RAVI MATHS TUITION CENTER, GKM COLONY, CHENNAI- 82. PH: 8056206308 Date: 01-Nov-19

HALF YEARLY MODEL PAPER 2

12th Standard **Business Maths**

Exam Time: 02:30:00 Hrs

Reg.No.:

Total Marks: 90 $20 \times 1 = 20$

(a) 0 (b) 1 (c) m (d) n (2) If $A = \begin{pmatrix} 2 & 0 \\ 0 & 8 \end{pmatrix}$, then $\rho(A)$ is (a) 0 (b) 1 (c) 2 (d) n (3) $\int \frac{\sin x}{\sin x} dx$ is (a) $\sin x + c$ (b) $\frac{1}{2} \sin x + c$ (c) $\cos x + c$ (d) $\frac{1}{2} \cos x + c$ 4) $\int \left[\frac{9}{x^3} - \frac{1}{x+1} \right] dx$ is (a) $\log x-3 - \log x+1 + c(b) \log x-3 + \log x+1 + c(c) 9 \log x-3 - \log x+1 + c(d) 9 \log x-3 + c(d) x-1 + c(d) 9 \log x-3 + c(d) 9 \log x-3 + c(d) 9 \log x-3 + c(d) 9$	1)	The rank of m×n matrix wh	ose elements are unity is		
(a) 0 (b) 1 (c) 2 (d) n 3) $\int \frac{\sin x}{2 \sin x} dx$ is (a) $\sin x + c$ (b) $\frac{1}{2} \sin x + c$ (c) $\cos x + c$ (d) $\frac{1}{2} \cos x + c$ 4) $\int \left[\frac{9}{x^3} - \frac{1}{x+1} \right] dx$ is (a) $\log x-3 - \log x+1 + c(b) \log x-3 + \log x+1 + c(c) 9 \log x-3 - \log x+1 + c(d) 9 \log x-3 + \log x+1 $ 5) Area bounded by the curve $y = \frac{1}{x}$ between the limits 1 and 2 is (a) $\log 2$ sq.units (b) $\log 5$ sq.units (c) $\log 3$ sq.units (d) $\log 4$ sq.units 6) The marginal cost function is $MC = 100 \sqrt{x}$. find AC given that $TC = 0$ when the out put is zero is (a) $\frac{200}{3} x^{\frac{1}{2}}$ (b) $\frac{200}{3} x^{\frac{3}{2}}$ (c) $\frac{200}{3x^{\frac{3}{2}}}$ (d) $\frac{200}{3x^{\frac{3}{2}}}$ 7) The order and degree of the differential equation $\sqrt{\frac{d^2y}{dx^2}} = \sqrt{\frac{dy}{dx} + 5}$ are respectively (a) 2 and 3 (b) 3 and 2 (c) 2 and 1 (d) 2 and 2 8) If $y = \cot x + c - c^3$ then its differential equation is (a) $y = \frac{dy}{dx} + \frac{dy}{dx} - \left(\frac{dy}{dx}\right)^3$ (b) $y = \left(\frac{dy}{dx}\right)^3 = x \frac{dy}{dx} - \frac{dy}{dx}$ (c) $\frac{dy}{dx} + y = \left(\frac{dy}{dx}\right)^3 - x \frac{dy}{dx}$ (d) $\frac{d^3y}{dx^3} = 0$ 9) If $h = 1$, ten $\Delta(x^2) =$ (a) 2x (b) 2x -1 (c) 2x +1 (d) 1 10) For the given data find the value of $\Delta^3 y_0$ is $\frac{ x }{ x } = \frac{ x }{ x }$				(c) m	(d) n
3) $\int \frac{\sin 2x}{2\sin x} dx$ is (a) $\sin x + c$ (b) $\frac{1}{2}\sin x + c$ (c) $\cos x + c$ (d) $\frac{1}{2}\cos x + c$ 4) $\int \left[\frac{9}{2x-3} - \frac{1}{x+1}\right] dx$ is (a) $\log x-3 - \log x+1 + c$ (b) $\log x-3 + \log x+1 + c$ (c) $9\log x-3 - \log x+1 + c$ (d) $9\log x-3 + \log x+1 + c$ (d) $\log x-3 + \log x+1 + c$ (e) $\log x-3 - \log x+1 + c$ (f) $\log x-3 + \log x+1 + c$ (f) $\log x-3 + \log x+1 + c$ (g) $\log x-1 + $	2)	If $A = \begin{pmatrix} 2 & 0 \\ 0 & 8 \end{pmatrix}$, then $\rho(A)$	is		
(a) $\sin x + c$ (b) $\frac{1}{2} \sin x + c$ (c) $\cos x + c$ (d) $\frac{1}{2} \cos x + c$ 4) $\int \frac{9}{2x^{-3}} - \frac{1}{x^{+1}} dx$ is (a) $\log x - 3 - \log x + 1 + c$ (b) $\log x - 3 + \log x + 1 + c$ (c) $9\log x - 3 - \log x + 1 + c$ (d) $9\log x - 3 + \log x + 1 + c$ 5) Area bounded by the curve $y = \frac{1}{x}$ between the limits 1 and 2 is (a) $\log 2$ sq.units (b) $\log 5$ sq.units (c) $\log 3$ sq.units (d) $\log 4$ sq.units 6) The marginal cost function is $MC = 100 \sqrt{x}$. find AC given that $TC = 0$ when the out put is zero is (a) $\frac{200}{3} x^{\frac{1}{2}}$ (b) $\frac{200}{3} x^{\frac{3}{2}}$ (c) $\frac{200}{3x^{\frac{3}{2}}}$ (d) $\frac{200}{3x^{\frac{3}{2}}}$ 7) The order and degree of the differential equation $\sqrt{\frac{d^2y}{dx^2}} = \sqrt{\frac{dy}{dx} + 5}$ are respectively (a) 2 and 3 (b) 3 and 2 (c) 2 and 1 (d) 2 and 2 8) If $y = cx + c - c^3$ then its differential equation is (a) $y = \frac{dy}{dx} + \frac{dy}{dx} - \left(\frac{dy}{dx}\right)^3$ (b) $y = \left(\frac{dy}{dx}\right)^3 = x\frac{dy}{dx} - \frac{dy}{dx}$ (c) $\frac{dy}{dx} + y = \left(\frac{dy}{dx}\right)^3 - x\frac{dy}{dx}$ (d) $\frac{d^3y}{dx^3} = 0$ 9) If $h = 1$, then $\Delta(x^2) =$ (a) $2x$ (b) $2x - 1$ (c) $2x + 1$ (d) 1 10) For the given data find the value of $\Delta^3 y_0$ is $\frac{ x }{ x } = \frac{ x }{ x }$		(a) 0	(b) 1	(c) 2	(d) n
4) $\int \left[\frac{9}{x^{-3}} - \frac{1}{x+1}\right] dx \text{ is}$ (a) $\log x-3 - \log x+1 + c(b) \log x-3 + \log x+1 + c(c) \operatorname{9log} x-3 - \log x+1 + c(d) \operatorname{9log} x-3 + + c(d) \operatorname{9log} x-2 + c(d$	3)	$\int \frac{\sin 2x}{2\sin x} dx$ is			
(a) $\log x-3 - \log x+1 + c(b)$ $\log x-3 + \log x+1 + c(c)$ $9\log x-3 - \log x+1 + c(d)$ $9\log x-3 + \log x+1 + c(d)$ $\log x-3 + \log x+1 + \log x+1 + c(d)$ $\log x-3 + \log x+1 + \log x+1 + c(d)$ $\log x-3 + \log x+1 + \log x+1 + c(d)$ $\log x-3 + \log x+1 + \log x$		(a) $\sin x + c$	(b) $\frac{1}{2}\sin x + c$	(c) $\cos x + c$	(d) $\frac{1}{2}\cos x + c$
5) Area bounded by the curve $y = \frac{1}{x}$ between the limits 1 and 2 is (a) $\log 2$ sq.units (b) $\log 5$ sq.units (c) $\log 3$ sq.units (d) $\log 4$ sq.units 6) The marginal cost function is $MC = 100 \sqrt{x}$. find AC given that $TC = 0$ when the out put is zero is (a) $\frac{200}{3}x^{\frac{1}{2}}$ (b) $\frac{200}{3}x^{\frac{3}{2}}$ (c) $\frac{200}{3x^{\frac{3}{2}}}$ (d) $\frac{200}{3x^{\frac{3}{2}}}$ 7) The order and degree of the differential equation $\sqrt{\frac{d^2y}{dx^2}} = \sqrt{\frac{dy}{dx} + 5}$ are respectively (a) 2 and 3 (b) 3 and 2 (c) 2 and 1 (d) 2 and 2 8) If $y = cx + c - c^3$ then its differential equation is (a) $y = \frac{dy}{dx} + \frac{dy}{dx} - \left(\frac{dy}{dx}\right)^3$ (b) $y = \left(\frac{dy}{dx}\right)^3 = x\frac{dy}{dx} - \frac{dy}{dx}$ (c) $\frac{dy}{dx} + y = \left(\frac{dy}{dx}\right)^3 - x\frac{dy}{dx}$ (d) $\frac{d^2y}{dx^2} = 0$ 9) If $h = 1$, then $\Delta(x^2) =$ (a) $2x$ (b) $2x - 1$ (c) $2x + 1$ (d) 1 10) For the given data find the value of Δ^3y_0 is $\frac{x}{y} = \frac{b}{y} = \frac{b}$	4)	$\int \left[\frac{9}{x-3} - \frac{1}{x+1} \right] dx$ is			
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The order and degree of the differential equation $\sqrt{\frac{d^3y}{dx^2}} = \sqrt{\frac{dy}{dx} + 5}$ are respectively (a) 2 and 3 (b) 3 and 2 (c) 2 and 1 (d) 2 and 2 8) If $y=cx+c-c^3$ then its differential equation is (a) $y=\frac{dy}{dx}+\frac{dy}{dx}-\left(\frac{dy}{dx}\right)^3$ (b) $y=\left(\frac{dy}{dx}\right)^3=x\frac{dy}{dx}-\frac{dy}{dx}$ (c) $\frac{dy}{dx}+y=\left(\frac{dy}{dx}\right)^3-x\frac{dy}{dx}$ (d) $\frac{d^3y}{dx^3}=0$ 9) If $h=1$, then $\Delta(x^2)=$ (a) $2x$ (b) $2x-1$ (c) $2x+1$ (d) 1 10) For the given data find the value of Δ^3y_0 is $\frac{\sqrt{5}}{\sqrt{5}}\frac{6}{\sqrt{9}}\frac{9}{11}$ $\frac{11}{\sqrt{12}}\frac{13}{15}\frac{18}{18}$ (a) 1 (b) 0 (c) 2 (d) -1 11) A variable that can assume any possible value between two points is called (a) discrete