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T.B.C. : YLO-U-DTSS

Test Booklet Series

IES/ISS EXAM,2018

Serial

1009189

TEST BOOKLET

STATISTICS

Paper I

A

Time Allowed : Two Hours ***Maximum Marks : 200***

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET ***DOES NOT*** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
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.
8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator ***only the Answer Sheet***. You are permitted to take away with you the Test Booklet.
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 (0·33)** 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.
    (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be **no penalty** for that question.

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1. Let A_1, A_2, A_3 and A_4 be independent events such that $P(A_1) = \frac{1}{2}$, $P(A_2) = \frac{1}{4}$, $P(A_3) = \frac{1}{8}$ and $P(A_4) = \frac{1}{16}$.
What is $P(A_1 \cup A_2 \cup A_3 \cup A_4)$ equal to ?

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

(b) $\frac{1023}{1024}$

(c) $\frac{709}{1024}$

(d) $\frac{315}{1024}$

2. A lot of 15 mobiles contains 4 defective mobiles. The mobiles are taken out one by one at random and examined. The examined ones are not put back. The probability that the ninth mobile examined is the last defective is

(a) $\frac{56}{195}$

(b) $\frac{8}{195}$

(c) $\frac{1}{7}$

(d) $\frac{24}{65}$

3. Let X be a random variable having probability density function

$$f(x) = \begin{cases} \frac{x}{2}, & 0 < x \leq 1 \\ \frac{1}{2}, & 1 < x \leq 2 \\ \frac{3-x}{3}, & 2 < x \leq 3 \end{cases}$$

What is $P(1{\cdot}5 < X \leq 2{\cdot}5 \mid X > 1)$ equal to ?

(a) $\frac{3}{8}$

(b) $\frac{1}{2}$

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

(d) $\frac{1}{4}$

4. The first of three urns contains 7 white and 10 black balls; the second urn contains 5 white and 12 black balls; and the third urn contains 17 white balls only. A person chooses an urn at random and draws a ball from it. The ball is white. What are the probabilities that the ball drawn is from the first, second and third urns respectively ?

(a) $\frac{7}{29}, \frac{6}{29}, \frac{18}{29}$

(b) $\frac{7}{29}, \frac{5}{29}, \frac{20}{29}$

(c) $\frac{7}{29}, \frac{5}{29}, \frac{17}{29}$

(d) None of the above

5. Let X and Y be jointly distributed with pdf

$$f(x, y) = \begin{cases} \frac{1+xy}{y}, & |x|<1, |y|<1 \\ 0, & \text{otherwise} \end{cases}$$

Which of the following statements is/are correct ?

1. X and Y are independent.
2. X^2 and Y^2 are independent.

Select the correct answer using the code given below :

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

6. Let X be a random variable with pdf

$$f(x) = \begin{cases} \frac{2}{x^3}, & x \geq 1 \\ 0, & x < 1 \end{cases}$$

Which one of the following statements is correct ?

(a) Both mean and variance exist.

(b) Mean exists but variance does not exist.

(c) Both mean and variance do not exist.

(d) Variance exists but mean does not exist.

7. Let X be a random variable following Binomial distribution with parameters n = 13 and p = 0·3. Consider the following statements :

1. Mode of the distribution of X is 3.
2. Distribution is negatively skewed.

Which of the above statement(s) is/are correct ?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

8. If X follows Normal distribution with mean 4 and variance 100, then the distribution of $Y = \frac{1}{2}\left(\frac{X-4}{10}\right)^2$ is

(a) Exponential with mean 4

(b) Chi square with one degree of freedom

(c) Gamma distribution with parameter 1/2

(d) Normal with mean 4 and variance 10

9. Let X and Y be independent gamma $G(\alpha_1, \beta)$ and $G(\alpha_2, \beta)$ random variables respectively. Then $X|(X+Y)$ is distributed as

(a) $G(\alpha_1 + \alpha_2, \beta)$

(b) $\beta_1(\alpha_1, \alpha_2)$

(c) $U(0, 1)$

(d) $G(\alpha_1, \alpha_2)$

10. For exponential distribution $f(x) = \theta e^{-\theta x}$; $x > 0$, consider the following statements :

1. Variance is greater than mean if $0 < \theta < 1$.
2. Variance is equal to mean if $\theta = 1$.
3. Variance is less than mean if $\theta > 1$.

