STA 402 **Reg. No. ……**

CREDIT BASED IV SEMESTER B.C.A. DEGREE EXAMINATION APRIL 2012

STATISTICS-II

PROBABILITY

Time: 3 Hrs **Max. Marks: 80**

Note: Normal Distribution Tables will be provided on request.

PART - A

Answer any TEN of the following: **10x2=20**

1. a) What do you mean by probability?

b) Define random experiment with an example.

c) Explain with example the term sample space.

d) Define P($B|A$).

e) If $P(A) =$, $P(B) =$, $P(A \cap B) =$, find $P(A \cup B)$

f) Define a random variable. When is it called discrete?

g) If $E(X) = 0.8$ and $E(X^2) =$ find $SD(X)$.

h) Write any two examples of Bernoulli distribution.

i) In a Poisson distribution if $P(X = 3) = P(X = 4)$, find the mean and s.d.

j) What do you mean by cyclic variation? Explain.

k) Give two examples of seasonal variation.

l) Mention any two demerits of the Method of Moving Averages.

PART – B

Answer any Two of the following: **2x10=20**

2. a) Find the probability that a throw of an unbiased die results in
(i) Number 1 (ii) an even number
(iii) multiple of 3 (iv) perfect square number (5)

b) A bag contains 3 red, 4 green and 3 yellow marbles. Three marbles are randomly drawn from the bag. What is the probability that they are of
(i) the same colour (ii) different colours (one of each colour) (5)

3. a) A card is randomly drawn from a pack of playing cards. Find the probability that the drawn card is (i) a spade or a king (ii) a King or a Queen. (5)

b) The probabilities of two students A and B solving a problem are ½ and ¾ respectively. If both of them try independently, what is the probability that the problem is solved? (5)

4. a) A bag contains 4 red and 6 blue balls. Two balls are randomly drawn from the bag. Find the probability that both of them are red if the balls are drawn one after the other (i) with replacement (ii) without replacement. (5)

b) What is the probability that there will be 53 Sundays in a randomly selected
(i) leap year (ii) non-leap year (5)

Answer any TWO of the following: **2x10=20**

5. a) Two fair coins are tossed once. Find the mathematical expectation of the number of heads obtained. (5)

b) For the following probability distribution, find SD(X).

x:	-2	0	1	2
p (x):	0.2	0.4	0.3	0.1

(5)

6. Seven coins are tossed and number of heads obtained is noted. The experiment is repeated 128 times and the following distribution is obtained.

No. of heads	0	1	2	3	4	5	6	7
Frequencies	7	6	19	35	30	23	7	1

Fit a binomial distribution and calculate the expected frequencies (10)

7. a) The probability that a razor blade manufactured by a firm is defective is $\frac{1}{500}$. Blades are supplied in packets of 50 each. In a lot of 10,000 packets, how many packets would contain at least two defectives? (5)

b) Weight at birth of babies is a normal variate with mean 3.5 kg and

standard deviation 0.9 kg. Find the probability that a new born baby weighs less than 2 kg. What percentage of babies would you expect to weigh between 2.5 and 4.5 kg? (5)

Answer any TWO of the following: **2x10=20**

8. a) Compute the seasonal variation for the following time-series by the Method of Simple Averages.

Year	Quarterly Production			
	I	II	III	IV
2007	3.5	3.9	3.4	3.6
2008	3.5	4.1	3.7	4.0
2009	3.5	3.9	3.7	4.2
2010	4.0	4.6	3.8	4.5
2011	4.1	4.4	4.2	4.5

b) Compute trend values by finding four-yearly moving averages for the following time series.

Year	2000	2001	2002	2003	2004	2005	2006	2007
Value	104	107	101	102	104	105	99	100

(5)

9. Find the linear trend values by the method of least squares and estimate the production of sugar for the year 2012.

Year	1998	2000	2002	2004	2006	2008	2010
Production ('000 quintals)	77	81	88	94	94	96	98

(10)

10. The following is the time series of turnover in crores of rupees of a business firm. Obtain the trend values and find the likely turnover in 2011 by fitting a second degree trend equation.