random variable (b) continuous random variable (c) discrete sample space (d) random variable 12) If we have $f(x)=2x$, $0 \le x \le 1$, then $f(x)$ is a (a) probability distribution (b) probability density function (c) distribution function (d) continuous random variable 13) If Z is a standard normal variate, the proportion of items lying between $Z=-0.5$ and $Z=-3.0$ is (a) 0.4987 (b) 0.1915 (c) 0.3072 (d) 0.3098 14) If for a binomial distribution b(n,p) mean = 4 and variance = 4/3, the probability, $P(X \ge 5)$ is equal to:		1	2	200	
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(a) $y = \frac{dy}{dx} + \frac{dy}{dx} - \left(\frac{dy}{dx}\right)^3$ (b) $y = \left(\frac{dy}{dx}\right)^3 = x\frac{dy}{dx} - \frac{dy}{dx}$ (c) $\frac{dy}{dx} + y = \left(\frac{dy}{dx}\right)^3 - x\frac{dy}{dx}$ (d) $\frac{d^3y}{dx^3} = 0$ 9) If $h = 1$, then $\Delta(x^2) =$ (a) $2x$ (b) $2x - 1$ (c) $2x + 1$ (d) 1 10) For the given data find the value of Δ^3y_0 is $ \frac{x5}{4} + \frac{6}{9} = \frac{9}{11} $ $ \frac{y_1^2}{y_1^2} = \frac{1}{315} = \frac{1}{18} $ (a) 1 (b) 0 (c) 2 (d) -1 11) A variable that can assume any possible value between two points is called (a) discrete random variable (b) continuous random variable (c) discrete sample space (d) random variable 12) If we have $f(x) = 2x$, $0 \le x \le 1$, then $f(x)$ is a (a) probability distribution (b) probability density function (c) distribution function (d) continuous random variable 13) If Z is a standard normal variate, the proportion of items lying between $Z = -0.5$ and $Z = -3.0$ is (a) 0.4987 (b) 0.1915 (c) 0.3072 (d) 0.3098 14) If for a binomial distribution $b(n,p)$ mean $Z = 4$ and variance $Z = 4/3$, the probability, $Z = 5$ is equal to:		(a) 2 and 3	(b) 3 and 2	(c) 2 and 1	(d) 2 and 2
(a) $y = \frac{dy}{dx} + \frac{dy}{dx} - \left(\frac{dy}{dx}\right)^3$ (b) $y = \left(\frac{dy}{dx}\right)^3 = x\frac{dy}{dx} - \frac{dy}{dx}$ (c) $\frac{dy}{dx} + y = \left(\frac{dy}{dx}\right)^3 - x\frac{dy}{dx}$ (d) $\frac{d^3y}{dx^3} = 0$ 9) If $h = 1$, then $\Delta(x^2) =$ (a) $2x$ (b) $2x - 1$ (c) $2x + 1$ (d) 1 10) For the given data find the value of Δ^3y_0 is $ \frac{x5}{4} + \frac{6}{9} = \frac{9}{11} $ $ \frac{y_1^2}{y_1^2} = \frac{1}{315} = \frac{1}{18} $ (a) 1 (b) 0 (c) 2 (d) -1 11) A variable that can assume any possible value between two points is called (a) discrete random variable (b) continuous random variable (c) discrete sample space (d) random variable 12) If we have $f(x) = 2x$, $0 \le x \le 1$, then $f(x)$ is a (a) probability distribution (b) probability density function (c) distribution function (d) continuous random variable 13) If Z is a standard normal variate, the proportion of items lying between $Z = -0.5$ and $Z = -3.0$ is (a) 0.4987 (b) 0.1915 (c) 0.3072 (d) 0.3098 14) If for a binomial distribution $b(n,p)$ mean $Z = 4$ and variance $Z = 4/3$, the probability, $Z = 5$ is equal to:	8)	If $y=cx + c - c^3$ then its diffe	erential equation is		