Which of the above statements are correct ?

(a) 1 and 3 only

(b) 2 and 3 only

(c) 1 and 2 only

(d) 1, 2 and 3

11. A rod of length $2l$ is broken into two pieces at random. The mean and variance of the length of the shorter of the two pieces are respectively

(a) $\frac{l}{2}, \frac{l^2}{3}$

(b) $l, \frac{l^2}{3}$

(c) $\frac{l}{2}, \frac{l^2}{12}$

(d) $l, \frac{l^2}{12}$

12. The joint distribution function of X and Y is given by

$$F(x, y) = \begin{cases} (1 - e^{-x})(1 - e^{-y}); & \text{for } x > 0,\ y > 0 \\ 0; & \text{otherwise} \end{cases}$$

What is the value of $P(|X - Y| \leq 10)$?

(a) $(1 - e^{-10})$

(b) $\frac{1}{2}(1 - e^{-10})$

(c) $\left(1 - \frac{e^{-10}}{2}\right)$

(d) None of the above

13. The joint density function of X and Y is given by

$$f(x, y) = \begin{cases} 2e^{-x} e^{-2y}; & 0 < x < \infty, 0 < y < \infty \\ 0; & \text{otherwise} \end{cases}$$

What is the value of $P(X < Y)$?

(a) 1/3

(b) 1/2

(c) 1/4

(d) 1/6

14. The joint pdf of X and Y is given by

$$f(x, y) = \begin{cases} \frac{1}{3}(x + y); & 0 < x < 1,\ 0 < y < 2 \\ 0; & \text{elsewhere} \end{cases}$$

What is the value of $E[3X(X + 2Y)]$?

(a) $\frac{9}{2}$

(b) $\frac{29}{6}$

(c) $\frac{31}{6}$

(d) $\frac{11}{2}$

15. The joint probability distribution of X and Y is given by

Y \ X	− 1	0	1
− 1	1/6	1/3	1/6
0	0	0	0
1	1/6	0	1/6

Consider the following statements :

1. X and Y are independent random variables.
2. $Cov(X, Y) = 0$.

Which of the statement(s) given above is/are correct ?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

16. If the pdf of X is given by

$$f(x) = \begin{cases} 1+x, & -1 < x \le 0 \\ 1-x, & 0 < x < 1 \\ 0, & \text{elsewhere} \end{cases}$$

The random variables are defined as $U = X$ and $V = X^2$.

Consider the following statements :

1. $Cov(U, V) = 0$.
2. U and V are independent random variables.

Which of the above statement(s) is/are correct ?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

17. Suppose X and Y are two independent normal random variables with means 10, 5 and variances 9, 4 respectively. Define $Z = 4X - 5Y$. The moment generating function of Z [i.e. $M_Z(t)$] is given by

(a) $\exp[15t + 22t^2]$

(b) $\exp[15t - 22t^2]$

(c) $\exp[15t + 122t^2]$

(d) $\exp[15t - 122t^2]$

18. A fair die is thrown repeatedly until 3 or 4 appears. Let X denote the number of throws required. The probability generating function of X when $|s| < 3/2$ is given by the expression

(a) $P(s) = \dfrac{2s}{3-s}$

(b) $P(s) = \dfrac{s}{3-2s}$

(c) $P(s) = \dfrac{3-s}{2s}$

(d) $P(s) = \dfrac{3-2s}{s}$

19. The number of automobiles sold weekly at a certain dealership is a random variable with expected value 16 and variance 9. The probability that next week's sales are between 10 and 22 is at least

