(CSE)

COMPUTER SCIENCE AND ENGINEERING

INSTRUCTIONS TO CANDIDATES

1. Candidates should write their Hall Ticket Number only in the space provided at the top left hand corner of this page, on the leaflet attached to this booklet and also in the space provided on the OMR Response Sheet. **BESIDES WRITING, THE CANDIDATE SHOULD ENSURE THAT THE APPROPRIATE CIRCLES PROVIDED FOR THE HALL TICKET NUMBERS ARE SHADED USING H.B. PENCIL ONLY ON THE OMR RESPONSE SHEET. DO NOT WRITE HALL TICKET NUMBER ANY WHERE ELSE.**
2. Immediately on opening this Question Paper Booklet, check:
   (a) Whether **200** multiple choice questions are printed (**50** questions in Mathematics, **25** questions in Physics, **25** questions in Chemistry and **100** questions in Engineering)
   (b) In case of any discrepancy immediately exchange the Question paper Booklet of same code by bringing the error to the notice of invigilator.
3. Use of Calculators, Mathematical Tables and Log books is not permitted.
4. **Candidate must ensure that he/she has received the Correct Question Booklet, corresponding to his/her branch of Engineering.**
5. **Candidate should ensure that the booklet Code and the Booklet Serial Number, as it appears on this page is entered at the appropriate place on the OMR Response Sheet by shading the appropriate circles provided therein using H.B. pencil only. Candidate should note that if they fail to enter the Booklet Serial Number and the Booklet Code on the OMR Response Sheet, their Answer Sheet will not be valued.**
6. **Candidate shall shade one of the circles 1, 2, 3 or 4 corresponding question on the OMR Response Sheet using H.B. Pencil only. Candidate should note that their OMR Response Sheet will be invalidated if the circles against the question are shaded using Black / Blue ink pen / Ball pen / any other pencil other than H.B. Pencil or if more than one circle is shaded against any question.**
7. One mark will be awarded for every correct answer. **There are no negative marks.**
8. The OMR Response Sheet will not be valued if the candidate :
   (a) Writes the Hall Ticket Number in any part of the OMR Response Sheet except in the space provided for the purpose.
   (b) Writes any irrelevant matter including religious symbols, words, prayers or any communication whatsoever in any part of the OMR Response Sheet.
   (c) Adopts any other malpractice.
9. Rough work should be done only in the space provided in the Question Paper Booklet.
10. No loose sheets or papers will be allowed in the examination hall.
11. Timings of Test: 10.00 A.M. to 1.00 P.M.
12. Candidate should ensure that he / she enters his / her name and appends signature on the Question paper booklet, leaflet attached to this question paper booklet and also on the OMR Response Sheet in the space provided. Candidate should ensure that the invigilator puts his signature on this question paper booklet, leaflet attached to the question paper booklet and also on the OMR Response Sheet.
13. Before leaving the examination hall candidate should **return both the OMR Response Sheet and the leaflet attached to this question paper booklet** to the invigilator. Failure to return any of the above shall be construed as malpractice in the examination. **Question paper booklet may be retained by the candidate.**
14. This booklet contains a total of **32** pages including Cover page and the pages for Rough Work.

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*Note: (1) Answer **all** questions.*

*(2) Each question carries **1** mark. There are no negative marks.*

(3) Answer to the questions must be entered only on OMR Response Sheet provided separately by completely shading with H.B. Pencil, only one of the circles 1, 2, 3 or 4 provided against each question, and which is most appropriate to the question.

(4) The OMR Response Sheet will be invalidated if the circle is shaded using ink / ball pen or if more than one circle is shaded against each question.

MATHEMATICS

1. If $A=\begin{bmatrix}3 & 0 & 0\\ 0 & 3 & 0\\ 0 & 0 & 3\end{bmatrix}$, then $A^4=$

(1) 3I (2) 9I (3) 27I (4) 81I

2. If $A=\begin{bmatrix}0 & 2 & 1\\ -2 & 0 & -2\\ -1 & x & 0\end{bmatrix}$ is a skew symmetric matrix, then the value of x is

(1) 1 (2) 2 (3) 3 (4) 4

3. What is the number of all possible matrices with each entry as 0 or 1 if the order of matrices is 3×3

(1) 64 (2) 268 (3) 512 (4) 256

4. If $A=\begin{bmatrix}1 & i & -i\\ i & -i & 1\\ -i & 1 & i\end{bmatrix}$, then $|A|=$

(1) 1 (2) 2 (3) 3 (4) 4

5. The solution of a system of linear equations $2x-y+3z=9, x+y+z=6, x-y+z=2$ is

(1) $x=-1, y=-2, z=-3$ (2) $x=3, y=2, z=1$

(3) $x=2, y=1, z=3$ (4) $x=1, y=2, z=3$

6. If $\frac{1}{x^2+a^2}=\frac{A}{x+ai}+\frac{B}{x-ai}$ then A = _____, B = _____.

(1) $\frac{1}{2ai}, -\frac{1}{2ai}$ (2) $-\frac{1}{2ai}, \frac{1}{2ai}$ (3) $\frac{1}{ai}, -\frac{1}{ai}$ (4) $-\frac{1}{ai}, \frac{1}{ai}$

7. If $\frac{2x+4}{(x-1)^3}=\frac{A_1}{(x-1)}+\frac{A_2}{(x-1)^2}+\frac{A_3}{(x-1)^3}$ then $\sum_{i=1}^{3} A_i$ is equal to

