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FOR UPSC IES ISS EXAM PREPARATION

UPSC IES ISS 2023 Question Paper · Statistics Paper I

EXAM	YEAR	TYPE	SUBJECT
UPSC IES ISS	2023	Question Paper	Statistics Paper I

I.E.S./I.S.S EXAM- 2023

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T.B.C. : ASRT-U-STT

Test Booklet Series

A

Serial 1004813

TEST BOOKLET

STATISTICS

Paper I

Time Allowed : Two Hours *Maximum Marks : 200*

INSTRUCTIONS

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2. **Please note that it is the candidate's responsibility to encode and fill in the Roll Number and Test Booklet Series Code A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet. Any omission/discrepancy will render the Answer Sheet liable for rejection.**
3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. ***DO NOT*** write ***anything else*** on the Test Booklet.
4. This Test Booklet contains **80** items (questions). Each item comprises four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose ***ONLY ONE*** response for each item.
5. You have to mark all your responses ***ONLY*** on the separate Answer Sheet provided. See directions in the Answer Sheet.
6. All items carry equal marks.
7. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.
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9. Sheets for rough work are appended in the Test Booklet at the end.
10. **Penalty for wrong answers :**

    THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.

    (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third** of the marks assigned to that question will be deducted as penalty.

    (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to that question.

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1. The members of a firm rent cars from three rental agencies : 60% from Agency-1, 30% from Agency-2 and 10% from Agency-3. If 9% of cars from Agency-1 need an oil change, 20% of cars from Agency-2 need an oil change and 6% of cars from Agency-3 need an oil change, then what is the probability that a rental car delivered to the firm will need an oil change ?

(a) 0·006

(b) 0·054

(c) 0·06

(d) 0·12

2. If $X \sim N(0, 1)$ and $Y|X = x \sim U(x - 1, x + 1)$, then what is the value of $E(E^2(Y|X))$?

(a) 1

(b) 2

(c) 3

(d) 4

3. If $X \sim \exp(\theta)$, then consider the following statements :

1. Variance > Mean if $0 < \theta < 1$
2. Minimum order statistics is chi-square distribution
3. Lack of memory property exists only if $\theta > 1$

Which of the statements given above is/are correct ?

(a) 1 only

(b) 3 only

(c) 1 and 2

(d) 1 and 3

4. A random variable X has probability mass function given by

$$P(X = x) = \frac{1}{5^{10}}\binom{10}{x} 2^x 3^{10-x}; \; x = 0, 1, 2, ..., 10$$

The mean and variance of X are respectively :

(a) 2, 4

(b) 2·4, 4

(c) 4, 2·4

(d) 4, 2

5. If $X \sim$ log-normal (μ, σ^2) and $Y = \sigma X^{\mu}$; $\sigma > 0$, $-\infty < \mu < \infty$, then what is the value of $\text{Var}\left(\left(\log\frac{Y}{\sigma} - \mu^2\right)^2\right)$?

(a) $105\,\mu^4\sigma^4$

(b) $15\,\mu^4\sigma^4$

(c) $3\,\mu^4\sigma^4$

(d) $2\,\mu^4\sigma^4$

6. The pdf of a random variable X is given by

$$f(x) = \begin{cases} 0{\cdot}2, & 0 \le x \le 5 \\ 0, & \text{otherwise} \end{cases}.$$

Consider the following probabilities :

1. $P(2 \le X \le 3) = 0{\cdot}2$
2. $P(X > 3{\cdot}5) = 0{\cdot}3$
3. $P(|x| \ge 2) = 0{\cdot}6$
4. $P(X < 4) = 0{\cdot}8$

How many of the probabilities given above are correct ?

(a) Only one

(b) Only two

(c) Only three

(d) All four

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7. If $\varphi(.)$ is pdf of N(0, 1) distribution and A represents a circle of unit area with centre at origin, then what is the value of $\iint_A \varphi(x)\,\varphi(y)\,dx\,dy$?