(a) 0·50

(b) 0·56

(c) 0·75

(d) 0·95

20. The pdf of random variable X is given by

$$f(x) = \begin{cases} \dfrac{kx^3}{(1+2x)^6}; & x > 0 \\ 0; & \text{otherwise} \end{cases}$$

The distribution of random variable $Y = \dfrac{2X}{1+2X}$ is β distribution of first kind with parameters :

(a) $m = 4, n = 2$

(b) $m = 5, n = 1$

(c) $m = 3, n = 3$

(d) $m = 5, n = 2$

21. Consider the following statements :

1. The weight of strawberry box is measured in interval scale.
2. Number of students admitted in each IIM in the year 2007 is cross-sectional data.
3. Bar code for items in departmental store is measured in nominal scale.

Which of the statements given above are correct ?

(a) 1 and 2 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

22. The minimum value of $Var(Y - aX)$, for all the values of 'a' is given by

(a) $\rho^2 \frac{Var(Y)}{Var(X)}$

(b) $\rho^2 \frac{Var(X)}{Var(Y)}$

(c) $\rho^2 Var(Y)$

(d) $(1 - \rho^2) Var(Y)$

23. For a certain frequency distribution, the numerical computation yields the following :

Mean = 62, Median = 65, Coefficient of skewness = – 0·3

The standard deviation is equal to

(a) 10

(b) 30

(c) 90

(d) 300

24. The data relating to smoking habits of father and son are given below :

1. Father is a smoker and so is son : 50
2. Father is a smoker, but not the son : 10
3. Father is not a smoker, but son is a smoker : 10
4. Father is not a smoker, son is not a smoker : 30

The coefficient of association between smoking habits of father and son is

(a) 0

(b) $\frac{7}{8}$

(c) $\frac{-7}{8}$

(d) $\frac{1}{4}$

25. Consider the following statements :

1. Two attributes A and B are said to be positively associated if the presence of one attribute A is accompanied by the presence of the other attribute B.
2. Two attributes A and B are said to be negatively associated if the presence of an attribute A ensures the absence of the other attribute B or vice versa.
3. Two attributes A and B are called independent in case the presence or absence of one attribute has linear relationship with the presence of the other attribute.

Which of the statements given above are correct ?

(a) 1, 2 and 3

(b) 1 and 2 only

(c) 1 and 3 only

(d) 2 and 3 only

26. If the joint pdf of (X, Y) is

$$f(x, y) = \begin{cases} \frac{1}{3} x^2 e^{-y(1+x)}; & x \geq 0,\ y \geq 0 \\ 0; & \text{otherwise} \end{cases}$$

then the regression equation of Y on X is

(a) $y = \frac{1}{1+x}$

(b) $y = \frac{x^2}{1+x}$

(c) $y = 1 + x$

(d) $y = \frac{x^2}{2(1+x)^2}$

27. Let $(X, Y) \sim BVN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$.

Consider the following statements :

1. X and Y are independent if and only if $\rho = 0$.
2. Every linear combination of X and Y is a normal variate.
3. The regression equation of Y on X and the regression equation of X on Y are linear and homoscedastic.

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

28. The correlation coefficient between the marks obtained in Mathematics and Statistics in First Semester Examination for a given set of 60 students is 0·65. After re-evaluation the marks in Mathematics of all the 60 students increased by 3 marks. The coefficient of correlation between the original marks in Statistics and the revised marks in Mathematics will be

(a) 0·60

(b) 0·65

(c) 0·70

(d) Almost 1

29. If the correlation coefficient of zero order in a set of 3 variates were equal to ρ each, then the multiple correlation $R^2_{1\cdot 23}$ is equal to

