Question Bank for (Semester 6) (Paper I)

SR NO.	QUESTION TEXT	OPTION 1	OPTION 2	OPTION 3	OPTION 4
1	Bivariate Normal distribution is a generalization of	Multinomial distribution	Normal distribution	Poisson distribution	Gamma distribution
2	If $(X,Y) \sim BVN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$ then X follows	Binomial distribution	Poisson distribution	Exponential distribution	Normal distribution
3	If $(X,Y) \sim BVN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$ then Y follows	Poisson distribution	Beta distribution	Normal distribution	Trinomial distribution
4	If $(X,Y) \sim BVN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$ then marginal distribution of X is	$N(\mu_1, \sigma_2^2)$	$N(\mu_2, \sigma_2^2)$	$N(\mu_1, \sigma_1^2)$	$N(\mu_2, \sigma_1^2)$
5	If $(X,Y) \sim BVN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$ then marginal distribution of Y is	$N(\mu_1, \sigma_2^2)$	$N(\mu_2, \sigma_2^2)$	$N(\mu_1, \sigma_1^2)$	$N(\mu_2, \sigma_1^2)$
6	In the joint pdf of (X,Y), the range of the parameters μ_1 & μ_2 is	$-\infty < \mu_{1,}\mu_2 < \infty$	$-\infty < \mu_{1,}\mu_2 < 1$	$0 < \mu_{1,}\mu_2 < 1$	$0 < \mu_{1,}\mu_2 < \infty$
7	In the joint pdf of (X,Y), the range of the parameters σ_1^2 & σ_2^2 is	$-\infty < \sigma_1^2, \sigma_2^2 < 0$	$-\infty < \sigma_1^2, \sigma_2^2 < \infty$	$0 < \sigma_1^2, \sigma_2^2 < \infty$	$0 < \sigma_1^2, \sigma_2^2 < 1$
8	Correlation coefficient ρ lies between	0 to 1	0 to 2	-1 to 1	-1 to 0
9	If $\rho = 0$, then we can conclude that X and Y are	Correlated	Uncorrelated	Positively correlated	Negatively correlated
10	If $\rho = 0$, then we can conclude that X and Y are	Independent	Dependent	Correlated	Random

11	$(X,Y) \sim BVN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$ such that $\rho = 0$, then X+Y follows	$N(\mu_{1,}, \sigma_1^2 + \sigma_2^2)$	$N(\mu_1 + \mu_2, \sigma_2^2)$	$N(\mu_{1,}, \sigma_2^2)$	$N(\mu_1 + \mu_2, \sigma_1^2 + \sigma_2^2)$
11	$(X,Y) \sim BVN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$, conditional mean of Y/X=x	$\mu_2 + \frac{\sigma_2}{\sigma_1} \rho\ (x - \mu_1)$	$\frac{\sigma_2}{\sigma_1} \rho\ (x - \mu_1)$	$\rho\ (x - \mu_1)$	$\mu_2 + \frac{\sigma_2}{\sigma_1} \rho\ (x - \mu_1)$
12	$(X,Y) \sim BVN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$, conditional mean of X/Y=y	$\mu_2 + \frac{\sigma_2}{\sigma_1} \rho\ (x - \mu_1)$	$\mu_1 + \frac{\sigma_1}{\sigma_2} \rho\ (y - \mu_2)$	$\mu_1 + \frac{\sigma_1}{\sigma_2} \rho$	$\frac{\sigma_1}{\sigma_2} \rho\ (y - \mu_2)$
13	$(X,Y) \sim BVN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$, conditional variance of Y/X=x	$\sigma_1^2\ (1 - \rho^2)$	σ_2^2	$\sigma_2^2\ (1 - \rho^2)$	σ_1^2
14	$(X,Y) \sim BVN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$, conditional variance of X/Y=y	$\sigma_1^2\ (1 - \rho^2)$	σ_2^2	$\sigma_2^2\ (1 - \rho^2)$	σ_1^2
15	$(X,Y) \sim BVN(0, 0, 1, 1, \rho)$, then correlation coefficient between X^2 & Y^2 is	ρ	2ρ	$2\rho^2 - 1$	ρ^2
16	$If\ (X,Y) \sim BVN(0, 0, 1, 1, \rho)$ then $Q = \frac{x^2 - 2\rho xy + y^2}{(1-\rho^2)}$ follows	t-distribution with 2 df	Chi-square distribution with 1 df	t-distribution with 1 df	Chi-square distribution with 2 df
17	$If\ (X,Y) \sim BVN(0, 0, 1, 1, \rho)$, then the marginal distribution of X is	$N(0,1)$	$N(0,2)$	$N(1,1)$	$N(1,0)$
18	$If\ (X,Y) \sim BVN(0, 0, 1, 1, \rho)$, then the marginal distribution of Y is	$N(0,2)$	$N(1,1)$	$N(1,0)$	$N(0,1)$
19	$If\ (X,Y) \sim BVN(0, 0, 1, 1, \rho)$, then the conditional mean of X/Y=y is	ρy	ρx	ρx^2	ρy^2