(a) $\frac{1}{2} + e^{-\pi}$

(b) $1 - e^{-\frac{1}{2\pi}}$

(c) $1 - e^{-2\pi}$

(d) $1 - e^{-\frac{1}{\sqrt{\pi}}}$

Consider the following for the next three (03) items that follow :

Let joint pdf of two random variables X and Y be

$$f(x, y) = \frac{1}{\sqrt{2\pi y}} e^{-\frac{1}{2y}(x-12y)^2} \quad ; -\infty < x < \infty, 0 < y < 1$$

8. What is the value of E(X) ?

(a) 1

(b) 2

(c) 4

(d) 6

9. What is the value of Var(X) ?

(a) 1

(b) 2

(c) 12

(d) 12·5

10. What is the value of Cov(X, Y) ?

(a) 1

(b) 2

(c) 2·5

(d) 3

11. If random variable X follows Binomial distribution with n = 10 and $p = \frac{1}{4}$, then what is the value of third cumulant of Y = 10 – X ?

(a) $-\frac{15}{16}$

(b) $\frac{15}{16}$

(c) $\frac{5}{8}$

(d) $\frac{5}{16}$

12. If X, Y and Z are iid exponential(1) variates, then the distribution of (X + Y + Z)/3 is :

(a) Exponential (1/3)

(b) Exponential (3)

(c) Gamma ($n = 3, \lambda = 1/3$)

(d) Gamma ($n = 3, \lambda = 3$)

13. If random variable X assumes non negative integral values and $P(s) = E(s^X)$, then what is the value of $\sum_{n=0}^{\infty} s^{2n}\, P(X \le n)$?

(a) $\frac{P(\sqrt{s})}{1 - s^2}$

(b) $\frac{P(s)}{1 - s^2}$

(c) $\frac{P(s^2)}{1 - s^2}$

(d) $\frac{P(\sqrt{s})}{1 - s}$

14. If a random variable assumes non negative integral values and $E(X) = \mu$, $Var(X) = \sigma^2$, then what is the value of $2\sum_{x=0}^{\infty} xP(X > x)$?

(a) $\sigma^2 + \mu^2$

(b) $\sigma^2 + \mu^2 - \mu$

(c) $(\sigma^2 - \mu)/2$

(d) $(\sigma^2 + \mu^2 - \mu)/2$

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Consider the following for the next three (03) items that follow :

The joint pmf of two random variables X and Y is given below :

X \ Y	– 2	– 1	0	1	2
– 1	θ	2θ	3θ	θ	θ
0	2θ	3θ	θ	0	0
1	θ	θ	θ	θ	2θ

where $0 < \theta < 1$.

15. What is the moment generating function of $X \mid Y = 2$?

(a) $\frac{e^{-t} + 2e^{t}}{3}$

(b) $\frac{1 + e^{-t} + e^{t}}{3}$

(c) $\frac{2e^{-t} + e^{t}}{3}$

(d) $(1 - 2t)^{-1}$

16. What is the value of Var $(X \mid Y = 2)$?

(a) 1/3

(b) 2/3

(c) 8/9

(d) 2/9

17. What is the value of $E(XY \mid Y = 2)$?

(a) 1

(b) 1/3

(c) 2/3

(d) 8/9

Consider the following for the next three (03) items that follow :

Let the joint pdf of X and Y be

$$f(x, y) = \begin{cases} \frac{\lambda x^{12}}{(1+xy)^{20}}; & x > 0, y > 1 \\ 0; & \text{otherwise} \end{cases}$$

18. What is the value of λ ?

(a) $\frac{1}{B(12, 7)}$

(b) $\frac{19}{B(12, 7)}$

(c) $\frac{7}{B(12, 7)}$

(d) $\frac{84}{B(12, 7)}$

where $B(m, n) = \int_0^1 x^{m-1} (1 - x)^{n-1} \, dx$

19. What is the marginal distribution of X ?

(a) Beta Type-II distribution with parameters (12, 7)

(b) Beta Type-II distribution with parameters (13, 7)

(c) Beta Type-I distribution with parameters (12, 7)

(d) Beta Type-I distribution with parameters (13, 7)

20. Marginal distribution of Y has pdf :

(a) $\frac{7}{y^{8}}$; $y > 1$ and 0 otherwise

(b) $\frac{11}{y^{12}}$; $y > 1$ and 0 otherwise

(c) $\frac{18}{y^{19}}$; $y > 1$ and 0 otherwise

(d) $\frac{12}{y^{13}}$; $y > 1$ and 0 otherwise

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21. Which of the following are examples of data condensing ?