(a) ρ

(b) $\frac{2\rho^2}{1+\rho}$

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

(d) + 1

30. If r is the coefficient of correlation for a sample of N independent observations from a bivariate normal population with population coefficient of correlation zero, then $E(1 - r^2)^{-1}$ is

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

(b) $\frac{2(N-3)}{(N-4)}$

(c) 0

(d) 1

31. If the relation $ax_1 + bx_2 + cx_3 = 0$ holds for all sets of values of x_1, x_2 and x_3, then the partial correlation coefficient $r_{12\cdot3}$ is

(a) 0

(b) 1

(c) -1

(d) 0·5

32. If X_1, X_2, X_3 and X_4 are four uncorrelated random variables each with variance σ^2, then what is the value of the correlation coefficient between U and V where $U = X_1 + X_2 + X_3$ and $V = X_1 + X_2 + X_4$?

(a) 0

(b) 1

(c) $\frac{1}{3}$

(d) $\frac{2}{3}$

33. Let $(X_1, X_2, X_3, ..., X_n)$ be a random sample of size n from a uniform distribution U[– 3, 3]. The large sample distribution of $\sqrt{n}\,\bar{X}$ is

(a) N(0, 1)

(b) N(0, 3)

(c) $U\left[-\frac{3}{\sqrt{n}}, \frac{3}{\sqrt{n}}\right]$

(d) $U\left[-\frac{3}{n}, \frac{3}{n}\right]$

34. A normal population has a mean 0·1 and standard deviation 2·1. What is the probability that the mean of a sample of size 900 will be negative ?
[Given $P(0 < Z < 1{\cdot}43) = 0{\cdot}4236$]

(a) 0·0764

(b) 0·6408

(c) 0·6074

(d) 0·7046

35. Suppose that five random variables $(X_1, X_2, X_3, X_4, X_5)$ are independent and each has standard normal distribution. The random variable $\frac{C(X_1 + X_2)}{(X_3^2 + X_4^2 + X_5^2)^{1/2}}$ will have a t-distribution if the constant C is equal to

(a) $\frac{\sqrt{3}}{2}$

(b) $\sqrt{\frac{3}{2}}$

(c) $\frac{3}{2}$

(d) $\sqrt{\frac{2}{3}}$

36. If X is an F(m, n) random variable, where $m > 2$ and $n > 2$, then $E(X)E\left(\frac{1}{X}\right)$ equals

(a) $\frac{n(n-2)}{m(m-2)}$

(b) $\frac{m(m-2)}{n(n-2)}$

(c) $\frac{mn}{(m-2)(n-2)}$

(d) $\frac{m(n-2)}{n(m-2)}$

37. Which one of the following non-parametric tests is analogous to chi-square test of goodness of fit ?

(a) Mann-Whitney test

(b) Kolmogorov-Smirnov test

(c) Wilcoxon test

(d) Median test

38. Consider the following statements :

1. Normal distribution is a particular case of chi-square distribution with 1 degree of freedom.
2. All moments of order less than n of t-distribution with n degrees of freedom exist.
3. If a statistic t follows Student's t-distribution with n degrees of freedom, then t^2 follows F-distribution with (1, n) degrees of freedom.

Which of the statement(s) given above is/are correct ?

(a) 1 only

(b) 1 and 2 only

(c) 2 and 3 only

(d) 1, 2 and 3

39. For a random sample of size 2 from $N(0, \sigma^2)$ population, what is the value of $E[X_{(1)}]$, where $X_{(1)}$ is first order statistic ?