Year	1999	2001	2003	2005	2007	2009
Turn over	6	9	11	7	7	10

(10)

STA 402(R) **Reg. No. ……**

CREDIT BASED IV SEMESTER B.C.A. DEGREE EXAMINATION APRIL 2013

STATISTICS-II

PROBABILITY

(Admn.2010)

Time: 3 Hrs **Max. Marks: 80**

PART - A

Answer any TEN of the following: **10x2=20**

1. a) Give the axiomatic definition of probability.

b) Write the sample space when 2 dice are thrown together.

c) Distinguish between mutually exclusive and independent events.

d) If $P(B) = \frac{1}{4}$, $P(A/B) = \frac{1}{2}$, find $P(B \cap A)$

e) Suppose $E(X) = 4$ *and* $E(X) = 3$, find $E(2X-3Y)$.

f) If X is a Bernoulli variate with parameter 0.45, find the variance and also the probability that the variate takes the value 0.

g) Give any two examples of Binomial variate.

h) For a Poisson Distribution, the second term is thrice the first term. Find the mean and standard deviation.

i) Suppose X~N (5, 4), define standard normal variate. Also write its p.d.f.

j) Mention any two examples of cyclic variation.

k) Write any two merits of method of least squares.

l) Mention the types of variation in the following.
i) Decreasing value of money.
ii) Increase in the demand for medicines during an epidemic.

PART – B

Answer any Two of the following: **2x10=20**

2. a) A fair coin is tossed twice. Find the probability that the tosses result in (i) two heads (ii) atmost one head. (5)

b) What is the probability that four cards drawn at random from a well shuffled pack of playing cards belong to (i) same suit (ii) different suits. (5)

3. a) Two fair dice are rolled. If the sum of the numbers obtained is 4, find the probability that the numbers obtained on both the dice are odd. (5)

b) In a college, there are five lecturers. Among them, three are doctrates. If a committee consisting three lecturers is formed, what is the probability that at least two of them are doctorates? (5)

4. a) A bag contains 3 white and 3 black balls. Another bag contains 1 white and 5 black balls. One of the bag is randomly selected and from the selected bag, a ball is drawn at random. What is the probability that it is white? (5)

b) A can hit a target 3 times with 5 shots, B can hit it 3 times with 4 shots and C can hit it 5 times with 8 shots. If they fire at a volley, what is the probability that at least one of them hits it? (5)

Answer any TWO of the following: **2x10=20**

5. For the following bivariate probability distribution, find coefficient of correlation. (10)

X \ Y	5	10
0	0.1	0.2
1	0.2	0.4
2	0.1	0

6. The following data relates to the number of mistakes in each page of a book containing 180 pages. Fit a Poisson distribution to the data. Obtain the theoretical frequencies.

No. of mistakes per page	0	1	2	3	4	5 or more
No. of Pages	156	16	5	2	1	0

(10)

7. a) In the incidence of an occupational disease in an industry is such that workers have 20% chance of suffering from it. What is the probability that out of 6 workers, 4 or more contract the disease? (5)

b) The distribution of monthly income of 3000 workers of a factory confirms normal law with mean ` 900 and S.D. ` 100.
i) Find the percentage of workers having income more than `800.
ii) Find the number of workers having income less than `600. (5)

Answer any TWO of the following: **2x10=20**

8. a) Briefly explain the components of a time series. (5)

b) Compute the trend values by finding four-yearly moving averages for the following time series. (5)

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009
Value	103	104	107	101	102	104	105	99	100

9. For the following time series fit a linear trend by the method of least squares. Estimate the sales for the year 2012. (10)

Year	1994	1996	1998	2000	2002	2004	2006	2008
Sales ('000 units)	103	106	95	93	98	93	90	86

10. Fit a quadratic trend for the following time series. Estimate the population for the year 2011.

Year	1961	1971	1981	1991	2001
Turn over(crores)	44	55	68	84	105

(10)

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STA 402.1 **Reg. No. ……**

CREDIT BASED FOURTH SEMESTER B.C.A. DEGREE EXAMINATION APRIL 2014

STATISTICS

PROBABILITY

Time: 3 Hrs **Max. Marks: 80**

Note: Normal Distribution Tables will be provided on request.

PART - A

Answer any TEN of the following: **2X10=20**

1. a) Define sample space.

b) If – , find .

c) State the addition theorem of probability for any two events.

d) 'Explain exhaustive events with an example.

e) Define 'Probability Mass Function'.

f) If and , find S.D. (Y).

g) If find and .

h) If and , find

i) A Bernoulli variable takes values 1 and 0 with probabilities 0.2 and 0.8 respectively. Find mean and variance.

j) Mention any two properties of Binomial distribution.

k) For a Poisson variable find the S.D.

l) Write down the mean and variance of Standard Normal Variate.