1. Data array
2. Frequency distribution
3. Histogram
4. Ogives

Select the correct answer using the code given below :

(a) 1, 2 and 4 only

(b) 1 and 3 only

(c) 2, 3 and 4 only

(d) 1, 2, 3 and 4

22. For the variable X, following observations are taken :

X = 2, 5, 0, 6, 3, 8, 1, 3, 0, 2

What is Var(2X + 2) ?

(a) 24·8

(b) 26·8

(c) 28·8

(d) 29·6

23. What is the 3rd central moment of Binomial distribution with parameters n = 10 and p = 1/2 ?

(a) 25

(b) 5

(c) 2·5

(d) 0

24. Consider the contingency table presenting the number of skilled and unskilled labour against their gender. What is the value of χ^2 for testing the association between gender and the nature of work ?

	Skilled	Unskilled
Male	30	30
Female	20	20

(a) 50

(b) 16·66

(c) 12·07

(d) 0

25. If Var(X) = 4, Cov(X, Y) = 32 and correlation coefficient r(X, Y) = 0·8 for some bivariate data, then what is V(Y) equal to ?

(a) 400

(b) 200

(c) $200\sqrt{2}$

(d) $400\sqrt{2}$

Consider the following for the next five (05) items that follow :

The pdf of Bi-variate normal distribution is given by

$f(x, y) = \lambda e^{-(2x^2+3xy+4y^2-7x-11y)}; -\infty < x < \infty,$

$-\infty < y < \infty,$

where λ is constant.

26. What is the value of E(X) + E(Y) + 3 ?

(a) 0

(b) 1

(c) 4

(d) 5

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27. What is the value of $23(\text{Var}(X) + \text{Var}(Y))$?

(a) 4

(b) 8

(c) 12

(d) 17

28. If r is the correlation coefficient between X and Y, then what is the value of $\sqrt{2}\ r$?

(a) $-\frac{3}{4}$

(b) $-\frac{1}{4}$

(c) $-\frac{1}{\sqrt{2}}$

(d) $-\frac{1}{2}$

29. What is the distribution of $Y \mid X = x$ equal to ?

(a) $N\left(\frac{11-3x}{8}, \frac{1}{8}\right)$

(b) $N\left(1, \frac{1}{8}\right)$

(c) $N\left(\frac{1+x}{2}, \frac{1}{8}\right)$

(d) $N\left(\frac{4-3x}{8}, \frac{7}{8}\right)$

30. If $E(X) = \mu_1$ and $E(Y) = \mu_2$, then what is the value of $2\pi\, f(\mu_1, \mu_2)$?

(a) $\sqrt{23}$

(b) $\sqrt{6}$

(c) $4\sqrt{2}$

(d) $16\sqrt{2}$

31. If $(X, Y) \sim BVN(0, 0, 1, 1 ; \rho)$, then what is the value of $\frac{E((Y-\rho X)^4 \mid X)}{(1-\rho^2)^2}$?

(a) 1

(b) 3

(c) 9

(d) 81

32. For h families containing equal number k of members in each family, the range of intra-class correlation coefficient ρ is :

(a) 0 to 1

(b) -1 to 1

(c) $-1/(k-1)$ to 0

(d) $-1/(k-1)$ to 1

33. If the correlation coefficient between heights of fathers and sons from a random sample of 900 is calculated as 0·67, what is the standard error ?

(a) 0·018

(b) 0·04

(c) 0·18

(d) 1·8

34. The mean height obtained from a random sample of size 100 is 64 inches. The standard deviation of the height distribution is known to be 3 inches. What is the 95% confidence interval for mean height of the population ? (Assume $Z_{0·025} = 2$)

(a) (63·4, 64·6)

(b) (63·1, 64·1)

(c) (62·8, 65·8)

(d) (62, 66)

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35. In an art school, 380 children out of 800 were found to be singers. If E is the standard error of proportion of singers, then what is $1280000E^2$ equal to ?