(a) $\frac{2\sigma}{\sqrt{\pi}}$

(b) $\frac{\sigma}{\pi}$

(c) $-\frac{\sigma}{\sqrt{\pi}}$

(d) $-\frac{\sigma}{\sqrt{2\pi}}$

40. If X_i, i = 1, 2, 3, ..., n are independent and identically distributed random variables with cdf $F(x) = x$, $0 \le x \le 1$, then the pdf g(r) of the range $R = X_{(n)} - X_{(1)}$ is

(a) $n(n-1)r^{n-2}(1-r)$

(b) $n(n-1)r(1-r)^{n-2}$

(c) nr^{n-1}

(d) $(n-1)r^{n-2}$

41. Given the data f(1) = 12, f(2) = 40, f(3) = 90, f(4) = 168, f(5) = 280, f(6) = 432. The degree of the polynomial f(x) is at least

(a) 2

(b) 3

(c) 4

(d) 5

42. The polynomial function $f(x) = x^3$ can be represented as factorial polynomial $f(x) = Ax^{(3)} + Bx^{(2)} + Cx + D$ when interval of differencing is h = 2. The values of A, B, C and D are respectively

(a) 1, 2, 6 and 0

(b) 1, 6, 4 and 0

(c) 2, 4, 6 and 0

(d) 2, 2, 6 and 1

43. The n^{th} divided difference of an n^{th} degree polynomial is

(a) A variable

(b) A constant

(c) Zero

(d) None of the above

44. The Runge-Kutta method of order four is used to solve the initial value problem $\frac{dy}{dx} = f(x)$, $y(0) = 0$ with step size h. Then the solution at $x = h$ is given by

(a) $y(h) = \frac{h}{6}\left[3f(0) + f\left(\frac{h}{2}\right) + 3f(h)\right]$

(b) $y(h) = \frac{h}{6}[f(0) + 5f(h)]$

(c) $y(h) = \frac{h}{6}\left[f(0) + 3f\left(\frac{h}{2}\right) + 2f(h)\right]$

(d) $y(h) = \frac{h}{6}\left[f(0) + 4f\left(\frac{h}{2}\right) + f(h)\right]$

45. The images f(n) of $n \in \{1, 2, 3, \ldots, 99\} \setminus \{50\}$ are given. If you have to estimate the image of 50 using forward difference table, then your hypothesis is

(a) f is a polynomial of degree 50

(b) f is a polynomial of degree 99

(c) f is a polynomial of degree 98

(d) f is a polynomial of degree not more than 97

46. Consider the following table :

x	1	2	3	4	5
f(x)	2	5	7	α	32

The missing term α in the above table is

(a) 14

(b) 15

(c) 16

(d) 17

47. If $u_{10} = 9$, $u_{20} = 39$, $u_{30} = 74$, $u_{40} = 116$ and $u_{50} = 167$, then the value of $E^{3/2}(u_{10})$ is

(a) 35·75

(b) 45·75

(c) 55·75

(d) 65·75

48. The value of k that satisfies the equation $\Delta^2(1 + k\Delta^3)0^5 = 630$ is

(a) 4

(b) 5

(c) 6

(d) 7

49. Consider the following statements (Given that interval of differencing is 1) :

1. $(E - 2)^2 (x2^x) = 0$.
2. $(E - 3)^3 (x3^x) \neq 0$.

Which of the statement(s) given above is/are correct ?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

50. The following table gives the population (in lakhs) of a town in certain years.

Year	*Population (in lakhs)*
1971	0·9
1981	1·2
1991	1·5
2001	1·9
2011	2·5

The population P_{2006} (in lakhs) in 2006 is estimated by Newton's forward difference formula. Which one of the following is correct ?

(a) $P_{2006} < 2$

(b) $2 < P_{2006} < 2·1$

(c) $2·1 < P_{2006} < 2·2$

(d) $2·2 < P_{2006} < 2·3$

51. Consider the following table :

x	2	3	α	5
f(x)	4	5	16	25

The missing value α of the argument in the above table is estimated by Lagrange interpolation formula. Which one of the following is correct ?

