RAVI MATHS TUITION CENTER PH- 8056206308

12TH BM MODEL PAPER 5 Date : 11-Nov-19

12th Standard

Business Maths Reg.No. : | | | | | | |

Instructions : (1) check the question paper for fairness of printing. if there is any lack of fairness, inform the hall supervisor immediately.(2) use blue or black ink to write and underline and pencil to draw diagrams.

Exam Time : 03:00:00 Hrs Total Marks : 90

PART I 20 x 1 = 20

ANSWER ALL THE QUESTIONS.

1) The rank of the unit matrix of order n is
(a) n −1 (b) n (c) n +1 (d) n^2

2) if $\rho(A) \neq \rho(A, B)$, then the system is
(a) Consistent and has infinitely many solutions (b) Consistent and has a unique solution (c) inconsistent (d) consistent

3) $\int \frac{logx}{x}$ dx , x > 0 is
(a) $\frac{1}{2}$ (log x)^2 + c (b) $-\frac{1}{2}$ (log x)^2 (c) $\frac{2}{x^2} + c$ (d) $\frac{2}{x^2} + c$

4) $\int_0^1 (2x + 1)dx$ is
(a) 1 (b) 2 (c) 3 (d) 4

5) $\int a^{3x+2}$ dx = _____ +c
(a) a^{3x+2} (b) $\frac{a^{3x+2}}{3}$ (c) $\frac{a^{3x+2}}{3loga}$ (d) 3 log a (a^{3x+2})

6) The demand and supply functions are given by D(x)= 16 − x^2 and S(x) = $2x^2$ + 4 are under perfect competition, then the equilibrium price x is
(a) 2 (b) 3 (c) 4 (d) 5

7) The producer's surplus when the supply function for a commodity is P = 3 + x and x_0 = 3 is
(a) $\frac{5}{2}$ (b) $\frac{9}{2}$ (c) $\frac{3}{2}$ (d) $\frac{7}{2}$

8) If the marginal cost function MC = 2 - 4x, then the cost function is
(a) 2x- $2X^2$+ k (b) 2-$4x^2$ (c) $\frac{2}{x} - 4$ (d) 2x-$4x^2$

9) The differential equation $\left(\frac{dx}{dy}\right)^3 + 2y^{\frac{1}{2}}$ = x is
(a) of order 2 and degree 1 (b) of order 1 and degree 3 (c) of order 1 and degree 6 (d) of order 1 and degree 2

10) The particular integral of the differential equation f(D)y = e^{ax} where f(D) = $(D-a)^2$
(a) $\frac{x^2}{2}e^{ax}$ (b) xe^{ax} (c) $\frac{x}{2}$ e^{ax} (d) x^2e^{ax}

11) If c is a constant, then E(c) is
(a) 0 (b) 1 (c) cfc (d) c

12) A listing of all the outcomes of an experiment and the probability associated with each outcome is called
(a) probability distribution (b) probability density function (c) attributes (d) distribution function

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) Which of the following statements is/are true regarding the normal distribution curve?
(a) it is symmetrical and bell shaped curve (b) it is asymptotic in that each end approaches the horizontal axis but never reaches it (c) its mean, median and mode are located at the same point (d) all of the above statements are true.

15) A_____is one where each item in the universe has an equal chance of known opportunity of being selected.
(a) Parameter (b) random sample (c) statistic (d) entire data

16) If probability $P[|\breve{\theta} - \theta| < \varepsilon] \to 1\mu \quad as \quad n \to \infty'$, for any positive ε then $\breve{\theta}$ is said to _____ esitimator of θ .

(a) efficient (b) sufficient (c) unbiased (d) consistent

17) Least square method of fitting a trend is

(a) Most exact (b) Least exact (c) Full of subjectivity (d) Mathematically unsolved

18) A typical control charts consists of

(a) CL, UCL (b) CL, LCL (c) CL, LCL, UCL (d) UCL, LCL

19) Solution for transportation problem using _____method is nearer to an optimal solution.

(a) NWCM (b) LCM (c) VAM (d) Row Minima

20) A type of decision –making environment is

(a) certainty (b) uncertainty (c) risk (d) all of the above

PART – II 7 x 2 = 14

ANSWER ANY SIX QUESTIONS AND QUESTION NUMBER 30 IS COMPULSORY

21) 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.

22) Integrate the following with respect to x.

$\frac{e^{3x}+e^{5x}}{e^{x}+e^{-x}}$

23) Find the area bounded by the curve $y = x^2$ and the line $y = 4$

24) Find the consumer's surplus for the demand function $p = 25 - x - x^2$ when $P_o = 19$

25) Solve: $\frac{dy}{dx} = y \sin 2x$

26) Using graphic method, find the value of y when x = 48 from the following data:

x	40	50	60	70
y	6.2	7.2	9.1	12

27) Explain what are the types of random variable?