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(a) 1 (b) 0 (c) 2 (d) -1 11) A variable that can assume any possible value between two points is called (a) discrete random variable (b) continuous random variable (c) discrete sample space (d) random variable 12) If we have f(x)=2x, 0≤ x≤ 1, then f (x) is a (a) probability distribution (b) probability density function (c) distribution function (d) continuous random variable 13) If Z is a standard normal variate, the proportion of items lying between Z = -0.5 and Z = -3.0 is (a) 0.4987 (b) 0.1915 (c) 0.3072 (d) 0.3098 14) If for a binomial distribution b(n,p) mean = 4 and variance = 4/3, the probability, P(X ≥ 5) is equal to:	10)	For the given data find the v	value of $\Delta^3 y_0$ is		
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 12) If we have f(x)=2x, 0≤ x≤ 1, then f (x) is a (a) probability distribution (b) probability density function (c) distribution function (d) continuous random variable 13) If Z is a standard normal variate, the proportion of items lying between Z = -0.5 and Z = -3.0 is (a) 0.4987 (b) 0.1915 (c) 0.3072 (d) 0.3098 14) If for a binomial distribution b(n,p) mean = 4 and variance = 4/3, the probability, P(X ≥ 5) is equal to: 	11)	A variable that can assume a	any possible value between two p	oints is called	
 (a) probability distribution (b) probability density function (c) distribution function (d) continuous random variable 13) If Z is a standard normal variate, the proportion of items lying between Z = -0.5 and Z = -3.0 is (a) 0.4987 (b) 0.1915 (c) 0.3072 (d) 0.3098 14) If for a binomial distribution b(n,p) mean = 4 and variance = 4/3, the probability, P(X ≥ 5) is equal to: 		(a) discrete random variable	(b) continuous random varia	able (c) discrete sample	space (d) random variable
 13) If Z is a standard normal variate, the proportion of items lying between Z = -0.5 and Z = -3.0 is (a) 0.4987 (b) 0.1915 (c) 0.3072 (d) 0.3098 14) If for a binomial distribution b(n,p) mean = 4 and variance = 4/3, the probability, P(X ≥ 5) is equal to: 	12)	If we have $f(x)=2x$, $0 \le x \le$	1, then $f(x)$ is a		
(a) 0.4987 (b) 0.1915 (c) 0.3072 (d) 0.3098 14) If for a binomial distribution $b(n,p)$ mean = 4 and variance = $4/3$, the probability, $P(X \ge 5)$ is equal to :		(a) probability distribution	(b) probability density function	(c) distribution function	(d) continuous random variable
14) If for a binomial distribution $b(n,p)$ mean = 4 and variance = $4/3$, the probability, $P(X \ge 5)$ is equal to :	13)	If Z is a standard normal va	riate, the proportion of items lying	g between $Z = -0.5$ and $Z = -3$.0 is
		(a) 0.4987	(b) 0.1915	(c) 0.3072	(d) 0.3098
(2) (2) (3) (4) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	14)	If for a binomial distribution	n $b(n,p)$ mean = 4 and variance =	4/3, the probability, $P(X \ge 5)$ is	s equal to:
(a) $(2/3)^{\circ}$ (b) $(2/3)^{\circ}(1/3)$ (c) $(1/3)^{\circ}$ (d) $4(2/3)^{\circ}$		(a) $(2/3)^6$	(b) $(2/3)^5(1/3)$	(c) $(1/3)^6$	(d) $4(2/3)^6$
15) A of statistical individuals in a population is called a sample.	15)	A of statistical	individuals in a population is call	led a sample.	
(a) Infinite set (b) finite subset (c) finite set (d) entire set		(a) Infinite set	(b) finite subset	(c) finite set	(d) entire set
16) Errors in sampling are of	16)	Errors in sampling are of			
(a) Two types (b) three types (c) four types (d) five types		(a) Two types	(b) three types	(c) four types	(d) five types
17) A time series consists of	17)	A time series consists of			
(a) Five components (b) Four components (c) Three components (d) Two components		(a) Five components	(b) Four components	(c) Three components	(d) Two components