(a) $3·5 < \alpha < 4$

(b) $\alpha = 4$

(c) $4 < \alpha < 4·2$

(d) $4·2 < \alpha < 4·5$

52. If δ and μ are the central difference and average operator respectively, then $\delta[f(x)g(x)]$ is equal to

(a) $\mu f(x)\mu g(x) + \delta f(x)\delta g(x)$

(b) $\delta f(x)\delta g(x) - \mu f(x)\mu g(x)$

(c) $\mu f(x)\delta g(x) - \mu g(x)\delta f(x)$

(d) $\mu f(x)\delta g(x) + \mu g(x)\delta f(x)$

53. If $f(x) = \frac{1}{x}$, then the third divided difference $\underset{b,c,d}{\overset{3}{\Delta}} f(a)$ is equal to

(a) $\frac{1}{abcd}$

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

(c) $\frac{a-d}{ad}$

(d) $\frac{1}{ad} - \frac{1}{bc}$

54. The equality $f(n^2) = n^3$ holds for n = 1, 2, 3. Then f(3) is given by Lagrange's interpolation as

(a) 4·9

(b) 5·1

(c) 5·3

(d) 5·5

55. The central difference δ is equivalent to which of the following ?

1. $2\sinh\left(\frac{hD}{2}\right)$

2. $E^{-1/2}\,\Delta$

3. $\Delta(1+\Delta)^{-1/2}$

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

56. Consider the following statements regarding quadrature formulae :

1. Geometrically Simpson's one-third rule implies that we have replaced the graph of the given function by n/2 arcs of second degree polynomials.
2. Weddle's rule gives an exact result when f(x) is a polynomial of degree 6 or less.

Which of the statement(s) given above is/are correct ?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

57. If an integral is computed using Simpson's three-eighth rule dividing the range into three equal parts, then the value of the integral $\int_0^{\frac{1}{2}} \sin \pi x \, dx$ is

(a) $\frac{3(1+\sqrt{2})}{32}$

(b) $\frac{5+3\sqrt{3}}{32}$

(c) $\frac{3+5\sqrt{3}}{32}$

(d) $\frac{3\sqrt{3}}{8}$

58. The formula $\alpha f\left(-\frac{1}{2}\right) + \beta f(0) + \gamma f\left(\frac{1}{2}\right)$ which approximates the integral $\int_{-1}^{1} f(x)\,dx$ is exact for every polynomial of degree less than 3. Then which one of the following is correct ?

(a) $\alpha = \gamma = \frac{4}{3},\ \beta = -\frac{2}{3}$

(b) $\alpha = \gamma = \frac{1}{3},\ \beta = 0$

(c) $\alpha = \gamma = \frac{4}{3},\ \beta = 1$

(d) $\alpha = \beta = \gamma$

59. If the integral is computed using Trapezoidal rule by dividing the range into ten equal parts, then the value of $\int_0^{10} 2^x \, dx$ belongs to

(a) (1400, 1450)

(b) (1450, 1500)

(c) (1500, 1550)

(d) (1550, 1600)

60. For the initial value problem $\frac{dy}{dx} = \frac{y}{x^2}$, $y(1) = 1$, approximations y_1 and y_2 are computed using Picard's method with $y_0 = y(1)$. Then the constant terms of $y_1(x)$ and $y_2(x)$ are respectively

(a) 1, 1

(b) 2, 2

(c) $2, \frac{3}{2}$

(d) None of the above

61. Consider the following statements :

1. ALU is a component of Control Unit.
2. CPU is a component of Control Unit.
3. Control Unit is not a component of ALU.
4. ALU is a component of CPU.

Which of the above statement(s) is/are correct ?

(a) 4 only

(b) 3 and 4 only

(c) 1 and 3 only

(d) 2, 3 and 4

62. Conversion of octal number 325·12 into its decimal number will be

(a) 532·123

(b) 213·15625

(c) 213·56121

(d) 124·123

63. A system consists of 1024 memory locations and each location can store 8 bits. How many number of address lines are required to address ?

