Department of Statistics
Sample Multiple Choice Questions
M.Sc. Part II Semester IV

PSST 401: Stochastic Processes

01 X(t) is number of telephone calls receiving at switchboard in (0 ,t] $t \in (0, \infty)$. Then X(t) is

a) discrete random variable
b) discrete stochastic process discrete in time
c) discrete stochastic process continuous in time
d) continuous stochastic process discrete in time

02 $\{x_t \ t \in T\}$ is a stochastic process. If the joint distribution of $X_{t1}, X_{t2} \ldots X_{tn}$ and X_{t1+h} , $X_{t2+h} \ldots X_{tn+h}$ is same for all h>0; then X(t) is

a) Weak stationary process
b) Strong stationary process
c) Process with independent increments.
d) Markov process

03 Following is the t.p.m for a Markov Chain,then

$$\begin{array}{c} \\ 1 \\ 2 \\ 3 \end{array} \begin{array}{c} \begin{array}{ccc} 1 & 2 & 3 \end{array} \\ \begin{bmatrix} 1-2a & 2a & 0 \\ a & 1-2a & a \\ 0 & 2a & 1-2a \end{bmatrix} \end{array}$$

a) value of a is any real no.
b) value of a is any positive real no.
c) value of a less than 0.5.
d) value of a is in [0, 0.5].

04 Which of the following is NOT CORRECT

a) An absorbing state is recurrent.
b) An ergodic state is recurrent.
c) Recurrent state is periodic.
d) An absorbing state is aperiodic.

05 For a Markov chain X_n with state space S,

$p_{ij}=P[X_{n+1}=j/X_n=i]]$ for all $i,j \in S$, then

a) p_{ij} are called n step transition probabilities.

b) p_{ij} are called (j-i) step transition probabilities.

c) p_{ij} are called transition probabilities of order n

d) p_{ij} are called one- step transition probabilities from state i to state j.

06 Following is t.p.m for a Markov chain with states {0,1,2} then

$$\begin{array}{c} \\ 0 \\ 1 \\ 2 \end{array}\begin{array}{c} \begin{array}{ccc} 0 & 1 & 0 \end{array} \\ \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix} \end{array}$$

a) All states are aperiodic

b) State 0 is aperiodic

c) State 0 has period 2 but other states are aperiodic

d) All states have period 3

07 If arrivals are according to Poisson process then distribution of inter arrival times is,

a) Gamma.

b) Chi-square.

c) Exponential.

d) Normal.

08 If $\{N_1(t)\}$ and $\{N_2(t)\}$ are two independent Poisson processes with rates λ_1 and λ_2 respectively then $N_1(t) - N_2(t)$ is a…

a) Poisson process with rate $\lambda_1 + \lambda_2$.

b) Poisson process with rate $\lambda_1 - \lambda_2$

c) Poisson process with rate λ_1 / λ_2

d) Not a Poisson process.

PSST 402: Time Series Analysis

01 The component of time series attached to long term variation is generally termed as, …

a) Cyclic variation.

b) Irregular variation.

c) Seasonal variation.

d) Trend.

02 The sales of departmental store on Dushera and Diwali is associated with the … component of a time series.

a) Trend.
b) Seasonal variation.
c) Irregular variation.
d) Cyclic variation.

03 Auto regressive process of order one can always be expressed as…

a) Infinite order moving average process.
b) Moving average of order one.
c) Auto regressive process of order p.
d) Moving average of order q.

04 Autocorrelation of lag zero of any process is equal to…

a) Variance of process.
b) One.
c) Zero.
d) Depends on process.

05 Which of the following statement about relation between strict and weak stationary process is true?

a) A strict stationary process with finite process is also weak stationary process.
b) A weak stationary process is always strict stationary process.
c) There is no relation between strict and weak stationary processes.
d) A weak stationary process following gamma distribution is strict stationary process.

PSST 403: Reliability and Survival Analysis

01 The cumulative distribution function of a survival time random variable T is defined as

a) $P(T< t) \quad \forall\, t\geq 0$
b) $P(T\geq t) \quad \forall\, t\geq 0$
c) $P(T> t) \quad \forall\, t\geq 0$
d) $P(T\leq t) \quad \forall\, t\geq 0$

02 A random variable is a survival time random variable if an observed outcome lies in the interval

a) $(0, \infty)$

b) $(1, \infty]$

c) $[0, \infty)$

d) $[1, \infty]$

03 Survival function of a survival time random variable T is defined as

a. $P(T \geq t) \ \forall\ t \geq 0$

b. $P(T < t) \ \forall\ t \geq 0$

c. $P(T > t) \ \forall\ t \geq 0$

d. $P(T \leq t) \ \forall\ t \geq 0$

04 Survival function of survival time random variable T is

a) Non-decreasing function of t.

b) Decreasing function of t.

c) Increasing function of t.

d) Non-increasing function of t.

05 If $h(t) = t^2$; $t \geq 0$

$= 0$; otherwise

Then cumulative hazard function of T

a) $\frac{t^4}{3}$

b) $\frac{t^3}{3}$

c) $\frac{t^2}{3}$

d) 2t

06 Kaplan- Meier estimator is used to estimate survival function in case of ---------- lifetime data.

a) Truncated.

b) outlier free.

c) Censored.

d) Any type of

07 Greenwood's formula is used for estimating approximate value of ---- of the Kaplan-Meier estimator.

a) Mean.

b) Variance.

c) confidence interval.

d) Bias.

08 Nelson and Aalen have derived an estimator for ---- .

a) Survival function.

b) Hazard function.

c) distribution function.

d) cumulative hazard function

09 Kaplan-Meier estimator is approximately unbiased estimate of ----.

a) Distribution function.

b) Density function.

c) Survival function.

d) Hazard function.

10 Kaplan -Meier estimator is also called as ----------.

a) Estimator of product.

b) Product limit estimator.

c) Maximum likelihood estimator.

d) Moment estimator.

PSST 404: Operations Research

01 Buffer stock' is the level of stock

a) Half of the actual stock.

b) At which the ordering process should start.

c) Minimum stock level below which actual stock should not fall.

d) Maximum stock in inventory

02 Which of the following is not an inventory?

a) Machines.

b) Raw material.

c) Finished products.

d) Consumable tools

03 The following classes of costs are usually involved in inventory decisions except

a) Cost of ordering.

b) Carrying cost.

c) Cost of shortages.

d) Machining cost

04 The time period between placing an order its receipt in stock is known as

a) Lead time.

b) Carrying time.

c) Shortage time.

d) Over time

05 The order cost per order of an inventory is Rs. 400 with an annual carrying cost of Rs. 10 per unit. The Economic Order Quantity (EOQ) for an annual demand of 2000 units is

a) 400.

b) 440.

c) 480.

d) 500

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