20	$If\ (X,Y)\sim BVN(0,0,1,1,\rho)$, then the conditional mean of Y/X=x is	ρx^2	ρy^2	ρx	ρy
21	$If\ (X,Y)\sim BVN(0,0,1,1,\rho)$, then the conditional variance of X/Y=y is	$(1-\rho^2)$	ρ^2	ρ^2-1	$2\rho^2-1$
22	$If\ (X,Y)\sim BVN(0,0,1,1,\rho)$, then the conditional mean of Y/X=x is	ρ^2	ρ^2-1	$(1-\rho^2)$	$2\rho^2-1$
23	$f\left(\frac{x}{y}\right)$=	$\frac{f(x,y)}{f(x)}$	$\frac{f(x,y)}{f(y)}$	$\frac{f(x,y)}{f(x^2)}$	$\frac{f(x,y)}{f(y^2)}$
24	As per Fisher's Z transformation, Z is approximately normal with mean	$\frac{1}{2}\ln\left(\frac{1+\rho}{\rho}\right)$	$\frac{1}{2}\ln\left(\frac{1-\rho}{\rho}\right)$	$\frac{1}{2}\ln\left(\frac{1+\rho}{1-\rho}\right)$	$\frac{1}{2}\ln\left(\frac{1}{\rho}\right)$
25	As per Fisher's Z transformation, Z is approximately normal with variance	$\frac{1}{n}$	$\frac{1}{n-2}$	$\frac{1}{n+1}$	$\frac{1}{n-3}$
26	To test $H_0: \rho = 0\ Vs\ H_1: \rho \neq 0$, the test statistic is	$\frac{r\sqrt{n}}{\sqrt{1-r^2}}$	$\frac{r\sqrt{n-1}}{\sqrt{1-r^2}}$	$\frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$	$\frac{r\sqrt{n-2}}{\sqrt{1-r}}$
27	$t_{cal} = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$ follows t-distribution with	2 df	n-2 df	n+2 df	1 df

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1	P.G.F. stands for	Pearson Generating Function	Probability Generating Function	Parameter Generating Function	Population Generating Function

2	P.G.F. help us to generate	Moments	Parameters	Probability	Central Moments
3	P.G.F. of a random variable X with parameter S is denoted by	$P_x(S)$	$P_S(X)$	$P_x(S^2)$	$P_{2S}(X)$
4	P.G.F. of a random variable X, $P_x(S)$=	$E(S^{2x})$	$E(X^s)$	$E(X^{2s})$	$E(S^x)$
5	If $S = e^t$, then $P_x(S) =$	M.G.F.	C.G.F.	P.D.F	P.M.F
6	$P_x(S) =$	$\sum_x S^{2x} P(x)$	$\sum_x P(x)$	$\sum_x S^x P(x)$	$\sum_x S^{ax} P(x)$
7	P.G.F. of a random variable $X \sim B(n, p)$ is	$(q + p)^n$	$(q + ps)^n$	$(qs + p)^n$	$(q + p)^{2n}$
8	P.G.F. of a random variable $X \sim Poisson(\lambda)$ is	$e^{-\lambda(S-1)}$	$e^{\lambda(S-2)}$	$e^{\lambda(S-1)}$	$e^{-\lambda(S-2)}$
9	P.G.F. of a random variable $X \sim Geometric(p)$ is	$\frac{q}{1 - qs}$	$\frac{q}{1 - ps}$	$\frac{p}{qs}$	$\frac{p}{1 - qs}$
10	When S=1, $P_x(S) =$	1	0	-1	2
11	$P_x'(1)$=	$E(X)$	$E(X^2)$	$E(X^2 - X)$	$V(X)$
11	$P_x''(1)$=	$E(X)$	$E(X^2)$	$E(X^2 - X)$	$V(X)$
12	$P_x''(1) + P_x'(1) - \left(P_x'(1)\right)^2 =$	$E(X)$	$E(X^2)$	$E(X^2 - X)$	$V(X)$
13	$Q_x(S) =$	$\sum_{x=0}^{\infty} p_x S^x$	$\sum_{x=0}^{n} q_x S^x$	$\sum_{x=0}^{\infty} q_x S^x$	$\sum_{x=0}^{\infty} q_x S^{2x}$