(1) A_2 (2) $2A_2$ (3) $4A_2$ (4) $4A_1$

8. The period of the function $f(x) = |\sin x|$ is

(1) π (2) 2π (3) 3π (4) 4π

9. If A+B=45°, then (1−cotA) . (1−cotB) is

(1) 1 (2) 0 (3) 2 (4) −1

10. The value of sin 78° + cos 132° is

(1) $\frac{\sqrt{5}+1}{4}$ (2) $\frac{\sqrt{5}+1}{2}$ (3) $\frac{\sqrt{5}-1}{2}$ (4) $\frac{\sqrt{5}-1}{4}$

11. If A+B+C = π, then sin2A + sin2B + sin2C =

(1) 4 cosA sinB cosC (2) 4 sinA cosB sinC

(3) 4 cosA cosB cosC (4) 4 sinA sinB sinC

12. The principal solution of Tanx = 0 is

(1) $x = n\pi, n\in Z$ (2) $x=0$

(3) $x=(2n+1)\,\pi/2, n\in Z$ (4) $x = n\pi+\alpha, n\in Z$

13. The value of $\text{Tan}^{-1}(2) + \text{Tan}^{-1}(3)$ is

(1) $\frac{\pi}{4}$ (2) $\frac{\pi}{2}$ (3) $\frac{\pi}{3}$ (4) $\frac{3\pi}{4}$

14. If the sides of a right angle triangle are in A.P., then the ratio of its sides is

(1) 1:2:3 (2) 2:3:4 (3) 3:4:5 (4) 4:5:6

15. The value of $r.r_1.r_2.r_3$ is

(1) Δ^2 (2) Δ^{-2} (3) Δ^{-3} (4) Δ^4

16. $\frac{1}{r1}+\frac{1}{r2}+\frac{1}{r3}=$

(1) $\frac{1}{r}$ (2) $\frac{1}{2r}$ (3) $\frac{1}{R}$ (4) $\frac{1}{\Delta}$

17. If $a=6$, $b=5$, $c=9$, then the value of angle A is

(1) $\cos^{-1}(2/9)$ (2) $\cos^{-1}(2/5)$ (3) $\cos^{-1}(7/9)$ (4) $\cos^{-1}(1/3)$

18. The polar form of complex number $1-i$ is

(1) $\sqrt{2}\,e^{-i\pi/4}$ (2) $\sqrt{2}\,e^{i\pi/4}$ (3) $\sqrt{2}\,e^{i\pi/2}$ (4) $\sqrt{2}\,e^{-i\pi/2}$

19. If 1, ω, ω^2 be the cube roots of unity, then the value of $2^{\omega^3}.2^{\omega^5}.2^{\omega}$ is

(1) ω (2) ω^2 (3) 1 (4) 0

20. The intercept made on X-axis by the circle $x^2+y^2+2gx+2fy+c = 0$ is

(1) $\sqrt{g^2-c}$ (2) $\sqrt{f^2-c}$ (3) $2.\sqrt{g^2-c}$ (4) $2.\sqrt{f^2-c}$

21. If one end of the diameter of the circle $x^2+y^2-5x-8y+13 = 0$ is (2, 7), then the other end of the diameter is

(1) (3, 1) (2) (1, 3) (3) (–3, –1) (4) (–1, –3)

22. The radius of the circle $\sqrt{1+m^2}(x^2+y^2)-2cx-2mcy=0$ is
(1) $2c$ (2) $4c$ (3) $c/2$ (4) c

23. The parametric equations of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ are
(1) $x=a\sec\theta, y=b\tan\theta$ (2) $x=b\sin\theta, y=a\cos\theta$
(3) $x=a\cos\theta, y=b\sin\theta$ (4) $x=a\operatorname{cosec}\theta, y=b\cot\theta$

24. The equation of the directrix of the parabola $2x^2=-7y$ is
(1) $8y+7=0$ (2) $8y-7=0$ (3) $7y+8=0$ (4) $8x-7=0$

25. The condition for a straight line $y=mx+c$ to be a tangent to the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ is
(1) $c=a/m$ (2) $c^2=a^2m^2-b^2$ (3) $c^2=a^2m^2+b^2$ (4) $c^2=a/m$

26. $\underset{x\to 1}{Lt}\ \frac{\sqrt{5x-4}-\sqrt{x}}{x-1}$ is
(1) 3 (2) 2 (3) 4 (4) 1

27. $\log i =$
(1) $\pi/2$ (2) $\pi/4$ (3) $i\pi/2$ (4) $i\pi/4$

28. $\frac{d}{dx}[\log_7 X]=$
(1) $\frac{1}{x}$ (2) $X\log_7^e$ (3) $\frac{1}{x}\log_e^7$ (4) $\frac{1}{x}\log_7^e$

29. $\frac{d}{dx}[2\cosh x]=$
(1) $\frac{e^x+e^{-x}}{2}$ (2) $\frac{e^x-e^{-x}}{2}$ (3) e^x+e^{-x} (4) e^x-e^{-x}

30. $\frac{d}{dx}\left[\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\right]=$

(1) $\frac{1}{1+x^2}$ (2) $\frac{-1}{1+x^2}$ (3) $\frac{2}{1+x^2}$ (4) $\frac{-2}{1+x^2}$

31. If $x = at^2, y = 2at$, then $\frac{dy}{dx}=$

(1) $\sqrt{\frac{y}{x}}$ (2) $\sqrt{\frac{x}{a}}$ (3) $\sqrt{\frac{a}{x}}$ (4) $\sqrt{\frac{x}{y}}$

