N.B. : 1. Attempt **any three** questions out of four.

2. Figure to the right indicate marks assigned to the question.

Q.1 a. A pair of uniform dice is thrown. Find the probability that: (5)

    p. the sum of the number obtained is a two digit number.

    q. the sum of the number obtained is a multiple of 4.

    r. the product is an odd number.

b. Sixty percent of persons staying in a building read "Express", fifty (5)
percent read "Times", while thirty percent of them read both. Find
the probability that a randomly chosen person staying in the
building reads.

    1. only one of them.

    2. atleast one of them.

    3. none of them.

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Q.2 a. Find 'k' in the following case, so that p(x) can be regarded as a (5)
probability distribution function. Hence find cumulative probability
distribution.

x :	-1	0	1	2
p(x) :	$\dfrac{k-1}{22}$	$\dfrac{k-5}{11}$	$\dfrac{k-1}{22}$	$\dfrac{3}{11}$

Also fine E(x).

b. Let (x,y) be a pair of discrete random variables each taking values (5)
1, 2, 3 with the following joint probability distribution.

x \ y	1	2	3
1	$5/27$	$4/27$	$2/27$
2	$1/27$	$3/27$	$3/27$
3	$3/27$	$4/27$	$2/27$

Obtain the marginal probability dist^{ns} of x & y. Hence find E(x),
V(x), E(y), V(y).

Q.3 a. The incidence of an occupational disease in an industry is such that (5)
the workers have a 20% chance of catching the disease. What is the
probability that out of six workmen:

    1. four will contact the disease.

    2. more than four will contact the disease.

b. If 3% of the electric bulbs manufactured by a company are defective,   (5)
find the probability that in a sample of 100 bulbs:

1. exactly 5 bulbs are defective.

2. none of them are defective.

(Given : e^{-3} = 0.0498, $e^{-0.3}$ = 0.74082)

Q.4   a. If x & y are two stochastically independent random variables with   (5)
means 7 & 4 & variances 9 & 4 respectively.

Find: i.   E (x + y)   iv.   V (2x)

ii.   V (x + y)   v.   V (3x - 2y)

iii. E (3x + 2)

b. A box contains 5 red, 3 blue balls. Another box contains 6 red, 5 blue   (5)
balls. One ball is drawn at random from each box.

1. What is the probability that one is red & another is blue.

2. What is the probability that both are red balls.

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