(a) 39·9

(b) 399

(c) 3990

(d) 4399

36. If a sample of size n is taken from $N(\mu, \sigma^2)$ and let $\bar{x}$ and s^2 be sample mean and sample variance respectively, then distribution of $\frac{(n-1)s^2}{\sigma^2}$ is :

(a) Chi-square with $(n-1)$ degrees of freedom

(b) Chi-square with n degrees of freedom

(c) Students-t with $(n-1)$ degrees of freedom

(d) Students-t with n degrees of freedom

37. For a bivariate data, using the principles of least-squares, the following models were constructed :

E1 : $Y = 3X + 5$ with $\Sigma(Y_i - 3X_i - 5)^2 = 15{\cdot}48$

E2 : $Y = -X^2 + 8X + 2$ with $\Sigma(Y_i + X_i^2 - 8X_i - 2)^2 = 13{\cdot}36$

What is the estimated value of Y for $X = 6$?

(a) 4·5

(b) 14

(c) 18·5

(d) 23

38. Let $x_1, x_2, x_3, \ldots, x_n$ be a random sample from a Normal population with mean μ_0 and variance σ^2. If $\bar{X}$ is the sample mean, then the distribution of $\frac{\bar{X} - \mu_0}{\left(\frac{\sigma}{\sqrt{n}}\right)}$ is :

(a) N(0, 1)

(b) t with n degrees of freedom

(c) t with $(n-1)$ degrees of freedom

(d) χ^2 with $(n-1)$ degrees of freedom

Consider the following for the next two (02) items that follow :

$(X, Y) \sim BVN(0, 0, 1, 1 ; \rho)$

39. What is the value of $Cov(Y - \rho X, X)$?

(a) 0

(b) 0·5

(c) 0·75

(d) 1

40. What is the moment generating function of $X^2 + Y^2 - 2\rho XY$?

(a) $(1 - 2t)^{-1}$

(b) $(1 - 2\rho t)^{-1}$

(c) $(1 - 2t + 2\rho^2 t)^{-1}$

(d) $(1 - 2t + 2\rho t)^{-1}$

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41. What is the minimum number of arguments required to find the third divided difference of the function $f(x) = x^3 - 2x + 1$?

(a) 2
(b) 3
(c) 4
(d) 5

42. What is $\underset{y,z}{\Delta^2} x^3$ equal to ?

(a) $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$
(b) $x + y + z$
(c) $x^2 + y^2 + z^2$
(d) $\frac{1}{x^2} + \frac{1}{y^2} + \frac{1}{z^2}$

43. Let U(x) be a polynomial of degree 3. Given that U(0) + U(4) = 72 and U(1) + U(3) = 42. What is the value of U(2) assuming that differencing interval h = 1 ?

(a) 1
(b) 2
(c) 4
(d) 16

44. If differencing interval is of length h, then what is $(x^2 + hx + 1) \tan(\Delta \tan^{-1} x)$ equal to ?

(a) 1
(b) h
(c) h + 1
(d) $h^2 + 1$

45. If $x^{(r)} = x(x - 1)(x - 2) \ldots (x - (r - 1))$, then what is the coefficient of x^4 in $2x^{(5)} - 5x^{(4)} + 3x^{(3)} + 2x^{(2)} + 1$?

(a) 2
(b) – 1
(c) – 10
(d) – 25

46. In case of equi-spaced tabular data, the error for linear interpolation is bounded by one eighth of the :

(a) first difference
(b) second difference
(c) third difference
(d) fourth difference

47. The integral $\int_0^1 x^3 \, dx$ is evaluated by the Trapezoidal rule with step length h. Then the error is :

(a) $h^2/12$
(b) $h^2/6$
(c) $h^2/4$
(d) $h^2/3$

48. What is the value of b if $\int_0^h f(x)\,dx = ahf(0) + bhf\left(\frac{h}{3}\right) + chf(h)$ exists for a polynomial of degree as high as possible ?

(a) 1
(b) 3/4
(c) 1/2
(d) 0

49. What is the value of the expression $\Delta^6((1 - x)(1 - 3x^2)(1 - 4x^3))$, when interval of differencing is 1 ?

(a) 8640
(b) 2160
(c) – 2160
(d) – 8640

50. If $\delta = \sqrt{E} - \frac{1}{\sqrt{E}}$ and $\mu = \frac{1}{2}\left(\sqrt{E} + \frac{1}{\sqrt{E}}\right)$, then what is $2\left(\sqrt{1 + \delta^2\mu^2}\right) y_x$ equal to ?