32. The derivative of e^x with respect to $\sqrt{x}$ is

(1) $\frac{2\sqrt{x}}{e^x}$ (2) $2\sqrt{x}\,e^x$ (3) $\frac{e^x}{2\sqrt{x}}$ (4) $\sqrt{x}.e^x$

33. The equation of the normal to the curve $y = 5x^4$ at the point (1, 5) is

(1) $x + 20y = 99$ (2) $x + 20y = 101$ (3) $x - 20y = 99$ (4) $x - 20y = 101$

34. The angle between the curves $y^2 = 4x$ and $x^2 + y^2 = 5$ is

(1) $\frac{\pi}{4}$ (2) $\tan^{-1}(2)$ (3) $\tan^{-1}(3)$ (4) $\tan^{-1}(4)$

35. If $u = x^3y^3$ then $\frac{\partial^3 u}{\partial x^3}+\frac{\partial^3 u}{\partial y^3}=$

(1) $6\,(x^3+y^3)$ (2) $6\,x^3\,y^3$ (3) $6x^3$ (4) $6y^3$

36. $\int \operatorname{cosec} x\,dx=$

(1) $\log(\operatorname{cosec} x + \cot x) + C$ (2) $\log(\cot x/2) + C$

(3) $\log(\tan x/2) + C$ (4) $-\operatorname{cosec} x.\cot x + C$

37. $\int_0^{\frac{\pi}{2}} \cos^{11} x \, dx =$

(1) $\frac{256}{693}$ (2) $\frac{256\pi}{693}$ (3) $\frac{\pi}{4}$ (4) $\frac{128}{693}$

38. $\int f'(x)[f(x)]^n dx =$

(1) $\frac{[f(x)]^{n-1}}{n-1}+C$ (2) $\frac{[f(x)]^{n+1}}{n+1}+C$ (3) $n[f(x)]^{n-1}+C$ (4) $(n+1)[f(x)]^{n+1}+C$

39. $\int \frac{dx}{(x+7)\sqrt{x+6}} =$

(1) $Tan^{-1}(\sqrt{x+6})+C$ (2) $2Tan^{-1}(\sqrt{x+6})+C$

(3) $Tan^{-1}(x+7)+C$ (4) $2Tan^{-1}(x+7)+C$

40. $\int \tan^{-1} x \, dx =$

(1) $x.Tan^{-1}x+\frac{1}{2}\log(1+x^2)+C$ (2) $\frac{1}{1+x^2}+C$

(3) $x^2.Tan^{-1}x+C$ (4) $x.Tan^{-1}x-\log\sqrt{1+x^2}+C$

41. $\int \frac{dx}{1+e^{-x}} =$

(1) $\log(1+e^{-x})+C$ (2) $\log(1+e^{x})+C$

(3) $e^{-x}+C$ (4) $e^{x}+C$

42. $\int_{\frac{-\pi}{2}}^{\frac{\pi}{2}} \sin|x| \, dx =$

(1) 0 (2) 1 (3) 2 (4) −1

43. Area under the curve $f(x) = \sin x$ in $[0, \pi]$ is
(1) 4 sq. units (2) 2 sq. units (3) 6 sq. units (4) 8 sq. units

44. The order of $x^3\frac{d^3y}{dx^3} + 2x^2\frac{d^2y}{dx^2} - 3y = x$ is
(1) 1 (2) 4 (3) 3 (4) 2

45. The degree of $\left[\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}} = a\frac{d^2y}{dx^2}$ is
(1) 4 (2) 2 (3) 1 (4) 3

46. The family of straight lines passing through the origin is represented by the differential equation
(1) $ydx + xdy = 0$ (2) $xdy - ydx = 0$ (3) $xdx + ydy = 0$ (4) $xdx - ydy = 0$

47. The differential equitation $\frac{dy}{dx} + \frac{ax + hy + g}{hx + by + f} = 0$ is called
(1) Homogeneous (2) Exact (3) Linear (4) Legender

48. The solution of differential equation $\frac{dy}{dx} = e^{-x^2} - 2xy$ is
(1) $y.e^{-x^2} = x + c$ (2) $ye^x = x + c$ (3) $ye^{x^2} = x + c$ (4) $y = x + c$

49. The complementary function of $(D^3+D^2+D+1)\,y = 10$ is
(1) $C_1\cos x + C_2\sin x + C_3e^{-x}$ (2) $C_1\cos x + C_2\sin x + C_3e^x$
(3) $C_1 + C_2\cos x + C_3\sin x$ (4) $(C_1 + C_2x + C_3x^2)\,e^x$

50. Particular Integral of $(D-1)^4y = e^x$ is
(1) x^4e^x (2) $\frac{x^4}{24}e^{-x}$ (3) $\frac{x^4}{12}e^x$ (4) $\frac{x^4}{24}e^x$

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PHYSICS

51. Two quantities A and B are related by the relation A/B = m where m is linear mass density and A is force. The dimensions of B will be
(1) same as that of latent heat (2) same as that of pressure
(3) same as that of work (4) same as that of momentum

52. The dimensional formula of capacitance in terms of M, L, T and I is
(1) $[ML^2T^2I^2]$ (2) $[ML^{-2}T^4I^2]$ (3) $[M^{-1}L^3T^3I]$ (4) $[M^{-1}L^{-2}T^4I^2]$