PART – B

Answer any TWO of the following: **10x2=20**

2. a) Two fair dice are rolled. Find the probability that
i) both the dice show number 6
ii) the sum of numbers obtained is 7 or 10.
iii) the sum is divisible by 3.

b) Two cards are drawn at random from that i) the cards belongs to the same suit
ii) the cards belongs to different suits. **(5+5)**

3. a) Two fair dice are rolled. If the sum of the numbers obtained is 4, find the probability that the numbers obtained on both the dice are even.

b) The odds favouring the survival of a man aged 60 for 20 more years are 2 to 6. The odds favouring the survival of a woman aged 50 for 20 more years are 2 to 5, what is the probability that a man aged 60 and his wife aged 50 will survive for 20 more years?

(5+5)

4. a) A can solve 30% of the problems in a text, B can solve 40% and C can solve 50% of them. If a randomly selected problem is given to them, what is the probability that if is solved?

b) In a hostel 60% residents take tea, 50% residents take coffee and 2)% residents take both tea and coffee. Find the probability that a randomly selected resident takes either tea or coffee. **(5+5)**

Answer any TWO of the following: **10x2=20**

5. a) Find the missing probability in the following probability distribution and find mean and variance.

x	4	6	8	10	12
P(x)	_	_	-	_	—

b) A bag has 4 white and 2 red balls. Two balls are drawn at random from the bag. Find the expectation of the number of red balls obtained in the draw.

(5+5)

6. a) For the following probability distribution, find and .

x	4	6	8	10
P(x)	_	_	_	_

b) A man throws a fair dice. If the throw results in an even number, he gets Rs. 5%. If the throw results m an odd number, he loses Rs. 10%. Find the mathematical expectation.

(5+5)

7. a) For the following bivariate probability distribution, find the correlation coefficient .

y / x	4	6
0	0.1	0.2
1	0.2	0.4
2	0.1	0

(5+5)

Answer any TWO of the following: **10x2=20**

8. a) From the following data, obtain theoretical frequencies, assuming binomial distribution.

Value	0	1	2	3	4	5	6	7
Frequencies	7	6	19	35	30	23	7	1

(5+5)

9. a) The number of persons joining a cinema queue on a minute has Poisson distribution with parameter 5.8. Find the probability that
   i) no one joins the queue on a particular minute
   ii) 2 or more persons join the queue in the minute.

   b) Height of students is normally distributed with mean 165 cms and standard deviation 5 cms. Find the probability that height of a student is
   i) more than 177 cms ii) less than 162 cms. **(5+5)**

10. a) On an average, 1 on every 50 valves manufactured by a form is substandard. If valves are supplied on packets of 20 each, on how many of a lot of 1000 packets would you expect substandard valves.

   b) Assume that the waiting time on a ticket counter is an exponential distribution with average working time 8 minutes. Find the probability that the working time is:
   i) on between 5 and 10 minutes
   ii) more than 12 minutes **(5+5)**

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STA 402.1 **Reg. No. ……**

CREDIT BASED FOURTH SEMESTER B.C.A. DEGREE EXAMINATION APRIL 2015

STATISTICS-II

PROBABILITY

Time: 3 Hrs **Max. Marks: 80**

Note: Normal Distribution Tables will be provided on request.

PART - A

Answer any TEN of the following: **2X10=20**

1. a) Define the term 'Random Experiment'.

   b) When two dice are thrown once, find the probability of getting sum of points as 12.

   c) If – – –, are A and B independent?

   d) If –, and – find

   e) If and find .

f) If then find .

g) If , then what is ?

h) If and , find

i) A Bernoulli variable takes values 1 and 0 with probabilities 0.2 and 0.8 respectively. Find mean and variance.

j) If a B.D. has mean 12 and S.D. 3, obtain the values of *n* and *p*.

k) Mention any two properties of Poisson Distribution.

l) Find Q.D. and M.D. of Normal Distribution with mean 30 and S.D. 6.

PART – B

Answer any TWO of the following: **2x10=20**

2. a) Two dice are rolled once. Find the probability of getting
i) both with number 5
ii) first dice with number 1
iii) sum on both the dice is 7
iv) sum is 10 or more
v) Both with same number

b) Two cards are drawn from a pack of 52 playing cards. Find the probability that they are of (i) kings (ii) clubs (iii) red cards (iv) a heart and a spade. **(5+5)**

3. a) Probability of hitting a target is − and that of B is −. If both attempt to hit the target, what is the probability that (i) both hit (ii) the target is hit.

b) Probability that a student A can solve a problem is − and that of B can solve is −.

