COMMON P.G. ENTRANCE TEST, 2021
STATISTICS

(1) If A, B and C be any three events on a sample space S with $P(A) = \frac{3}{5}$, $P(B) = \frac{1}{4}$ and $P(C) = \frac{1}{3}$, then

(I) A, B and C can not be mutually exclusive events.

(II) A, B and C are independent events.

(III) Only A and B are mutually exclusive.

(a) All are correct. (b) Only (II) is incorrect.

(c) All are incorrect. (d) Only (I) is correct.

(2) Which of the following methods of finding real roots of the equation $f(x) = 0$ is quadratically convergent?

(a) Bisection Method (b) Newton-Raphson Method

(c) Regula Falsi Method (d) Secant Method

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(4) If a line makes angles α, β and γ with the X-axis, Y-axis and Z-axis respectively, then the value of $\sin^2\alpha + \sin^2\beta + \sin^2\gamma$ is:

(a) 0 (b) 1

(c) 2 (d) 3

(5) If $\begin{vmatrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{vmatrix} = 0$, then $xyz =$?

(a) 1 (b) -1

(c) 2 (d) -2

(6) If $a \neq p, b \neq q$ and $c \neq r$ and $\begin{vmatrix} p & b & c \\ a & q & c \\ a & b & r \end{vmatrix} = 0$, then what is the value of $\frac{p}{p-a} + \frac{q}{q-b} + \frac{r}{r-c}$?

(a) 1 (b) -1

(c) 2 (d) 0

(7) If $x + ky - z = 0, 3x - ky - z = 0$ and $x - 3y + z = 0$ have non-zero solution for $k =$?

(a) -1 (b) 0

(c) 1 (d) 2

(8) Which of the following methods of finding real roots of the equation $f(x) = 0$ is quadratically convergent?

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(9) Let V be a vector space of all functions from R to R and $W_1 = \{f: F(4)3 + f(2)\}$, $W_2 = \{f: 2f(3) = f(1)\}$, $W_3 = \{f: f(5) = 0\}$. Then which of the following is true?

(a) W_1, W_2 and W_3 are subspaces of V. (b) W_1 is not a subspace but W_2 and W_3 are subspaces of V.

(c) W_1, W_2 are subspaces but W_3 is not a subspace of V. (d) W_1, W_2 are subspaces of V and W_3 is not a subspace of V.

(10) A quantity like P which distinguishes one population from another similar population is called a

(a) Statistic (b) Sampling Distribution

(c) Null-hypothesis. (d) Parameter

(11) Vital statistics is obtained through;

(a) Census

(b) Registration

(c) Surveys

(d) All of the above

(12) The death rate of babies under one month is known as;

(a) Neonatal mortality rate

(b) Infant mortality rate

(c) Maternal mortality rate

(d) Foetal death rate

(13) A driver covers a distance of 400km from Bhubaneswar to Rourkela by a car at speed of 80 km/hour. He returns at a speed of 100 km/hour. The average speed during his trip is

(a) 180 km/hour

(b) 90 km/hour

(c) 88.88 km/hour

(d) None of these

(14) In histogram frequencies are proportional to the

(a) Breadth of the rectangles

(b) Area of the rectangles

(c) Height of the rectangles

(d) None of these

(15) For comparing the variability of two series which are in different units, which of the following measure is used?

(a) Standard deviation

(b) Coefficient of variation

(c) Mean deviation from mean

(d) Inter quartile range

(16) The sum, the sum of squares and the standard deviation of n ($n<20$) observations are 50, 625 and 5 respectively. The value of n is

(a) 15

(b) 10

(c) 8

(d) 5

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(b) W_1 is not a subspace but W_2 and W_3 are subspaces of V.

(c) W_1, W_2 are subspaces but W_3 is not a subspace of V.

(d) W_1, W_2 are subspaces of V and W_3 is not a subspace of V.