- 18) The seasonal variation means the variations occurring with in
 - (a) A number of years
- (b) within a year
- (c) within a month
- (d) within a week

- 19) In a non degenerate solution number of allocations is
 - (a) Equal to m+n-1
- (b) Equal to m+n+1
- (c) Not equal to m+n-1
- (d) Not equal to m+n+1
- 20) If number of sources is not equal to number of destinations, the assignment problem is called____
 - (a) balanced
- (b) unsymmetric
- (c) symmetric
- (d) unbalanced

 $7 \times 2 = 14$

21) Solve the following equations by using Cramer's rule

$$2x + 3y = 7$$
; $3x + 5y = 9$

22) Integrate the following with respect to x.

$$\frac{x^3}{x+2}$$

- 23) Using integration, find the area of the region bounded by the line y 1 = x, the x axis and the ordinates x = -2, x = 3.
- 24) Solve: ydx xdy = 0
- 25) Find the missing entry in the following table

X	0	1	2	3	4
Уx	1	3	9	-	81

26) The discrete random variable X has the following probability function

P(X=x)={
$$kx$$
 $x=2,4,6$ where k is a constant. Show that $k=\frac{1}{18}$ $k(x-2)$ $x=8$ 0 $otherwisde$

- 27) Mention the properties of binomial distribution.
- 28) What is standard error?
- 29) Define secular trend.
- 30) Write mathematical form of transportation problem.

 $7 \times 3 = 21$

- 31) Show that the equations 2x+y+z=5, x+y+z=4, x-y+2z=1 are consistent and hence solve them.
- 32) Evaluate $\int \frac{2x^2-14x+24}{x-3} dx$
- 33) Find the area of the region bounded by the parabola $y = 4-x^2$, x axis and the lines x = 0, x = 2
- 34) Solve 9y'' 12y' + 4y = 0
- 35) Evaluate $\Delta\left[\frac{5x+12}{x^2+5x+6}\right]$ by taking '1' as the interval of differencing.
- 36) Two unbiased dice are thrown simultaneously and sum of the upturned faces considered as random variable. Construct a probability mass function.