53. If l, m and n are the direction cosines of a vector, then
(1) $l+m+n=1$ (2) $l^2+m^2+n^2=1$ (3) $\frac{1}{l}+\frac{1}{m}+\frac{1}{n}=1$ (4) $lmn=1$

54. The angle between i+j and j+k is
(1) 0° (2) 90° (3) 45° (4) 60°

55. A particle is moving eastwards with a velocity of 5 ms^{-1}. In 10 seconds the velocity changes to 5 ms^{-1} northwards. The average acceleration in this time is
(1) $\frac{1}{\sqrt{2}}$ ms^{-2} towards north-west (2) zero
(3) $\frac{1}{2}$ ms^{-2} towards north (4) $\frac{1}{\sqrt{2}}$ ms^{-2} towards north-east

56. The linear momentum of a particle varies with time t as $p = a+bt+ct^2$ which of the following is correct?
(1) Force varies with time in a quadratic manner.
(2) Force is time-dependent.
(3) The velocity of the particle is proportional to time.
(4) The displacement of the particle is proportional to t.

57. A shell of mass m moving with a velocity v suddenly explodes into two pieces. One part of mass $m/4$ remains stationary. The velocity of the other part is
(1) v (2) $2v$ (3) $3v/4$ (4) $4v/3$

58. The velocity of a freely falling body after 2s is
(1) 9.8 ms^{-1} (2) 10.2 ms^{-1} (3) 18.6 ms^{-1} (4) 19.6 ms^{-1}

59. A large number of bullets are fired in all directions with the same speed u. The maximum area on the ground on which these bullets will spread is
(1) $\frac{\pi u^2}{g^2}$ (2) $\frac{\pi u^4}{g^2}$ (3) $\frac{\pi u^2}{g^4}$ (4) $\frac{\pi u}{g^4}$

60. The minimum stopping distance for a car of mass m, moving with a speed v along a level road, if the coefficient of friction between the tyres and the road is μ, will be
(1) $\frac{v^2}{2\mu g}$ (2) $\frac{v^2}{\mu g}$ (3) $\frac{v^2}{4\mu g}$ (4) $\frac{v}{2\mu g}$

61. When a bicycle is in motion, the force of friction excreted by the ground on the two wheels is such that it acts
(1) In the backward direction on the front wheel and in the forward direction on the rear wheel
(2) In the forward direction on the front wheel and in the backward direction on the rear wheel
(3) In the backward direction on both the front and the rear wheels
(4) In the forward direction on both the front and the rear wheels

62. In a perfectly inelastic collision, the two bodies
(1) strike and explode (2) explode without striking
(3) implode and explode (4) combine and move together

63. Under the action of a constant force, a particle is experiencing a constant acceleration, then the power is
(1) zero (2) positive
(3) negative (4) increasing uniformly with time

64. Consider the following two statements:

A : Linear momentum of a system of particles is zero.

B : Kinetic energy of a system of particles is zero.

Then

(1) A implies B & B implies A
(2) A does not imply B & B does not imply A
(3) A implies B but B does not imply A
(4) A does not imply B but B implies A

65. An engine develops 10 kW of power. How much time will it take to lift a mass of 200 kg to a height of 40 m? (Given $g = 10\ ms^{-2}$)

(1) 4s (2) 5s (3) 8s (4) 10s

66. If a spring has time period T, and is cut into n equal parts, then the time period will be

(1) $T\sqrt{n}$ (2) $\frac{T}{\sqrt{n}}$ (3) nT (4) T

67. When temperature increases, the frequency of a tuning fork

(1) increases
(2) decreases
(3) remains same
(4) increases or decreases depending on the materials

68. If a simple harmonic motion is represented by $\frac{d^2x}{dy^2}+\alpha x=0$, its time period is

(1) $2\pi\sqrt{\alpha}$ (2) $2\pi\alpha$ (3) $\frac{2\pi}{\sqrt{\alpha}}$ (4) $\frac{2\pi}{\alpha}$

69. A cinema hall has volume of 7500 m^3. It is required to have reverberation time of 1.5 seconds. The total absorption in the hall should be

(1) 850 w-m^2 (2) 82.50 w-m^2 (3) 8.250 w-m^2 (4) 0.825 w-m^2

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70. To absorb the sound in a hall which of the following are used
(1) Glasses, stores
(2) Carpets, curtains
(3) Polished surfaces
(4) Platforms

71. If N represents avagadro's number, then the number of molecules in 6 gm of hydrogen at NTP is
(1) 2N (2) 3N (3) N (4) N/6

72. The mean translational kinetic energy of a perfect gas molecule at the temperature T K is
(1) $\frac{1}{2}kT$ (2) kT (3) $\frac{3}{2}kT$ (4) $2kT$

73. The amount of heat given to a body which raises its temperature by 1°C
(1) water equivalent
(2) thermal heat capacity
(3) specific heat
(4) temperature gradient

74. During an adiabatic process, the pressure of a gas is found to be proportional to the cube of its absolute temperature. The ratio *Cp/Cv* for gas is
(1) $\frac{3}{2}$ (2) $\frac{4}{3}$ (3) 2 (4) $\frac{5}{3}$

75. Cladding in the optical fiber is mainly used to
(1) to protect the fiber from mechanical stresses
(2) to protect the fiber from corrosion
(3) to protect the fiber from mechanical strength
(4) to protect the fiber from electromagnetic guidance