(18) A quantity like P which distinguishes one population from another similar population is called a

(a) Statistic

(b) Sampling Distribution

(c) Null-hypothesis.

(d) Parameter

(19) The value of the series $1 + \frac{2^3}{2!} + \frac{3^3}{3!} + \frac{4^3}{4!} + \cdots\cdots$ is

(a) e

(b) $5e^2$

(c) $5e$

(d) e^5

(20) If A, B and C be any three events on a sample space S with $P(A) = \frac{3}{5}$, $P(B) = \frac{1}{4}$ and $P(C) = \frac{1}{3}$, then

(I) A, B and C can not be mutually exclusive events.

(II) A, B and C are independent events.

(III) Only A and B are mutually exclusive.

(a) All are correct.

(b) Only (II) is incorrect.

(c) All are incorrect.

(d) Only (I) is correct.

(21) A coin is tossed six times. The probability of obtaining heads and tails alternatively is

(a) 1/64

(b) 1/2

(c) 1/32

(d) 1/6

(22) One of the two events is certain to happen. The chance of one event is one-fifth of the other. The odds in favor of the other is

(a) 1 : 6 (b) 6 : 1

(c) 5 : 1 (d) 1 : 5

(23) If one card is selected at random from 100 cards numbered 00, 01, 02, 03, 04, ……..., 99. Suppose a card is selected at random and X and Y denote the random variables denoting the sum and product of the digits on the selected card then the value of $P(X = i|Y = 0)$ is equal to (i is a whole number):

(a) $^{1}/_{19}$ (b) $^{19}/_{100}$

(c) $^{1}/_{100}$ (d) $^{1}/_{50}$

(24) For husband and wife applied against a vacant post in an office where the chances of getting it are $^{1}/_{5}$ and $^{1}/_{3}$ respectively. The chance that either of them will get the job is

(a) $^{1}/_{15}$ (b) $^{2}/_{8}$

(c) $^{7}/_{15}$ (d) $^{8}/_{15}$

(25) A discrete random variable takes four values -1, 0, 3 and 4 with probabilities $\frac{1}{6}$, k, $\frac{1}{4}$ and $1 - 6k$, where k is a constant. The value of k will be

(a) $^{1}/_{3}$ (b) $^{2}/_{9}$

(c) $^{1}/_{12}$ (d) $^{5}/_{24}$

(26) If X is a random variable with probability density function $f(x), x > 1$. The quantity $E(\log X)$ represents

(a) Arithmetic Mean (b) Geometric Mean

(c) Harmonic Mean (d) Raw moments

(27) The probability distribution for which mean and variance does not exist:

(a) Chi-square Distribution (b) Gamma Distribution

(c) Hypergeometric Distribution (d) Cauchy Distribution

(28) The area under the standard normal curve beyond the lines $z = \pm 1.96$ is:

(a) 95% (b) 90%

(c) 5% (d) 10%

(29) If $X \sim N(\mu, \sigma^2)$, the points of inflexion of normal distribution curve are:

(a) $\pm\mu$ (b) $\mu \pm \sigma$

(c) $\sigma \pm \mu$ (d) $\pm\sigma$

(30) The distribution possessing the memoryless property is

(a) Binomial Distribution (b) Normal Distribution

(c) Poisson Distribution (d) Exponential Distribution

(31) The Kruskal-Wallis test statistic H is approximately distributed as

(a) Standard Normal Distribution (b) Chi-Square

(c) Students' t - distribution (d) Snedecor's F distribution

(32) Two variables X and Y are related as $X + Y = 1$, then the value of correlation coefficient between X and Y is

(a) -1 (b) 1

(c) 0.5 (d) 0

(33) Two attributes A and B are positively associated, then

(a) $(AB) > \frac{(A)(B)}{N}$

(b) $(AB) < \frac{(A)(B)}{N}$

(c) $(AB) = \frac{(A)(B)}{N}$

(d) None of these.