14	Relationship between $P(S)$ and $Q(S)$ is	$Q(S) = \frac{1 - P(S)}{1 - S}$	$Q(S) = \frac{1 - P(S)}{S - 1}$	$Q(S) = \frac{1 - P(S)}{S}$	$Q(S) = \frac{1 - Q(S)}{P(S) - 1}$
15	$Q_x(1) =$	$E(X^2 - X)$	$V(X)$	$E(X)$	$E(X^2)$
16	$For\ a\ random\ varibale\ X, Q'(1) + Q(1) - \left(Q(1)\right)^2 =$	$E(X^2 - X)$	$V(X)$	$E(X)$	$E(X^2)$
17	For a Random variable X, P.G.F. of x+1 is $P_{x+1}(S) =$	$(S + 1)\ P_x(S)$	$S\ P_x(S^2)$	$S\ P_x(S)$	$S\ P_{x+1}(S^2)$
18	For a Random variable X, P.G.F. of 2x is $P_{2x}(S) =$	$(S + 2)\ P_x(S)$	$P_x(S^2)$	$S^2 P_x(S)$	$S\ P_{x+1}(S^2)$
19	P.G.F. of $P(X \leq n)$ is	$\frac{P(S)}{1 - S}$	$\frac{P(S)}{1 - 2S}$	$\frac{1 - P(S)}{1 - S}$	$\frac{P(S) - 1}{1 - S}$
20	If $X_1, X_2, \dots \dots \dots, X_n$ are n independent random variables with identical probability distribution, then $Y = X_1 + X_2 + \dots \dots + X_n$ has P.G.F. $P_y(S) =$	$[P_x(S)]^{n-1}$	$[P_x(S)]^{n+1}$	$[P_x(S)]^n$	$[P_{x+1}(S)]^n$
21	If $X_i \sim Bernoulli(p)\ ;\ i = 1,2, \dots ., n$ then $Y = X_1 + X_2 + \dots \dots + X_n$ follows	$B(n, q)$	$B(n, p + q)$	$B(n + 1, p)$	$B(n, p)$
22	If $X_i \sim Geometric(p)\ ;\ i = 1,2, \dots ., n$ then $Y = X_1 + X_2 + \dots \dots + X_n$ follows	Negative Binomial(n, q)	$B(n, p)$	$B(k, p)$	Negative Binomial(k, p)
23	If $X_i \sim Poisson(\lambda)\ ;\ i = 1,2, \dots ., n$ then $Y = X_1 + X_2 + \dots \dots + X_n$ follows	Poisson (λ)	Poisson (nλ)	Poisson (λ-1)	Poisson (kλ)
24	Random variables X and Y are stochastically independent, P.G.F. of Z=X+Y is $P_z(S) =$	$P_x(S) + P_y(S)$	$P_x(S) - P_y(S)$	$P_x(S) \times P_y(S)$	$P_x(S) \div P_y(S)$

Sr. No.	Questions	Option 1	Option 2	Option 3	Option 4
1	In stochastic processes observations are found to be dependent on _______.	Probability	Time	Place	Observations
2	If there are n unites in the system we say that the system is in the state ______ at time't'.	E_0	E_t	E_n	E_{n+1}
3	In stochastic process when there are n units in the system, death rate is represented by	μ_n	μ_1	μ_0	μ
4	A system which consist of individuals or units which can give birth to new individuals but can not die, this process is	Pure birth process	Death process	Birth and death process	Linear growth model
5	For poison process ($a > 0$) with initial condition $P_0(0)$ =____ for $n\neq0$.	∞	0	1	2
6	An individual which can only die or dropout but cannot give birth to individuals this process is ______ .	Birth process	Markov process	Pure death process	poisson
7	Probability that there are n units in the system at time t is represented by	$P_n(t)$	$P_t(n)$	$P(t)$	$P(n)$