- 37) In tossing of a five fair coin, find the chance of getting exactly 3 heads.
- 38) Using the Kendall-Babington Smith Random number table, Draw5 random samples.

23	15	75	48	59	01	83	72	59	93	76	24	97	08	86	95	23	03	67	44
05	54	55	50	43	10	53	74	35	08	90	61	18	37	44	10	96	22	13	43
14	87	16	03	50	32	40	43	62	23	50	05	10	03	22	11	54	36	08	34
38	97	67	49	51	94	05	17	58	53	78	80	59	01	94	32	42	87	16	95
97	31	26	17	18	99	75	53	08	70	94	25	12	58	41	54	88	21	05	13

39) Fit a trend line by the method of semi-averages for the given data.

Year	2000	2001	2002	2003	2004	2005	2006
Production	105	115	120	100	110	125	135

40) Determine an initial basic feasible solution to the following transportation problem using North West corner rule.

	D_{1}	D_2	D_3	D_4	Availability
O_1	6	4	1	5	14
O_2	8	9	2	7	16
O_3	4	3	6	2	5
Requirement	6	10	15	4	35

Here O_i and D_i represent ith origin and jth destination.

 $7 \times 5 = 35$

41) a) In year 2000 world gold production was 2547 metric tons and it was growing exponentially at the rate of 0.6% per year. If the growth continues at this rate, how many tons of gold will be produced from 2000 to 2013? [$e^{0.078} = 1.0811$)

(OR)

b) Solve the following assignment problem. Cell values represent cost of assigning job A, B, C and D to the machines I, II, III and IV.

	hines
mac	nines

		I	II	III	IV
	A	10	12	19	11
	B	5	10	7	8
jobs	C	12	14	13	11
	D	8	15	11	9

42) a) Using graphic method, find the value of y when x = 38 from the following data:

X	10	20	30	40	50	60
y	63	55	44	34	29	22

(OR)

b) Calculate Fisher's price index number and show that it satisfies both Time Reversal Test and Factor Reversal Test for data given below.

0					
Commodities	Price	;	Quandity		
Commodities	2003	2009	2003	2009	
Rice	10	13	4	6	
Wheat	125	18	7	8	
Rent	25	29	5	9	
Fuel	2511	14	8	10	
Miscellaneous	14	17	6	7	

- 43) a) Evaluate $\int dx$ $\left[\frac{1}{\log x} \frac{1}{(\log x)^2}\right]$ (OR)
 - b) Consider a random variable X with probability density function $f(x)=\{4x^2, if 0 < x < 1 \}$ 0, otherwise

Find E(X) and V(X)

44) a) Solve by Cramer's rule x+y+z=4,2x-y+3z=1,3x+2y-z=1

(OR

- b) The marginal cost function of a commodity in a firm is $2 + e^{3x}$ where X is the output. Find the total cost and average cost function if the fixed cost is Rs. 500.
- 45) a) Solve $\sec^2 x \tan y \, dx + \sec^2 y \tan x \, dy = 0$

(OR)

- b) An ambulance service claims that it takes on the average 8.9 minutes to reach its destination in emergency calls. To check on this claim, the agency which licenses ambulance services has them timed on 50 emergency calls, getting a mean of 9.3 minutes with a standard deviation of 1.6 minutes. What can they conclude at the level of significance
- 46) a) For what values of k, the system of equations kx+y+z=1,x+ky+z=1,x+y+kz=1 have
 - (I) Unique solution
 - (ii) More than one solution
 - (iii) no solution

(OR)

- b) Assuming one in 80 births is a case of twins, calculate the probability of 2 or more sets of twins on a day when 30 births occur.
- 47) a) Suppose that the quantity needed $Q_d = 42$ -4p-4 $\frac{dp}{dt} + \frac{d^2p}{dt^2}$ and quantity supplied Q_s =-6+8p where p is the price. Find the s equilibrium price for market clearance.

(OR)

b) Using Lagrange's formula find the value of y when x = 4 from the following table.

X	0	3	5	6	8
v	276	460	414	343	110