(a) $y_{x+2} - 2y_{x+1} + y_x$
(b) $y_{x+1} - y_{x-1}$
(c) $y_{x+1} + y_{x-1}$
(d) $y_{x+2} - y_x$

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Consider the following for the next two (02) items that follow :

It is given that $u_3 = 4{\cdot}8$, $u_4 = 8{\cdot}4$, $u_5 = 14{\cdot}5$, $u_6 = 23{\cdot}6$, $u_7 = 36{\cdot}2$, $u_8 = 52{\cdot}8$, $u_9 = 73{\cdot}9$.

51. What is the value of u_2 according to Newton-Gregory forward difference interpolation formula ?

(a) 3·1
(b) 3·2
(c) 3·3
(d) 3·4

52. What is the approximate value of $u_{8{\cdot}5}$ according to Newton-Gregory backward difference interpolation formula ?

(a) 62·75
(b) 64·75
(c) 66·75
(d) 68·75

53. Suppose $t_0 = 0 < t_1 < t_2 < \ldots t_n = 1$. If f is a continuous function and $f(t_i)$ are given for $0 \le i \le n$, which quadrature formula is applicable to compute $\int_0^1 f(x)\,dx$?

(a) Trapezoidal rule
(b) Simpson's one-third rule
(c) Simpson's three-eighth rule
(d) No quadrature formula

54. Let $f : [0, 1] \to \mathbb{R}$ be a continuous function. If $f\left(\frac{t}{10}\right)$ are given for t = 0, 1, 2, 3, 4, 5 and $f\left(\frac{t}{20}\right)$ are given for t = 11, 12, 13, ..., 20, which quadrature formula will one use to utilize the given data for the computation of $\int_0^1 f(x)\,dx$?

(a) Trapezoidal rule only
(b) Simpson's one-third rule only
(c) Simpson's three-eighth rule
(d) Trapezoidal rule or combination of Trapezoidal rule and Simpson's one-third rule

55. Consider the following for equi-spaced arguments with h as the interval of differencing :

1. $x^{(-r)} = \dfrac{2}{(x + rh)^{(r)}}$

2. $\Delta^m x^{(-r)} = r(r+1)(r+2)\ldots(r+m)h^m x^{(-r-m)}$ for $m \le r$

Which of the statements given above is/are correct ?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

56. Consider the following :

1. $\Delta(u_x v_x) = u_x \Delta v_x + v_{x+1} \Delta u_x$
2. $\Delta(u_x v_x) = v_x \Delta u_x + u_{x+1} \Delta v_x$

Which of the above equalities is/are valid ?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

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57. Euler's method is applied to the initial value problem $\frac{dy}{dx} = \lambda y$; $y(0) = 1$, $\lambda < 0$. Then, the method is stable (absolutely) for step size h that satisfies :

(a) $-2 < \lambda h < 2$

(b) $0 < \lambda h < 2$

(c) $-1 < \lambda h < 1$

(d) $-2 < \lambda h < 0$

58. The classical Runge-Kutta fourth order method is applied to $\frac{dy}{dx} = -y$; $y(0) = 1$. The result obtained after applying one step of length h is :

(a) $1 - h + \frac{h^2}{2}$

(b) $1 + h + \frac{h^2}{2} + \frac{h^3}{6} + \frac{h^4}{24}$

(c) $1 - h + \frac{h^2}{2} - \frac{h^3}{6} + \frac{h^4}{24}$

(d) $1 - h - \frac{h^2}{2} - \frac{h^3}{6} - \frac{h^4}{24}$

For the next two (02) items that follow :

Consider the series 12, 40, 90, 168, 280, 432, ... Let f(x) be the polynomial of least degree related to this series.