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CHEMISTRY

76. The valency electronic configuration of Phosphorous atom (At.No. 15) is
(1) $3s^2\ 3p^3$ (2) $3s^1\ 3p^3\ 3d^1$ (3) $3s^2\ 3p^2\ 3d^1$ (4) $3s^1\ 3p^2\ 3d^2$

77. An element 'A' of At.No.12 combines with an element 'B' of At.No.17. The compound formed is
(1) covalent AB (2) ionic AB_2 (3) covalent AB_2 (4) ionic AB

78. The number of neutrons present in the atom of $_{56}Ba^{137}$ is
(1) 56 (2) 137 (3) 193 (4) 81

79. Hydrogen bonding in water molecule is responsible for
(1) decrease in its freezing point (2) increase in its degree of ionization
(3) increase in its boiling point (4) decrease in its boiling point

80. In the HCl molecule, the bonding between hydrogen and chlorine is
(1) purely covalent (2) purely ionic (3) polar covalent (4) complex coordinate

81. Potassium metal and potassium ions
(1) both react with water (2) have the same number of protons
(3) both react with chlorine gas (4) have the same electronic configuration

82. 5.85 gms of sodium chloride were dissolved in water and the solution made upto 100 ml in a standard flask. 10 ml of this solution were pipetted out into another flask and made up with distilled water into 100 ml of solution. The concentration of the sodium chloride solution now is
(1) 0.1 M (2) 1.0 M (3) 0.5 M (4) 0.25 M

83. Concentration of a 1.0 M solution of phosphoric acid in water is
(1) 0.33 N (2) 1.0 N (3) 2.0 N (4) 3.0 N

84. Which of the following is a Lewis acid?
(1) Ammonia (2) Berylium chloride
(3) Boron trifluoride (4) Magnesium oxide

85. Which of the following constitutes the components of a buffer solution?
(1) Potassium chloride and potassium hydroxide
(2) Sodium acetate and acetic acid
(3) Magnesium sulphate and sulphuric acid
(4) Calcium chloride and calcium acetate

86. Which of the following is an electrolyte?
(1) Acetic acid (2) Glucose (3) Urea (4) Pyridine

87. Calculate the Standard emf of the cell, $Cd/Cd^{+2}//Cu^{+2}/Cu$ given that $E^0\ Cd/Cd^{+2} = 0.44V$ and $E^0\ Cu/Cu^{+2} = (-)\ 0.34\ V$.
(1) (–) 1.0 V (2) 1.0 V (3) (–) 0.78 V (4) 0.78 V

88. A solution of nickel chloride was electrolysed using Platinum electrodes. After electrolysis,
(1) nickel will be deposited on the anode (2) Cl_2 gas will be liberated at the cathode
(3) H_2 gas will be liberated at the anode (4) nickel will be deposited on the cathode

89. Which of the following metals will undergo oxidation fastest?
(1) Cu (2) Li (3) Zinc (4) Iron

90. Which of the following cannot be used for the sterilization of drinking water?
(1) Ozone (2) Calcium Oxychloride
(3) Potassium Chloride (4) Chlorine water

91. A water sample showed it to contain 1.20 mg/litre of magnesium sulphate. Then, its hardness in terms of calcium carbonate equivalent is
(1) 1.0 ppm (2) 1.20 ppm (3) 0.60 ppm (4) 2.40 ppm

92. Soda used in the L-S process for softening of water is, Chemically.
(1) sodium bicarbonate (2) sodium carbonate decahydrate
(3) sodium carbonate (4) sodium hydroxide (40%)

93. The process of cementation with zinc powder is known as
(1) sherardizing (2) zincing (3) metal cladding (4) electroplating

94. Carrosion of a metal is fastest in
(1) rain-water (2) acidulated water (3) distilled water (4) de-ionised water

95. Which of the following is a thermoset polymer?
(1) Polystyrene (2) PVC
(3) Polythene (4) Urea-formaldehyde resin

96. Chemically, neoprene is
(1) polyvinyl benzene (2) polyacetylene
(3) polychloroprene (4) poly-1,3-butadiene

97. Vulcanization involves heating of raw rubber with
(1) selenium element (2) elemental sulphur
(3) a mixture of Se and elemental sulphur (4) a mixture of selenium and sulphur dioxide

98. Petrol largely contains
(1) a mixture of unsaturated hydrocarbons C_5 - C_8
(2) a mixture of benzene, toluene and xylene
(3) a mixture of saturated hydrocarbons C_{12} - C_{14}
(4) a mixture of saturated hydrocarbons C_6 - C_8

99. Which of the following gases is largely responsible for acid-rain?
(1) SO_2 & NO_2 (2) CO_2 & water vapour
(3) CO_2 & N_2 (4) N_2 & CO_2

100. BOD stands for
(1) Biogenetic Oxygen Demand (2) Biometric Oxygen Demand
(3) Biological Oxygen Demand (4) Biospecific Oxygen Demand

Set Code : T2
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COMPUTER SCIENCE AND ENGINEERING

101. Which of the following is the first integrated logic family?
(1) ECL (2) TTL (3) RTL (4) MOS

102. What is the approximate worst-case noise margin in TTL logic circuit?
(1) 400 mV (2) 1 V (3) 1 mV (4) 100 mV

103. Which of the following is the fastest integrated logic family?
(1) ECL (2) TTL (3) DTL (4) CMOS

104. When is that the NAND logic gate can function as a NOT logic gate?
(1) One input is set to '0' (2) One input is set to '1'
(3) Inputs are left open (4) Inputs are connected together

