

HSC 12TH STANDARD
STATISTICS
MODEL QUESTION PAPER - 3

TIME: 2.30HOURS

MARKS: 70

I. Choose the correct answer:-

15 × 1 = 15

1. $P\left(\frac{A \cup B}{A}\right) =$

- a) 0
- b) 1
- c) P(A)
- d) P(AUB)

2. $\text{Var}(5) =$

- a) 5
- b) 5^2

4. A wrong decision about H_0 leads to

- a) One kind of error
- b) two kinds of error
- c) Three kinds of error
- d) four kinds of error

5. Large sample theory is applicable when

- a) $n > 30$
- b) $n < 30$
- c) $n < 100$
- d) $n < 1000$

6. Alternative hypothesis $H_1: p > p_0$ at 1% level of significance the test statistic z is

- a) 2.33
- b) 2.58
- c) 1.96
- d) 1.645

7. t-distribution ranges from

- a) $-\infty$ to 0
- b) 0 to ∞
- c) $-\infty$ to ∞
- d) 0 to 1

8. Analysis of variance technique was originated in the field of
- a) Agriculture
 - b) Industry
 - c) Biology
 - d) Genetics
9. In the case of one-way classification with t treatments, the mean sum of squares for treatment is
- a) $SST/N-1$
 - b) $SST/t-1$
 - c) $SST/N-t$
 - d) SST/t
10. Semi average method is used to calculate
- a) Trend values
 - b) cyclic variations
 - c) Seasonal indices
 - d) none of these
11. If the slope of the trend line is positive it shows
- a) Rising trend
 - b) declining trend
 - c) Stagnation
 - d) none of the above
13. In the case of two attributes $(AB) + (A\beta) + (\infty \beta) + (\infty \beta) =$
- a) A
 - b) β
 - c) $(A)+(B)$
 - d) N
14. Which of the following does not apply to a decision tree?
- a) A square node is a point at which a decision must be made
 - b) A circular node represents an encounter with uncertainty
 - c) one chooses a sequence of decisions which have the greatest probability of success.
 - d) One attempts to maximize expected return
15. For which measure the table of loss is a must
- a) maxi-min
 - b) maxi-max
 - c) mini-max
 - d) Hurwicz method

Part-2

Answer any of the six questions. Question No.17th is compulsory **6×2=12**

16. Define statistical probability.

17. Find the derivative of $y = \frac{x^2+1}{x-5}$ with respect to x.

18. A continuous random variable x is said to have a normal distribution its

probability density function $f(x) = \frac{1}{5\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-60}{5}\right)^2}$ find mean and variance of x.

19. Define Sampling distribution.

20. State the assumption of students 't' tests.

21. The standard deviations calculated from two samples of sizes 9 and 13 are 2.1 and 1.8 respectively. Can the samples be regarded as drawn from normal populations with the same standard deviation?

23. What is 'Time series'?

24. What is the criteria of pessimism (maxi-mini)?

Part-3

Answer any of the six questions. Question No.28 is compulsory. **6×3=18**

25. Find the probability distribution of x when 3 coins are tossed, where x is defined as the number of heads found in an outcome.

26. In a Poisson distribution $3P(x=2)=P(x=4)$. Find the parameter 'm'.

27. Define parameter and statistic.

28. A person throws 10 dice 500 times and obtains 2560 times 4, 5 or 6 . Can this be attributed to fluctuations of sampling?

29. A drug is given to 10 patients and the increments in their blood pressure were recorded to be 3, 6, -2, 4, -3, 4, 6, 0, 0, and 2. Is it reasonable to believe that the drug has no effect on change of blood pressure?
30. Define non-parametric test.
31. State all the assumptions involved in analysis of variance technique.
32. What are the merits and demerits of the method of least square.
33. Write briefly about association of attributes.

Part-4

Answer all the questions:-

5×5=25

34. (a) A test paper containing 10 problems is given to three students A, B, and C. it is considered that student A can solve 60% problems. Student B can solve 40% problems and student C solves 30% problems. Find the probability that the problem chosen from the test paper will be solved by the following.

- (i) Find the probability of C not solving the problem?
- (ii) Find the probability of C along not solving the problem?
- (iii) C not solving the sum when the solution is obtained?

(Or)

(b) Two researchers adopted different sampling techniques while investigating the same group of students to find the number of students falling in different intelligence levels. The results are as follows.

Researchers	Number of Students				Total
	Below average	Average	Above average	Genius	
X	86	60	44	10	200
Y	40	33	25	2	100
Total	126	93	69	12	300

Would you say that smoking technique adopted by the two researcher are independent?.

35. (a) A random variable X has the following probability function

Values X x	0	1	2	3	4	5	6	7
P(x)	0	K	2k	2k	3k	K^2	$2K^2$	$7K^2 + k$

(i) Find K (ii) find P ($0 < X < 5$) (iii) find P ($x \leq 6$)

(Or)

(b) A manufacturer who produces medicine bottles finds that 0.1% of the bottles are defective. They are packed in boxes containing 500 bottles. A drug manufacture buys 100 boxes from the producer of bottles. Using poisson distribution find how many boxes will contain (i) no defective (ii) exactly 2 (iii) at least 2 defective.

36. (a) What are the procedures generally followed in testing of a hypothesis?

(Or)

(b) If 60 M.A Economics students are found to have a mean height of 63.60 inches and 50 M.Com students have a mean height of 69.51 inches. Would you conclude that the Commerce students are taller than Economics students? Assume the standard deviation of height of post-graduate students to be 2.48 inches.

37. (a) The following table gives the number of refrigerators sold by 4 salesman in three months May, June and July.

Machines	A	B	C	D
May	50	40	48	39
June	46	48	50	45
July	39	44	40	39

Carryout the analysis of variance?

(Or)

(b) A and B are independent. We have $N=200$ $(A) =150$ $(AB)=120$. Find the missing values.

38. (a) From the following data calculate the 4-yearly moving average and determine the trend values. Find the short term fluctuations. Plot the original data and the trend on a graph.

Year	93	94	95	96	97	98	99	00	01	02
Value	50	36.5	43	44.5	38.9	38.1	32.6	41.7	41.1	33.8

(Or)

(b) A florist stock highly perishable flower. A dozen at flower cost ₹ 3.00 and sells for 10.00. Any flower not sold the day are worthless. Demand in dozen of flowers are as follows.

Demand in dozen	0	1	2	3	4
Probability	0.1	0.2	0.4	0.2	0.1

Assuming the failure to satisfy any one customer's request will result in future lost profit amounting to ₹ 5.00 in addition to the lost profit on the immediate sale. How many flowers should the florist stock to expect maximum profits.