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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST 2 EXAMINATION (October 2018)
COURSE CODE: 18P1WGE101
COURSE NAME: Research Methodologies including Quantitative Methods & Computer Application
COURSE CREDITS: 3

MAX. MARKS: 25

MAX. TIME: 1Hr 30 Mins

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Use of scientific calculator is allowed.

SECTION-A (STATISTICS PART)

Q.1 Fill in the suitable word(s) or phrase(s) in the blanks:

[0.5 x 4 = 2]

(i) Data obtained by conducting a survey is called............... data.

(ii) Sturge's rule for determining the number of classes is............... .

(iii) Pie-chart is always............... .

(iv) If the harmonic mean of the two numbers a and b is 5, if $a = 5$, then b is........... .

Q.2 Select the correct alternative out of given ones:

[0.5 x 4 = 2]

(i) In tossing three coins at a time, the probability of getting at most one head is:

    (A) 3/8   (B) 7/8   (C) 1/2   (D) 1/8

(ii) Given that $P(A) = \dfrac{1}{3}$, $P(B) = \dfrac{1}{4}$, $P(A|B) = \dfrac{1}{6}$, then the probability $P(B|A) = ?$:

    (A) 1/4   (B) 3/4   (C) 1/8   (D) None of the above.

(iii) If for a binomial distribution $B(n, p)$, $n = 4$ and $P(X = 2) = 3P(X = 3)$, the value of p is:

    (A) 9/11   (B) 1   (C) 1/3   (D) None of the above.

(iv) For a normal distribution, the Q. D., M. D. And S.D. are in the ratio:

    (A) 5:6:7   (B) 10:12:15   (C) 2:3:9   (D) None of the above.

(ATTEMPT ANY TWO PARTS)

Q.3 **(A)** The following data shows the cost of advertising expenditure and sales are given below:

	Advertising Cost (In Lakhs)	Sales (In Lakhs)
Mean	10	90
Standard deviation	3	12

Correlation coefficient = 0.80.

(i)   Calculate the two regression lines.

(ii)   Find the likely sales when advertisement expenditure is 15.0 lakhs.

(iii)   What should be the advertisement expenditure if the company wants to attain a sales target of 120.0 lakhs?

(B) A certain drug is claimed to be effective in curing colds. In an experiment on 164 people with colds, half of them were given the drug and half of them given sugar pills. The patients reacting to the treatment are recorded in the following table:

	Helped	Harmed	No effect
Drug	104	20	40
Sugar pills	88	24	52

(Given $\chi^2_{0.05}$ for 2 d.f. = 5.99).

Test the hypothesis that the drug is no better than sugar pills for curing colds.

(C) The Median and Mode of the following wage distribution are known to be Rs. 16 and Rs. 19.0 respectively. Find the values of f_3, f_4 and f_5:

Wages (in Rs.):	0-5	5-10	10-15	15-20	20-25	25-30	30-35	Total
Frequency:	4	16	f_3	f_4	f_5	6	4	100

[2.5+2.5=5]

SECTION-B (MATHEMATICS PART)

[4]

Q.4 Solve the following LPP graphically,

$$Max\ Z = 8000x_1 + 7000x_2$$

s.t.

$$3x_1 + x_2 \leq 66$$

$$x_1 + x_2 \leq 45$$

$$x_1 \leq 20$$

$$x_2 \leq 40$$

$$x_1, x_2 \geq 0$$

Q.5 Find the initial basic feasible solution to the following transportation problem using Vogel's approximation method,

[4]

		To			Available
		A	B	C	
	I	50	30	220	1
From	II	90	45	170	3
	III	250	200	50	4
Required		4	2	2	

Q.6 Using Gauss Seidel Iterative technique, solve the following system of linear equations: [3]

$$3x + 9y - 2z = 11; \quad 4x + 2y + 13z = 24; \quad 4x - 4y + 3z = -8.$$

Q.7 Finding the rank of augmented matrix, solve the following system of linear equations: [2.5]

$$2x + y + z = 7; \quad x + 2y + z = 8; \quad x + y + 2z = 9.$$

Q.8 Using power method, find the largest eigenvalue and the corresponding eigenvector of the following matrix by taking the initial eigenvector as [1, 1, 0]:

[2.5]

$$\begin{pmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{pmatrix}$$

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