105. What logic function is produced when an inverter is added to each input and the output of an AND gate?
(1) NAND (2) XOR (3) OR (4) NOR

106. What is the simplified form of the given Boolean expression: (X + Y + XY) (X + Z)?
(1) X + Y + Z (2) XY + YZ (3) X + YZ (4) XZ + Y

107. Give the effective combination for a Master slave flip-flop:
(1) An SR flip-flop and a D flip-flop (2) An SR flip-flop and a T flip-flop
(3) A T flip-flop and a D flip-flop (4) Two T flip-flops

108. How many flip-flops are required to divide the input frequency by 64?
(1) 4 (2) 5 (3) 6 (4) 7

109. Which is the first microprocessor introduced by the Intel Corporation?
(1) 2002 (2) 4004 (3) 8008 (4) 8080

110. The 8086 microprocessor has a _____ bit data bus and a _____ bit address bus.
(1) 8, 8 (2) 8, 16 (3) 16, 16 (4) 16, 20

111. 8086 has a _____ bytes queue.
(1) 4 (2) 6 (3) 8 (4) 16

112. The registers which are used for the address calculations in based indexed addressing mode are_____.
(1) BP & SI (2) BP & DI (3) BX & SI (4) BX/BP & SI/DI

113. Which of the following instruction is used for unconditional jump?
(1) JMP (2) JUMP (3) JZ (4) GO

114. How is the implementation of the control section of Intel 8086 microprocessor done?
(1) Using microprogramming
(2) Using nanoprogramming
(3) It is a combination of Microprogramming and Hard-wired designs
(4) Using hard-wired control in a random manner

115. How many conditional flags are available in 80486?
(1) 6 (2) 8 (3) 10 (4) 16

116. What address instructions are used by a Stack?
(1) Zero (2) One (3) Two (4) Three

117. Which is the addressing mode where the operand is specified within the instruction?
(1) Direct (2) Indirect (3) Immediate (4) Register

118. EDRAM indicates_____.
(1) Extended DRAM (2) Enhanced DRAM
(3) Electronic DRAM (4) Electrical DRAM

19. Which of the following matches better with DMA I/O?
(1) High Speed RAM (2) Printer
(3) ALU (4) Disk

120. Which of the following is not a form of memory?
(1) Translation lookaside buffer (2) Instruction opcode
(3) Instruction cache (4) Instruction register

121. Which of the following is an advantage of virtual memory?
(1) Processes can be given priority
(2) Programs larger than the physical memory size can be run
(3) Faster access to memory on an average
(4) Linker can assign addresses independent of where the program will be loaded in physical memory.

122. Which of the following is an advantage of memory interlacing?
(1) A large memory is obtainted
(2) A non-volalite memory is obtained
(3) The cost of the memory is reduced
(4) Effective speed of the memory is increased

123. Which of the following devices should be given higher priority in assigning interrupts?
(1) Printer (2) Floppy disk (3) Keyboard (4) Hard disk

124. _____ addressing mode permits relocation without any change to the code.
(1) Base register (2) Indexed register
(3) Relative (4) Indirect

125. Between what components of a Computer does an I/O processor control the flow of information?
(1) I/O devices and Cache memory (2) I/O devices and Main memory
(3) Two I/O devices (4) Main memory and Cache memory

126. What 'C' command which is used to free the allocated memory?
(1) Dispose (2) Free (3) Deallocate (4) Refresh

127. In order to realize dynamic memory allocation by using functions like malloc, calloc and realloc, which header file should be included?
(1) string.h (2) stdiomemory.h (3) stdio.h (4) stdlib.h

128. What does 'stderr' in C language stands for?
(1) Standard error streams (2) Standard error types
(3) Standard error definitions (4) Standard errors

129. What is the output of the following 'C' code?

```
main()
    {
      static char a[ ] = "ECET12";
      char * b = "ECET12";
      printf("\n%d %d", sizeof(a), sizeof(b));
    }
```

(1) a = 7, b = 2 (2) a = 2, b = 7 (3) a = 7, b = 6 (4) a = 7, b = 8

130. What is the purpose rewind() function in C?
(1) file pointer repositions to the starting of the file
(2) file pointer repositions to the end of file
(3) file pointer repositions to the starting of the line
(4) file pointer repositions starting of the word

131. The total number of nodes in a binary tree with 'n' leaves is _____.
(1) n (2) 2n (3) 2n–1 (4) 2n–2

132. A tree is special case of a graph which consists of _____ number of cycles.
(1) 0 (2) 1 (3) 2 (4) more than 2

133. A heap allows a very efficient implementation of a _____.
(1) Stack (2) Queue (3) Priority queue (4) Tree

134. If the postorder traversing of a tree results in C F E D B J I H G A; then the preorder traversal would return what?
(1) ABDCEFGHIJ (2) ABCDEFGHIJ (3) ABCDEFHGIJ (4) ABCDFEGHIJ

135. Which data structure allows deletion at both ends of the list but insertion at only one end?
(1) Input-restricted deque (2) Output-restricted deque
(3) Priority queue (4) Circular queue

136. _____ layer is not present in the TCP/IP reference model.
(1) Transport (2) Session (3) Internet (4) Application

137. _____ is the Protocol Data Unit (PDU) used at the network layer of the OSI model.
(1) Segment (2) Frame (3) Packet (4) Bits

138. Which layer in the OSI reference model takes the responsibility of flow control?
(1) Application layer (2) Transport layer
(3) Network layer (4) Session layer

139. _____ are the devices that operate at the network layer of the OSI model for forwarding the packets over WAN.
(1) Hubs (2) Bridges (3) Switches (4) Routers

140. What does SMTP stand for?
(1) Standard message transfer protocol (2) Standard mail transfer protocol
(3) Simple mail transfer protocol (4) Simple message transfer protocol

141. Identity the class of the IP address given in the binary representation below:
11000110.01110000.00011100.11111100
(1) A (2) B (3) C (4) D

142. Which of the following statement is typically FALSE about Ethernets?
(1) Ethernets use circuit switching to send messages
(2) Ethernets are used in providing physical address
(3) Ethernet protocols use a collision-detection method to ensure that messages are transmitted properly.
(4) Networks connected by Ethernets are limited in length to a few hundred meters.

