$

- 25) Solve the following homogeneous differential equations.

$$(y^2 - 2xy)dx = (x^2 - 2xy)dy$$

The slope of the tangent to a curve at any point (x, y) on it is given by  $(y^3 - 2yx^2)dx + (2xy^2 - x^3)dy = 0$  and the curve passes through (1, 2). Find the equation of the curve.

- 27) If  $\frac{dy}{dx} + y \tan x = \sin x$  and if  $y = 0$  when  $x = \frac{\pi}{3}$  express y in terms of x.
- 28) Solve the following differential equations  $(D^2 + D - 6)y = e^{3x} + e^{-3x}$
- 29) Solve the following differential equations  $(D^2 - 10D + 25)y = 4e^{5x} + 5$
- 30) Suppose that the quantity demanded  $Q_d = 13 - 6P + \frac{dp}{dt} + \frac{d^2p}{dt^2}$  and quantity supplied  $Q_s = -3 + 2p$  where p is the price. Find the equilibrium price for market clearance.
- 31) Suppose that  $Q_d = 30 + 5P + 2\frac{dp}{dt} + \frac{d^2p}{dt^2}$  and  $Q_s = 6 + 3P$ . Find the equilibrium price for market clearance.
- 32) Solve  $(x^2 + y^2)dx + 2xy dy = 0$
- 33) Solve  $x^2 y dx - (x^3 + y^3) dy = 0$
- 34) Evaluate  $\Delta \left[ \frac{1}{(x+1)(x+2)} \right]$  by taking '1' as the interval of differencing
- 35) In an examination the number of candidates who secured marks between certain interval were as follows

Marks	0-19	20-39	40-59	60-79	80-99
No. of candidates	41	62	65	50	17

- 36) Use Lagrange's formula and estimate from the following data the number of workers getting income not exceeding Rs. 26 per month

Income not exceeding (Rs)	15	25	30	35
No. of workers	36	40	45	48

- 37) If  $u_0 = 560$ ,  $u_1 = 556$ ,  $u_2 = 520$ ,  $u_4 = 385$ , show that  $u_3 = 465$
- 38) From the following data find y at  $x = 43$  and  $x = 84$

x	40	50	60	70	80	90
y	184	204	226	250	276	304

- 39) Show that the equations  $2x + y + z = 5$ ,  $x + y + z = 4$ ,  $x - y + 2z = 1$  are consistent and hence solve them.
- 40) Investigate for what values of 'a' and 'b' the following system of equations  $x + y + z = 6$ ,  $x + 2y + 3z = 10$ ,  $x + 2y + az = b$  have
- no solution
  - a unique solution
  - an infinite number of solutions.
- 41) The total number of units produced (P) is a linear function of amount of over times in labour (in hours) (l), amount of additional machine time (m) and fixed finishing time (a)
- i.e,  $P = a + bl + cm$
- From the data given below, find the values of constants a, b and c

Day	Production (in Units P)	Labour (in Hrs l)	Additional Machine Time (in Hrs m)
Monday	6,950	40	10
Tuesday	6,725	35	9
Wednesday	7,100	40	12

Estimate the production when overtime in labour is 50 hrs and additional machine time is 15 hrs.

- 42) 80% of students who do maths work during one study period, will do the maths work at the next study period. 30% of students who do english work during one study period, will do the english work at the next study period.

Initially there were 60 students do maths work and 40 students do english work.

Calculate,

(i) The transition probability matrix

(ii) The number of students who do maths work, english work for the next subsequent 2 study periods.

- 43) Evaluate the integral as the limit of a sum:  $\int_1^2 (2x + 1) dx$

- 44) Evaluate the integral as the limit of a sum:  $\int_1^2 x^2 dx$

- 45) Sketch the graph  $y = |x + 3|$  and evaluate  $\int_{-6}^0 |x + 3| dx$

- 46) Find the differential equation corresponding to  $y = ae^{4x} + be^{-x}$  where a, b are arbitrary constants.

- 47) If the marginal cost of producing x shoes is given by  $(3xy + y^2)dx + (x^2 + xy)dy = 0$  and the total cost of producing a pair of shoes is given by Rs. 12. Then find the total cost function.

- 48) Solve:  $(D^2 - 2D + 1)y = e^{2x} + e^x$

- 49) Evaluate  $\Delta \left[ \frac{5x+12}{x^2+5x+6} \right]$  by taking '1' as the interval of differencing.

- 50) Estimate the production for 1964 and 1966 from the following data

Year	1961	1962	1963	1964	1965	1966	1967
Production	200	220	260	-	350	-	430

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- 51) Evaluate  $\int \left[ \frac{1}{\log x} - \frac{1}{(\log x)^2} \right] dx$

- 52) If  $f(x) = \begin{cases} x^2, & -2 \leq x < 1 \\ x, & 1 \leq x < 2 \\ x-4, & 2 \leq x \leq 4 \end{cases}$ , then find the following

(i)  $\int_{-2}^1 f(x) dx$

(ii)  $\int_{-2}^1 f(x) dx$

(iii)  $\int_2^3 f(x) dx$

(iv)  $\int_{-2}^{1.5} f(x) dx$

(v)  $\int_1^3 f(x) dx$

- 53) Evaluate

$\int_0^\infty e^{-x^2} dx$

- 54) Processing math: 69%

A firm has the marginal revenue function given by  $MR = \frac{a}{(x+b)^2} - c$  where  $x$  is the output and  $a, b, c$  are constants. Show that the demand function is given by  $x = \frac{a}{b(p+c)} - b$ .

- 55) The elasticity of demand with respect to price  $p$  for a commodity is  $\eta_d = \frac{p+2p^2}{100-p-p^2}$ . Find demand function where price is Rs. 5 and the demand is 70.

- 56) Solve  $3e^x \tan y dx + (1 + e^x) \sec^2 y dy = 0$  given  $y(0) = \frac{\pi}{4}$

- 57) Using Newton's formula for interpolation estimate the population for the year 1905 from the table:

Year	1891	1901	1911	1921	1931
Population	98,752	1,32,285	1,68,076	1,95,670	2,46,050

- 58) From the following table find the number of students who obtained marks less than 45.

Marks	30-40	40-50	50-60	60-70	70-80
No. of Students	31	42	51	35	31

- 59) Using appropriate interpolation formula find the number of students whose weight is between 60 and 70 from the data given below

- 60) Calculate the value of  $y$  when  $x = 7.5$  from the table given below

x	1	2	3	4	5	6	7	8
y	18	27	64	125	216	343	512	

- 61) Using Lagrange's interpolation formula find  $y(10)$  from the following table:

x	5	6	9	11
y	12	13	14	16

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