28) The time to failure in thousands of hours of an important piece of electronic equipment used in a manufactured DVD player has the density function

$f(x)=\{2e^{-2x}, > 0$

$0, \quad otherwise$

Find the expected life of this piece of equipment.

29) The average number of customers, who appear in a counter of a certain bank per minute is two. Find the probability that during a given minute

(i) No customer appears

(ii) three or more customers appear .

30) Obtain an initial basic feasible solution to the following transportation problem by using least- cost method.

	D_1	D_2	D_3	Supply
O_1	9	8	5	25
O_2	6	8	4	35
O_3	7	6	9	40
demand	30	25	45	

PART – III 7 x 3 = 21

ANSWER ANY SIX QUESTIONS AND QUESTION NUMBER 40 IS COMPULSORY

31) Akash bats according to the following traits. If he makes a hit (S), there is a 25% chance that he will make a hit his next time at bat. If he fails to hit (F), there is a 35%

chance that he will make a hit his next time at bat. Find the transition probability matrix for the data and determine Akash's long- range batting average.

32) Show that the equations x- 3y + 4z = 3, 2x - 5y + 7z = 6, 3x - 8y + 11z = 1 are inconsistent

33) Evaluate the integral as the limit of a sum: $\int_0^1 x dx$

34) The demand function of a commodity is $y = 36 - x^2$. Find the consumer's surplus for $y_0 = 11$

35) Find the area under the demand curve xy = 1 bounded by the ordinates x = 3, x = 9 and x-axis

36) Solve $\frac{d^2y}{dt^2} - \frac{3dy}{dt} + 2x = 0$ given that when t = 0, x = 0 and $\frac{dx}{dt} = 1$

37) From the following table find the missing value

x	2	3	4	5	6
f(x)	45.0	49.2	54.1	-	67.4

38) Find y when x = 0.2 given that

x	0	1	2	3	4
y	176	185	194	202	212

39) Suppose A and B are two equally strong table tennis players. Which of the following two events is more probable:
(a) A beats B exactly in 3 games out of 4 or
(b) A beats B exactly in 5 games out of 8 ?

40) Find the sample size for the given standard deviation 10 and the standard error with respect of sample mean is 3.

PART IV 14 x 5 = 70

ANSWER ALL THE QUESTIONS.

41) a) An automobile company uses three types of Steel S_1, S_2 and S_3 for providing three different types of Cars C_1, C_2 and C_3. Steel requirement R (in tonnes) for each type of car and total available steel of all the three types are summarized in the following table.

Types of Steel	Types of Car			Total Steel available
	C_1	C_2	C_3	
S_1	3	2	1	28
S_2	1	1	2	13
S_3	2	2	2	14

Determine the number of Cars of each type which can be produced by Cramer's rule.

(OR)

b) Construct Fisher's price index number and prove that it satisfies both Time Reversal Test and Factor Reversal Test for data following data.

Commodities	Base Year		Current Year	
	Price	Quantity	Price	Quantity
Rice	40	5	48	4
Wheat	45	2	42	3
Rent	90	4	95	6
Fuel	85	3	80	2
Transport	50	5	65	8
Miscellaneous	65	1	72	3

42) a) An auto company decided to introduce a new six cylinder car whose mean petrol consumption is claimed to be lower than that of the existing auto engine. It was found that the mean petrol consumption for the 50 cars was 10 km per litre with a

standard deviation of 3.5 km per litre. Test at 5% level of significance, whether the claim of the new car petrol consumption is 9.5 km per litre on the average is acceptable.

43) a) Evaluate $\int \frac{cos2x}{sin^2 x cos^2 x} dx$

(OR)

b) The marginal cost and marginal revenue with respect to commodity of a firm are given by C'(x) = 8 + 6x and R'(x)= 24. Find the total Profit given that the total cost at zero output is zero.

44) a) Solve: $(x^2+x+1)dx+(y^2-y+3)dy = 0$

(OR)

b) From the following table of half- yearly premium for policies maturing at different ages. Estimate the premium for policies maturing at the age of 63.

Age	45	50	55	60	65
Premium	114.84	96.16	83.32	74.48	63.48

45) a) Solve : x - y $\frac{dx}{dy} = a\left(x^2 + \frac{dx}{dy}\right)$

46) a) Evaluate $\int_1^2 \frac{1}{(x+1)(x+2)} dx$

(OR)

b) Solve: $(D^2 + 14D + 49)y = e^{-7x} + 4$.

47) a) 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) $\int_{1}^{3} f(x)dx$

(OR)

b) Solve: $x^2\frac{dy}{dx} = y^2+2xy$ given that y =1, when x=1

48) a) Using integrals as limit of sums, evaluate $\int_2^4 (2x-1)dx$

(OR)

b) From the following data, calculate the value of $e^{1.75}$

x	1.7	1.8	1.9	2.0	2.1
e^x	5.474	6.050	6.686	7.386	8.166

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