59. What is the degree of f(x) ?

(a) 2

(b) 3

(c) 4

(d) 5

60. What is the constant term in f(x) ?

(a) 0

(b) 1

(c) 8

(d) 12

61. Consider the following in respect of two kinds of microprocessors CISC (Complex Instruction Set Computer) and RISC (Reduced Instruction Set Computer) :

1. The instructions of CISC are of variable length.
2. RISC supports parallel processing.
3. AMO is based on RISC.

Which of the statements given above are correct ?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

62. Which of the following are audio file formats ?

1. MPEG
2. WAV
3. TIFF
4. WMA

Select the correct answer using the code given below :

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

63. The technique of dividing the physical memory space into multiple blocks is known as :

(a) Paging

(b) Segmentation

(c) Fragmentation

(d) Swapping

64. In TCP/IP reference model, consider the following protocols belonging to various layers :

1. SMPT
2. FTP
3. DHCP
4. IP
5. TCP

Which of the above are the Application Layer Protocols ?

(a) 1, 2 and 3

(b) 1, 3 and 4

(c) 1, 3 and 5

(d) 3, 4 and 5

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65. Consider the following statements regarding cache memory in the computer system :

1. The size of cache memory is always kept higher than the size of RAM.
2. Cache memory is faster to access than RAM but slower to access than CPU registers.
3. The effectiveness of cache memory is measured by hit rate.

Which of the statements given above are correct ?

(a) 1 and 3 only
(b) 2 and 3 only
(c) 1 and 2 only
(d) 1, 2 and 3

66. Which one of the following Operating Systems responds to an event within a predetermined time ?

(a) Time Sharing Operating System
(b) Embedded Operating System
(c) Real-time Operating System
(d) Batch Operating System

67. Consider the following statements :

1. In number system if $(110)_X = (1100)_2$, then the value of X is 3.
2. The gray coded equivalent of the binary number $(01010010)_2$ is (01111011).

Which of the statements given above is/are correct ?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

68. Division of a computer program in terms of functions and modules is one of the vital features of :

(a) Assembly language
(b) Machine language
(c) Structural language
(d) Low level language

69. Which of the following Operating Systems is an open source ?

(a) Windows 10
(b) iOS 16
(c) Linux
(d) MS-DOS

70. Consider the following statements :

1. TCP/IP is the communication protocol used in Internet.
2. A Network Interface Card (NIC) is used to connect a computer to Internet.
3. IP address is also known as hardware address that is assigned uniquely to every computer connected to the Internet.

Which of the statements given above are correct ?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

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71. Consider the following statements in respect of SQL :
1. SQL can execute queries against a database.
2. SQL can update records in a database.
3. SQL query automatically eliminates duplicates.
Which of the statements given above are correct ?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

72. Which of the following statements is/are correct ?
1. Encryption process converts cipher text into plain text.
2. Digital signature employs two keys – private key and public key.
3. Secret Key Cryptography uses a single key for both, encryption and decryption.
Select the correct answer using the code given below :
(a) 2 only
(b) 2 and 3 only
(c) 3 only
(d) 1, 2 and 3

73. A device that converts digital signal into analog signal and vice-versa is known as :
(a) Network switch
(b) Modem
(c) Network hub
(d) Network router

74. Which one of the following is the core component of UNIX ?
(a) Shell
(b) Kernel
(c) Process
(d) Directories

75. Which of the following devices are used for recognizing the characters in the supermarkets ?
(a) OCR device only
(b) OMR device only
(c) MICR device
(d) Both OCR and OMR devices

76. RISC processors are always preferred to CISC processors because of :
1. Compact size
2. Small instruction set
3. Executing multiple clock cycles
Which of the above are correct ?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

77. Which of the following algorithms are stable ?
1. Bubble sort
2. Quick sort
3. Merge sort
4. Insertion sort
Select the correct answer using the code given below :
(a) 1, 2 and 3
(b) 1, 2 and 4
(c) 1, 3 and 4
(d) 2, 3 and 4

78. Consider the following statements :
1. Steps for developing software program remain same irrespective of the Operating System.
2. If the program is using exp() function, then the object code of this function should be brought from the 'math' library of the system and linked to the main program.
Which of the statements given above is/are correct ?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

79. What is the equivalent hexadecimal number of the octal number 6251 ?
(a) 9CA
(b) AC9
(c) DB9
(d) CA9

80. Which of the following are Firewall Related Terminology ?
1. Gateway
2. Proxy server
3. Screening routers
Select the correct answer using the code given below :
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

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