(a) 8

(b) 10

(c) 16

(d) 1024

64. The core component of UNIX is

(a) Command shell

(b) Kernel

(c) Directories and programs

(d) None of the above

65. Consider signed magnitude, 1's complement and 2's complement representation of negative integers in computers. Generally 2's complement is used because

1. More numbers can be stored in 2's complement
2. Arithmetic operations can be performed faster
3. It is easy to represent negative numbers in 2's complement

Which of the 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 is the correct normalised form for 11·234 ?

(a) 11·234
(b) ·11234E + 2
(c) ·011234E + 1
(d) 1·1234E × 10

67. The maximum decimal integer number that can be stored in memory of 8 bit word processor computer is

(a) $(128)_{10}$
(b) $(127)_{10}$
(c) $(129)_{10}$
(d) $(130)_{10}$

68. Which of the following are ***not*** bitwise operators ?

1. &&
2. &
3. >>
4. !
5. %

Select the correct answer using the code given below :

(a) 2 and 3 only
(b) 1, 3, 4 and 5
(c) 1, 2 and 5
(d) 1, 4 and 5

69. Which type of memory is the auxiliary memory ?

(a) SRAM
(b) Magnetic tape
(c) Flash ROM
(d) Cache memory

70. Which one of the following statements is correct ?

(a) Compiler translates and executes instructions simultaneously.
(b) Interpreter translates and executes the instructions simultaneously.
(c) Interpreter can only translate machine language programs.
(d) None of the above

71. Consider the following code :

```
While (x! = y)
{
        if (x > y)
        x = x – y
        else
        y = y – x
}
```

What does the above code do ?

(a) It computes x mod y using repeated subtraction

(b) It computes x ÷ y using repeated subtraction

(c) It computes the greatest common divisor of x and y

(d) It computes the least common multiple of x and y

72. Consider the following statements :

1. Array is a collection of data elements of same type.
2. Strings are character arrays in which each character is stored using one byte in memory.
3. Array can store different types of elements.
4. Strings can be data array also.

Which of the above statements are correct ?

(a) 1 and 3 only

(b) 1 and 2 only

(c) 3 and 4 only

(d) 1, 2, 3 and 4

73. Consider the following statements :

1. Weighted 4-bit BCD code is known as 1246 weighted code.
2. Octal system is also known as base-8 system.
3. Octal system is known as base-2 system.
4. Weighted 4-bit BCD code is known as 8421 weighted code.

Which of the above statement(s) is/are correct ?

(a) 2 only

(b) 3 and 4 only

(c) 1 and 2 only

(d) 2 and 4 only

74. The maximum permissible integer in a computer with n-bit word processor and one word per integer is equal to

(a) $2^n - 1$

(b) $2^{n-1} - 1$

(c) $2^{n-1} + 1$

(d) $2^n + 1$

75. Which operators follow right to left order of precedence ?

1. Unary operator
2. Assignment operator
3. Logical operator
4. Bit manipulation operator

Select the correct answer using the code given below :

(a) 1 and 2 only

(b) 1, 2 and 4

(c) 3 and 4 only

(d) 1 only

76. Compiler can diagnose

(a) Grammatical errors only

(b) Logical errors only

(c) Both grammatical and logical errors

(d) Neither grammatical errors nor logical errors

77. A software program that cannot be changed easily and is stored in a ROM is known as

(a) Hardware

(b) Firmware

(c) Linker

(d) Editor

78. A computer program can run successfully even if there is

(a) Syntax error

(b) Logical error

(c) Run-time error

(d) None of the above

79. A disc storage has 16 data-recording surfaces. Number of tracks per surface is 256 and number of sectors per track is 16. Bytes per sector are 512. What is storage capacity of the disc system ?

(a) 3325652 bytes

(b) 3256662 bytes

(c) 33554432 bytes

(d) 335444332 bytes

80. Which one of the following is a low-level programming language ?

(a) FORTRAN

(b) Machine language

(c) COBOL

(d) C

SPACE FOR ROUGH WORK

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