(34) In the following frequency distribution, the one of the frequencies is missing.

Class Intervals	30-40	40-50	50-60	60-80	80-100
Frequency	5	15	------	18	6

Which of the following is an appropriate method for estimating the missing frequency?

(a) Newton-Gauss Formula

(b) Binomial Expansion Formula

(c) Lagrange's Formula

(d) All the above.

(35) A cycle in a time series is represented by the difference between

(a) Two successive peaks

(b) The end points of a convex portion

(c) The mid-points of a trough and the crest

(d) None of these.

(36) The moving averages in a time series are free from the influence of

(a) Seasonal and cyclic variations

(b) Trend and seasonal variation

(c) Only secular trend.

(d) Seasonal and irregular variations.

(37) When several time series models are fitted to estimate the ling term component of a time series, then the best model have

(a) Reliable estimates of the model parameters

(b) Least residual sum of squares.

(c) The shape of the fitted curve.

(d) All of these.

(38) Combining two index number series having two different base years into a single series with only one base year is known as

(a) Splicing (b) Base shifting

(c) Deflating (d) None of these.

(39) Factor reversal test permits the interchange of

(a) Base periods (b) Price and quantities

(c) Weights (d) Current periods

(40) The consumer price index numbers for 2001 and 2002 to the base 1994 are 320 and 400 respectively. The consumer price index for 2001 to the base 2002 is:

(a) 125 (b) 80

(c) 128 (d) 100

(41) The Shewhart control charts are meant:

(a) To detect whether the process is under statistical control or not. (b) To detect the presence of assignable causes.

(c) To reflect the selection of samples. (d) All of these.

(42) The probability of accepting a lot with fraction defective P_t is known as:

(a) Consumer's risk (b) Type I error

(c) Producer's risk (d) Type II Error

(43) R-Charts are preferable over σ −charts because

(a) R and S.D. fluctuate together in case of small samples (b) R can be easily calculated

(c) R-charts are economical. (d) All of these.

(44) The quantity $(x-\mu)'\Sigma^{-1}(x-\mu)$ involved in the multivariate normal density function represents:

(a) Multivariate normal density (b) Dispersion matrix

(c) Exponential series (d) Mahalanobis squared distance

(45) The expression present in the multivariate normal density function describing the shape of the density is

(a) $\frac{1}{(2\pi)^{p/2}|\Sigma|^{1/2}}$ (b) $e^{-\frac{1}{2}(x-\mu)'\Sigma^{-1}(x-\mu)}$

(c) $(x-\mu)'\Sigma^{-1}(x-\mu)$ (d) All the above

(46) Local control in the field is maintained through

(a) Uniformity trials (b) Randomization

(c) Natural factors (d) None of the above

(47) Which of the following is a treatment contrast?

(a) $3T_1 - T_2 - 3T_3 + T_4$ (b) $T_1 + 3T_2 - 3T_3 + T_4$

(c) $-3T_1 - T_2 + 3T_3 + T_4$ (d) $T_1 + T_2 + T_3 + T_4$

(48) The maximum possible number of orthogonal contrasts among four treatments is

(a) Four (b) Three

(c) Two (d) One

(49) The following layout meets the requirements of a

A	B	C	D
A	C	B	D
B	A	C	C

A A B C

(a) Completely randomized design (b) Randomized block design

(c) Latin square design (d) None of these

(50) In the analysis of data using a randomized block design with b blocks with v treatments, the error degrees of freedom is

(a) $(b-1)(v-1)$ (b) $b(v-1)$

(c) $v(b-1)$ (d) $bv-1$

(51) A randomized block design has

(a) One way classification (b) Two way classification

(c) Three way classification (d) Two way cross classification

(52) The general decline in sales of cotton clothes is attached to the component of the time series:

(a) Secular Trend (b) Seasonal variation

(c) Cyclic variation (d) Irregular component

(53) The sales of a departmental store on Dussehra and Diwali are associated with the component of a time series:

(a) Irregular component (b) Secular trend

(c) Cyclic Component (d) Seasonal variation

(54) The cycles in a time series are regular in

(a) periodicity (b) amplitude

(c) Both (a) and (b) (d) Neither (a) nor (b)

(55) If a most-efficient estimator A and a less-efficient estimator B of a certain parameter tend to joint normality for large samples, then the correlation between $B-A$ and A is

(a) 1 (b) 0

(c) -1 (d) 0.5

(56) For large samples, which of the following statement is true?