143. _____ acts as security buffer between a company's private network and all external networks.
(1) Firewall (2) Password
(3) Disaster recovery plan (4) Virus checker

144. How many bytes are used by the Class 'B' IP addresses to represent the Host and Network IDs?
(1) 1,3 (2) 2,3 (3) 2,2 (4) 3,1

145. _____ protocol is used for remote login purpose.
(1) Telnet (2) HTTP (3) FTP (4) SMTP

146. What is meant by a Process?
(1) A program written in high level language and stored on the disk
(2) A program is execution
(3) A job stored in the secondary memory
(4) A job available in the main memory

147. A computer system cannot boot if the _____ is not available on it.
(1) Loader (2) Linker
(3) Interpreter (4) Operating System

148. What is the use of Job Control Language (JCL) statements?
(1) Allocate the CPU to a job
(2) Read the input from one device to another device
(3) Inform the OS, the start and end of a job in a batch
(4) For managing the memory

149. Which strategy allows the processes that are logically runnable to be temporarily suspended?
(1) Shortest Job First (2) First come First served
(3) Non-preemptive scheduling (4) Round Robin

150. _____ algorithm executes the shortest job first that has entered the queue of jobs.
(1) FIFO (2) SJF (3) Round Robin (4) LIFO

151. Fragmentation of the file system can be temporarily avoided by _____.
(1) Thrashing (2) CPU scheduling
(3) Compaction (4) I/O devices scheduling

152. What is a page fault?
(1) An error that occurs while a program accesses a page in the memory
(2) An access to a page that is currently not available in the memory
(3) A reference to a page of another program
(4) An error which is page specific

153. Belady's Anomaly is a behaviour of _____ page replacement algorithm.
(1) Optimal (2) LRU (3) Circular FIFO (4) FIFO

154. What is the special software used to create a job queue?
(1) Device driver (2) Spooler (3) Linker (4) Loader

155. Which of the following devices has the highest access time?
(1) Floppy Disk (2) Cache memory
(3) Associative Memory (4) Main memory

156. Relational database is a group of _____.
(1) Fields (2) Records (3) Tables (4) Packages

157. The best way to classify the data models is by the degree of _____.
(1) difficulty (2) abstraction (3) knowledge (4) unification

158. Hierarchical database is not efficient when handling _____.
(1) security (2) large amounts of data
(3) large number of transactions (4) 1:M relationships

159. Which of the following is a Date function in SQL?
(1) SYSDATE (2) SYS_DATE
(3) SYSTEM_DATE (4) CURRENT_DATE

160. What needs to be created if Kishan is working with an employee table and wants to find out how many employees are working in India?
(1) Create a new table (2) Create a new query
(3) Create a new form (4) Utilize the database wizard

161. A normal form which is sufficient for the consideration of a relational database design is _____
(1) BCNF (2) 5 NF (3) 4 NF (4) 3 NF

162. Which of the following type of JOIN is not used in SQL?
(1) Inner join (2) Outer join (3) Equi-join (4) Non Equi-join

163. Abbreviate SQL: _____.
(1) Systematic Query Language (2) Structured Query Language
(3) Structural Query Language (4) Simple Query Language

164. What is the command used in SQL to remove row(s) from a given table?
(1) DELETE (2) DROP (3) ERASE (4) REMOVE

165. Where is the 'HAVING' clause of SQL used for querying?
(1) Used for rows rather than columns
(2) Used for columns rather than rows
(3) Used for groups rather than rows
(4) Used for rows rather than groups

166. If duplicate rows are to be avoided in the queried output using a SELECT statement, what qualifier should be used
(1) DEFINITE (2) DISTINCT (3) DISJOINT (4) UNIQUE

167. Select one equivalent SQL statement for the given query:
SELECT EMP_NAME FROM EMPLOYEE WHERE PLACE = 'HYD';
(1) SELECT EMP_NAME FROM EMPLOYEE WHERE PLACE IN ('HYD');
(2) SELECT EMP_NAME IN EMPLOYEE WHERE PLACE IN ('HYD');
(3) SELECT EMP_NAME IN EMPLOYEE WHERE PLACE = 'H';
(4) SELECT EMP_NAME IN EMPLOYEE WHERE PLACE = 'HYD');

168. In SQL what command is used to get sorted output of a given query
(1) GROUP BY (2) ORDER BY (3) SORT BY (4) ARRANGE BY

169. Multi-valued dependencies should _____ be eliminated.
(1) Never (2) Rarely (3) Always (4) Frequency

170. DROP statement in SQL belongs to which category statement
(1) DML statement (2) DDL statement (3) DCL statement (4) TCL statement

