TB144510C **Reg. No: .....**

Name: .....

B. A. DEGREE (C.B.C.S.S) EXAMINATION, MARCH 2017
(Supplementary – 2014 Admission)
SEMESTER IV - COMPLEMENTARY COURSE (STATISTICS)
STA4ST – STATISTICAL TOOLS
(For Sociology)

Time: Three Hours **Maximum Marks: 80**

Use of Scientific calculators and Statistical tables are permitted.

PART A

I. Answer all questions. Each question carries 1 mark.

1. Define an event and give an example of an event.
2. Explain exhaustive events.
3. The mean and variance of a Binomial distribution are 6 and 4 respectively. Find the parameters of the distribution.
4. Define a Random variable.
5. Define power of a test.
6. Define Alternative hypothesis.
7. If the correlation co-efficient between two variables x and y is 0.8, then what is the correlation co-efficient between 8x and 4y?
8. What will be the nature of the regression lines when r = +1?
9. Give the use of Index numbers.
10. Name the tests to be satisfied by a good Index number.

(10x1=10)

PART B

II. Answer any eight questions. Each question carries 2 marks.

11. When are two events A and B said to be independent?
12. A coin and a die are tossed. Write down the sample space.
13. State the multiplication theorem on probability for two events.
14. Distinguish between Simple and Composite hypotheses.
15. Explain Critical region of a test.
16. Give the test statistic for testing whether the proportion in a population is equal to a specified value.
17. Give the formula for Spearman's rank correlation.
18. Explain why there are two regression lines for a bivariate data.
19. If n = 10, $\Sigma x = 35$, $\Sigma y = 28$, $\Sigma x^2 = 203$, $\Sigma y^2 = 140$ and $\Sigma xy = 168$, find b_{xy} and b_{yx}.
20. What is Circular test for Index numbers?
21. Distinguish between fixed base and chain base index numbers.
22. If $\Sigma p_0q_0 = 1330$, $\Sigma p_0q_k = 1726$, $\Sigma p_kq_0 = 1570$ and $\Sigma p_kq_k = 2057$, find Laspeyer's and Paasche's Index numbers.

(8x2=16)

PART C

III. Answer any six questions. Each question carries 4 marks.

23. There are two bags containing 3 white & 7 black balls and 8 white & 2 black balls respectively. A bag is chosen and a ball is drawn from it. Find the probability that it is a black ball.
24. A random variable X follows a Normal distribution with mean 50 and standard deviation 2. Find P[46 ≤ X ≤ 52].
25. Define conditional probability. If A and B are independent events, show that P(A|B)= P(A).
26. Out of a sample of 500 people from a certain district A, 448 were literates. Can it be reasonably claimed that 90% of the population of district A are literates?
27. Explain Simple, Multiple and Partial correlations.
28. Find Spearman's rank correlation from the following data

X	59	65	45	52	60	62	70	55	45	49
Y	75	70	55	65	60	69	80	65	51	61

29. Given that $\bar{x}$ = 40, $\bar{y}$ = 48, σ_x =12, σ_y = 16 and r = 0.48, predict the value of x when y=50.
30. Examine whether Fisher's index number satisfies Circular test.
31. From the fixed base index numbers given below, construct chain base index numbers

Year	2001	2002	2003	2004	2005	2006
Fixed base IN	100	110	105	120	130	150

(6x4= 24)

PART D

IV. Answer any two questions. Each question carries 15 marks.

32. (i) State and prove addition theorem on probability.
    (ii) A bag contains 4 red and 5 black balls. Two balls are drawn out at random. What is the probability that
        a) Both are red
        b) Both are black
        c) One is red and the other is black.
33. A sample of 6400 Englishmen showed a mean height of 67.85 inches with a standard deviation of 2.56 inches. Another sample of 1600 Australians showed a mean height of 68.55 inches with a standard deviation of 2.52 inches. Do the data indicate that Australians are on the average taller than Englishmen.
34. The following data gives the aptitude test scores and productivity indices of 10 workers

Aptitude score	60	62	65	70	72	48	53	73	65	82
Productivity index	68	60	62	80	85	40	52	62	60	81

Find both the regression lines and estimate productivity index of a worker whose test score is 92.

35. (a)Explain the steps in the construction of Index numbers.

(b) Find Fisher's Index number from the following data.

Commodity	Price		Quantity	
	Base period	Current period	Base period	Current period
A	6	10	50	56
B	2	2	100	120
C	4	6	60	60
D	10	12	30	24
E	8	12	40	36

(2x15=30)