(a) The maximum likelihood estimator tends to minimum Chi-square estimator.

(b) The maximum likelihood estimator and minimum Chi-square estimator does not exist.

(c) The minimum Chi-square estimator tends to Maximum likelihood estimator.

(d) The maximum likelihood estimator and minimum Chi-square estimator are completely different.

(57) If X has a F −distribution with parameters p and q, then the distribution of $\frac{P}{1+P}$, where $P = \frac{p}{q}X$ is

(a) $Beta\left(\frac{p}{2}, \frac{q}{2}\right)$ (b) $Exponential\ (p+q)$

(c) Normal$\left(p, \frac{pq}{2}\right)$ (d) None of these.

(58) If a negative value appears in the solution values (x_b) column of the simplex method, then

(a) The basic solution is optimum

(b) The basic solution is infeasible

(c) The basic solution is unbounded

(d) All of the above

(59) The set $S = \{(x_1, x_2) : x_1, x_2 \geq 1; x_1 \geq 0, and\ x_2 \geq 0\}$ is

(a) Convex

(b) Not convex

(c) Concave

(d) None of the above

(60) The curve $a^2y^2 = x^2(a^2 - x^2)$

(I) is symmetric about both the axes.

(II) has two tangents at origin given by $y = \pm x$.

(III) has no asymptotes.

(a) Only (I) is correct. (b) (II) and (III) are correct.

(c) (I) and (III) are correct. (d) All of these are correct.

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(a) Only (I) is correct. (b) (II) and (III) are correct.

(c) (I) and (III) are correct. (d) All of these are correct.

(62) The order of convergence of Secant method is approximately equal to

(a) 1.62 (b) 2

(c) 1 (d) 2.62

(63) The equation $ax^2 + by^2 + cz^2 + 2fyz + 2gzx + 2hxy + 2ux + 2vy + 2wz + d = 0$ represents a sphere, if

(a) $a = b = c$ (b) $f = g = h = 0$

(c) $u = v = w$ (d) $a = b = c$ and $f = g = h = 0$

(64) The maximum value of $y = (1 - x)(2 + 3x)$ is

(a) $^{25}/_{12}$ (b) $^{25}/_{32}$

(c) ∞ (d) $^{25}/_{64}$

(65) A man selected six books in a book fair. In how many ways can he buy at least two of these books?

(a) 2^6 (b) 6^2

(c) $2^6 - 7$ (d) $6^2 - (6 - 1)$

(66) The value of the series $1 + \frac{2^3}{2!} + \frac{3^3}{3!} + \frac{4^3}{4!} + \cdots\cdots$ is

(a) e (b) $5e^2$

(c) $5e$ (d) e^5

(67) The speed of your internet access is defined in terms of:

(a) RAM

(b) Mega Hertz

(c) Kilobytes per second

(d) Megabytes

(68) Modem stands for

(a) Modular Demodulator

(b) Monetary Devaluation Exchange Mechanism

(c) Memory Demagnetization

(d) Monetary Demarcation

(69) What is the difference between Internet and an Intranet?

(a) One is public and other is private

(a) One if safer than the other

(c) One can be monitored, the other can't

(d) None of the above

(70) A JPG is

(a) a Jumper Programmed Graphic

(b) a format for an image file

(c) a type of hard disk

(d) a unit for measuring memory of a computer