8	The system is in the state E_0 at time _______ .	∞	2	0	-1
9	For poisson process mean is ______ .	λ	λt	0	λ^2t
10	Expected number units in the system =	E(n)	E(t)	E(nt)	V(n)
11	In poisson death process, initially there ______ units in the system	a	0	1	T
12	For poisson death process, the death rate is ________ of system size	Independent	Dependent	Mean	Variance
13	For _______ process, we cannot find $P_n(t)$	Pure Birth Process	Yules process	Poisson birth process	Poisson death process
14	For poisson death process, mean is	i-μt	I	μt	2μt
15	For poison process variance is _______ .	λ	λt	0	λ^2t
16	For poison process with initial condition $P_n(0)$=____ for n≠0.	2	1	∞	0
17	For poisson death process, variance is	i-μt	I	μt	2μt
18	________ process includes birth rate as well as death rate	Birth and death	Pure birth	Pure death	Poisson death

Sr. No.	Questions	Option 1	Option 2	Option 3	Option 4
1	When Customers arrive & are served in a group. The situation is referred as a ____ queue.	Bulk	Network	Finite	Infinite
2	The Source from which customers are generated is known as ______.	Service Discipline	Calling Source	Bulk	Arrival
3	Customer may leave the queue after being in it for sometime thinking that waiting has too much this is known as____.	Jockeying	Bulked	Departure	Reneging
4	Expected number of customers in the system is	Lq	Ls	Ws	Wq
5	Traffic Intensity = _____	$\frac{\lambda}{\mu}$	$\frac{\mu}{\lambda}$	$\frac{\lambda 2}{\mu 2}$	λμ
6	In a model (M/M/1):(GD/N/∞) maximum queue length is_____	N+1	N	N-1	N-2
7	In a model (M/M/C):(GD/N/∞) arrival rate λn = _____ ∀ n= N,N+1,….....	λ	λn	0	λn^2
8	In a model (M/M/∞):(GD/∞/∞) Effective arrival rate is _____.	λ^2	(1-λ)	$(1-\lambda^2)$	λ
9	The manner of choosing a customer from queue to start service is called as ______.	Service Discipline	Queue	Arrival	Departure
10	Customers may change the queues helping to decrease waiting time is known as ________.	Reneged	Bulked	Jockeying	Departure
11	For a queuing model (a/b/c):(d/e/f) symbol "a" represents	Calling Source	Number of Parallel servers	Arrival Distribution	Departure Distribution
12	Expected number of customers in the queue is	Lq	Ls	Ws	Wq
13	For a model (M/M/1):(GD/∞/∞) numbers of departure in the system μn = _____ ∀ n	μ	μ^2	nμ	2μ

14	In a model (a/b/c):(d/e/f) symbol "d" represents	Arrival Distribution	System Size	Calling Source	Service Discipline
15	In a model (M/M/∞):(GD/∞/∞) service rate is μn = _____ ∀ n	cμ	nμ	μ	n^2μ
16	In a model (M/M/C):(GD/∞/∞) arrival rate is λn = _____ ∀ n	nλ	λ	$λ^2$	n^2λ
17	Design of the queue may be in series as well as parallel which is known as _____ queue.	Service	Network	Bulk	joning
18	Customers may not join queue expecting a long delay which is known as ______.	Reneged	Jockeying	Bulking	Empty
19	For a queuing model (a/b/c):(d/e/f) symbol "b" represents	Departure Distribution	Calling Source	System size	Arrival Distribution
20	Expected waiting time in the system is	Lq	Ls	Ws	Wq
21	For a model (M/M/1):(GD/∞/∞) numbers of Arrivals in the system λn = _____ ∀ n	n^2λ	λ	nλ	$λ^2$
22	In a model (M/M/C):(GD/∞/∞) departure rate μn = _____ ∀ n=0,1,2,3,…....,c-1.	nμ	μ	$μ^2$	n^2μ
23	In a model (M/M/∞):(GD/∞/∞) Expected number of customers in the system is _____.	ϱ(1-ϱ)	(1-ϱ)	ϱ	$ϱ^2$
24	Average waiting time in queue i.e. Wq = ______	$\frac{Lq}{\lambda eff}$	Lq	$\frac{Ls}{\lambda eff}$	$\frac{Lq}{\lambda}$