[Use a separate answer book for each group]

Group – A

1. State four components of a time series data. Distinguish between seasonal and cyclical fluctuations. [5]

Or,

What is modified exponential curve? How can you fit a modified exponential curve?

2. Explain different types of errors in construction of index number. State uses of index number. [5]

Or,

Define COLIN and real wage. The COLIN for a contain group of workers of a city has increased by 20% while the rise in their wages is 50%. Find percentage increase in their real wages.

Group – B

[*Answer **any three** questions*]   [3×5]

3. If X_1, X_2, X_3 be a random sample from $N(0, \sigma^2)$ population, what is the distribution of $(X_1^2 + X_2^2 + X_3^2)/\sigma^2$? State the sampling distribution of the statistics $\sqrt{2}X_1 / \sqrt{X_2^2 + X_3^2}$ and X_1^2 / X_2^2, mentioning the appropriate degrees of freedom in each case. [5]

4. 'A' tossed a biased coin 50 times and got head 20 times, while 'B' tossed it 90 times and got 40 heads. Find the maximum likelihood estimate of the probability of getting head when the coin is tossed. [5]

5. Let X be the average of a sample of 16 independent normal random variables with mean 0 and variance 1. Determine c such that $P[|\bar{x}| < c] = 0 \cdot 5$. [Given $\Phi^{-1}(0 \cdot 75) = 0 \cdot 68$] [5]

6. A single observation of a random variable having a geometric distribution is used to test the null hypothesis $H_0 : \theta = \theta_0$ as $H_1 : \theta = \theta_1 > \theta_0$. If the null hypothesis is rejected if and only if the observed value of the random variable is greater than or equal to positive integer k, find expressions for the probabilities of type – I and type – II errors. [here θ denotes the parameter of the geometric random variable] [5]

———— × ————