Find the probability that
(i) Both solve (ii) At least one solves (iii) None of them solve the problem. **(5+5)**

4. a) A card is drawn at random from a pack of cards.
(i) What is the probability that it is a heart?
(ii) If it is known that the card drawn is red, what is the probability that it is a heart?

b) The odds favouring the event of a person hitting a target are 3 to 5. The odds against the event of another hitting the target are 3 to 2. If each of them fire once at the target, find the probability that (i) at least one of them hits it. (ii) both of them hit it. **(5+5)**

Answer any TWO of the following: **2x10=20**

5. a) Find the mean and standard deviation for the following probability distribution.

x	-2	-1	0	2	4
P(x)					

b) A box has 5 blue and 3 yellow marbles. Two marbles are drawn at random. Find the expected number of blue marbles that can be drawn. **(5+5)**

6. a) A person tosses a coin two times. If head turns up once, he gets Rs. 15/- and if tail turns up both times he gets Rs. 10/-, otherwise he gets nothing. If he has paid an entrance fee of Rs. 2/-, what is his expectation?

b) For the following distribution, find and . **(5+5)**

x	-1	0	3	5
P(x)				

7. For the following bivariate probability distribution, find the correlation coefficient .

y / x	1	3	9
2	0.1	0.1	0.05
4	0.2	k	0.1
6	0.1	0.15	0.2

(10)

Answer any TWO of the following: **2x10=20**

8. From the following data, obtain theoretical frequency, assuming Binomial distribution.

Values	0	1	2	3	4	5

Frequency	8	12	11	12	5	2

(10)

9. a) 3% of the bulbs manufactured by a company is found to be defective. Find the probability that a box of 50 bulbs contains (i) Exactly 4 (ii) 2 or more defective bulbs.

b) An intelligent test was conducted on 1000 children. The average score was 42 and standard deviation 24. Find the number of children

i) Exceeding the score 60 ii) Score b/w 20 and 40. **(5+5)**

10. a) Suppose that the loading time for a truck at the ships' loading dock follows an exponential distribution with average loading time equal to 15 minutes. Find the probability that the loading time is

(i) less than or equal to 6 minutes

(ii) between 6 and 18 minutes

b) On an average, a typist makes 3 mistakes while typing one page. What is the probability that a randomly observed page is free of mistakes? Among 200 pages, in how many pages would you expect mistakes? **(5+5)**

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b) When two dice are thrown once, find the probability of getting sum of points as 12.

c) If , are A and B independent?

d) If , and find

e) If and find .

f) If then find .

g) If , then what is ?

h) If and , find

i) A Bernoulli variable takes values 1 and 0 with probabilities 0.2 and 0.8 respectively. Find mean and variance.

j) If a B.D. has mean 12 and S.D. 3, obtain the values of *n* and *p*.

k) Mention any two properties of Poisson Distribution.

l) Find Q.D. and M.D. of Normal Distribution with mean 30 and S.D. 6.

PART – B

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Answer any TWO of the following: **2x10=20**

5. a) Find the mean and standard deviation for the following probability distribution.

x	-2	-1	0	2	4
P(x)	/	/	/	/	/

b) A box has 5 blue and 3 yellow marbles. Two marbles are drawn at random. Find the expected number of blue marbles that can be drawn. **(5+5)**

6. a) A person tosses a coin two times. If head turns up once, he gets Rs. 15/- and if tail turns up both times he gets Rs. 10/-, otherwise he gets nothing. If he has paid an entrance fee of Rs. 2/-, what is his expectation?

b) For the following distribution, find and . **(5+5)**

x	-1	0	3	5
P(x)	–	–	–	–

7. For the following bivariate probability distribution, find the correlation coefficient .

y / x	1	3	9
2	0.1	0.1	0.05

4	0.2	k	0.1
6	0.1	0.15	0.2

(10)

Answer any TWO of the following: **2x10=20**

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Frequency	8	12	11	12	5	2

(10)

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b) An intelligent test was conducted on 1000 children. The average score was 42 and standard deviation 24. Find the number of children

i) Exceeding the score 60 ii) Score b/w 20 and 40. **(5+5)**

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