171. _____ storage class is not supported by C++ compiler.
(1) Dynamic (2) Register (3) Auto (4) Mutable

172. _____ feature is not at all supported by the C++ compiler.
(1) Operate overloading (2) Exception handling
(3) Reflection (4) Namespaces

173. _____ keyword supports dynamic method resolution in C++.
(1) Abstract (2) Virtual
(3) Dynamic (4) Typeid

174. Which of the following should be used to access an array element in C++?
(1) Dot operator (2) Member name
(3) An index number (4) Function name

175. What is meant by operator overloading in C++?
(1) It is creating new operations
(2) It is creating new functions
(3) It is giving new meanings to existing C++ operators
(4) It is loading multiple operators into a given function

176. What is meant by C++ pure virtual function?
(1) A function which has no body
(2) A function which returns no value
(3) A function which is never used in a base class
(4) A function which is difficult to explain

177. In C++ what does redirection perform.
(1) It redirects a file from a device to a stream
(2) It redirects a stream from a file to a console
(3) It redirects a device from the screen to a file
(4) It redirects the screen from a device to a stream

178. To which class of stream does 'cout' object in C++ belong to?
(1) stringstream (2) istream (3) ostream (4) ifstream

179. Which of the following is used by an object to refer to itself?
(1) this (2) itself (3) self (4) own

180. In C++ when no access specifier is explicitly mentioned for the base class, _____ is the default inheritance type.
(1) Public (2) Private (3) Internal (4) Protected

181. In C++, name mangling is used to support the feature called _____
(1) Overloading (2) Overriding (3) Data Hiding (4) Abstraction

82. Which of the following operators in C++ cannot be overloaded?
(1) Assignment - = (2) Equality - ==
(3) Scope resolution - :: (4) Arrow - ->

183. _____ cannot be declared as a template in C++
(1) Classes (2) Member functions
(3) Global functions (4) Macros

184. Which of the following Inheritance mechanisms is not supported in Java
(1) Single level (2) Multiple level
(3) Multi level (4) All the above

185. If class X is friend of class Y and if class Y is friend of class Z, which of the following is correct?
(1) Class X is friend of Class Z
(2) Class Z is friend of Class X
(3) Class X and Class Z do not have any friend relationships
(4) Class Y is a mutual friend to Class X and Class Y

186. What is the output of the following given Java code:

```
public class Ecet {
public static void main (string[] args) {
new Ecet().go("hello", 1);
new Ecet().go("hello", "word", 2);
}
public void go (string y, int x) {
System.out.print(y[y.length - 1] + " ");
}
}
```

(1) h he (2) hello world (3) world world (4) compilation fails

187. Which one of the following statements is TRUE?
(1) At once, more than two threads may possibly end up in deadlock.
(2) The JVM implementation guarantees that multiple threads cannot enter into a deadlocked state.
(3) Deadlocked threads release once their sleep() method's sleep duration has expired.
(4) Deadlocking can occur only when the wait(), notify(), and notifyAll() methods are used incorrectly.

188. Fill up the blank with one of the following statements for the given Java code which allows **Ecet** class to compile:

```
class Navigation{
public enum Direction {North, South, East, West}
}
public class Ecet{
_____
}
```

(1) Direction d = North;
(2) Navigation.Direction d = Navigation.Direction.North;
(3) Direction d = Direction.North;
(4) Navigation.Direction d = North;

189. What is the output of the given Java code below?

```
interface TestA { String to String();}
public class Test {
public static void main (String[] args) {
System.out.println(new TestA() {
public String to String() { return "test";}
});
}
}
```

(1) test
(2) null
(3) An exception is thrown at runtime
(4) Compilation fails because of an error in line 1

190. Given the following Java code, _____ can directly access and change the value of the variable name?

```
package exam;
class Ecet {
public String name = "hello";
}
```

(1) any class
(2) only the Ecet class
(3) any class in the exam package
(4) any class that extends Ecet

191. What is the output of the following Java code?

```
public class EcetString1 {
public static void main(String[] args) {
String str = "420";
str+=42;
System.out.print(str);
}
}
```

(1) 42 (2) 420 (3) 42042 (4) 462

192. Given the following Java code below, what is the output?

```
int a = 0;
int b = 10;
do {
b--;
++a;
} while (a<5);
symtem.out.print(+a "," +b);
```

(1) 5,6 (2) 5,5 (3) 6,5 (4) 6,6

193. What is a Web Browser?

(1) A compiler which compiles high level language programs
(2) A compiler which compiles low level language programs
(3) An interpreter which helps to view and navigate through web pages
(4) A loader program which connects to the operating system

194. Which of the following is not a Web Brower?
(1) Mozilla Firefox (2) Apple Safari
(3) Google Chrome (4) You Tube

195. Which protocol is used to connect to Internet?
(1) HTTP (2) FTP (3) ICMP (4) IP

196. Which HTML tag is used for indicating long quotations?
(1) title (2) blockquote (3) label (4) style

197. Which of the following statements is correct about VBScript?
(1) It is an application-specific programming language like LISP
(2) It is client-side scripting language
(3) It is not a Web Browser firendly language
(4) It is not an active scripting language

198. Which VBscript built-in function gives the position of the occurrence of one string within another, from the end of the string?
(1) InStr (2) String (3) InStrRev (4) StrComp

199. Which of the following is an ASP object?
(1) AdRotator (2) Server (3) BrowserCap (4) Content Linking

200. Which of the following is an ASP component?
(1) Response (2) Request (3) Application (4) Content Rotator