

231/2023

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. The radius of a Mohr's Circle gives directly :
 - (A) Maximum Normal Stress at a point
 - (B) Minimum Normal Stress at a point
 - (C) Maximum Shear Stress at a point
 - (D) None of the above

2. The volumetric strain in a body with Young's Modulus ' E ' and Poisson's Ratio ' $1/m$ ' subjected to a normal tensile stress ' p ' in only one direction is :
 - (A) $p(1+m)/mE$
 - (B) $p(m-1)/mE$
 - (C) $p(m+2)/mE$
 - (D) $p(m-2)/mE$

3. The stone blocks are finely chisel dressed and their faces are in perfect true shape in :
 - (A) Ashlar rock
 - (B) Ashlar Chamfered
 - (C) Ashlar facing
 - (D) Ashlar Fine

4. Floor Space Index is the ratio between :
 - (A) Total Plinth area and total carpet area
 - (B) Total carpet area and plot area
 - (C) Total Plinth area and plot area
 - (D) None of the above

5. If the fineness modulus of a given quantity of aggregate is 8.2, the average size of aggregates varies from :
 - (A) 4.75 mm to 10 mm
 - (B) 10 mm to 20 mm
 - (C) 20 mm to 40 mm
 - (D) 40 mm to 80 mm

6. The workability of concrete is influenced by :
 - (A) Grade of cement
 - (B) Size of Aggregate
 - (C) Both (A) and (B)
 - (D) None of the above

7. The long term Modulus of Elasticity of M25 grade concrete whose creep coefficient is 1.5, is :
 - (A) 15,000 M Pa
 - (B) 7,500 M Pa
 - (C) 10,000 M Pa
 - (D) 5,000 M Pa

8. The levelling method used, to find the difference in elevation between two points, when it is not possible to set up the level, midway between them is :
- (A) Fly levelling (B) Precise Levelling
(C) Differential Levelling (D) Reciprocal Levelling
9. In Chain Surveying, correction for slope to be applied in a land surveyed of length 100 m and level difference 1 m is :
- (A) + 1 cm (B) -1 cm
(C) + 0.5 cm (D) - 0.5 cm
10. Young's Modulus of Elasticity for a perfectly rigid body is :
- (A) Zero (B) Infinity
(C) Unity (D) 0.5
11. If a tensile stress of 60 kN/m^2 and a compressive stress of 50 kN/m^2 are acting at right angles to each other on a piece of material then resultant stress on a plane, the normal of which makes an angle 45° with 60 kN/m^2 will be :
- (A) 55 kN/m^2 (B) 5 kN/m^2
(C) 110 kN/m^2 (D) 10 kN/m^2
12. The resultant of two coplanar concurrent tensile forces :
- (i) 20 kN inclined NE 45°
(ii) 20 kN inclined NW 45° is
- (A) zero (B) 10 kN
(C) 14.14 kN (D) 28.28 kN
13. A force of 20 kN is acting through point B at an angle of 30° with line AB, 5 m long. Moment at point A due to the force at B, is :
- (A) 86.5 kNm (B) 50 kNm
(C) Zero (D) 100 kNm
14. A simply supported Beam AB of span 6 m, acted upon by a concentrated upward force 10 kN at 2 m from A and a clockwise moment 20 kNm at 2 m from B. The reactions at the supports are :
- (A) 10 kN downward at A and zero at B
(B) 10 kN upward at A and zero at B
(C) zero at A and 10 kN upward at point B
(D) zero at A and 10 kN downward at B

15. A Trapezium with parallel sides 5 cm and 10 cm and height 6 cm is kept symmetrically about Y-Y Axis with its base along X-X axis. The coordinates of centroid of the trapezium in cm is :
- (A) (0, 1.33) (B) (0, 1.50)
(C) (0, 2.22) (D) (0, 2.67)
16. The Force exerted by a man weighing 700 N on the floor of a lift moving with an upward acceleration of 2.45 m/s^2 is :
- (A) 875 N (B) 1050 N
(C) 350 N (D) 525 N
17. The Coefficient of uniformity of soil with Coefficient of Curvature as unity is :
- (A) $\left[\frac{D_{30}}{D_{10}} \right]^2$ (B) $\frac{D_{30}}{D_{10}}$
(C) $\frac{D_{10}}{D_{30}}$ (D) $\left[\frac{D_{10}}{D_{30}} \right]^2$
18. Critical Hydraulic Gradient of a soil with Specific Gravity 'G', Porosity 'n', Void ratio 'e' is :
- (A) $\frac{G+1}{1+e}$ (B) $(G-1)(1-n)$
(C) $\frac{G+1}{1-e}$ (D) $(G-1)(1+n)$
19. For an irrotational 3D flow which of the following is not correct?
- (A) $\frac{\partial u}{\partial y} = \frac{\partial v}{\partial x}$ (B) $\frac{\partial u}{\partial z} = \frac{\partial w}{\partial x}$
(C) $\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}$ (D) $\frac{\partial w}{\partial y} = \frac{\partial v}{\partial z}$
20. If intensity of rainfall is more than the infiltration capacity of soil, then direct runoff will be :
- (A) more than infiltration capacity
(B) less than infiltration capacity
(C) equal to intensity of rainfall
(D) either (A) or (B)

21. If BOD – Biochemical Oxygen Demand, DO — Dissolved Oxygen, then for Safe drinking water BOD/DO is :
- (A) equal to 1 (B) Greater than 1
(C) Greater than 0, but less than 1 (D) None of these
22. The dilution factor of sewage effluent for direct discharge into the river water without any treatment must be :
- (A) Greater than 150, but less than 300
(B) Greater than 300, but less than 500
(C) Neither (A) nor (B)
(D) Both (A) and (B)
23. Recommended width of Roadway for two lane traffic for National Highways in plain and rolling terrain by IRC is :
- (A) 8.8 m (B) 12 m
(C) 9 m (D) 15 m
24. A vehicle is travelling at a speed of 90 kmph in a Four lane two-way traffic road. If the longitudinal friction coefficient is 0.35 and reaction time is 2.5 sec, the Safe Stopping Distance (in metre) for the vehicle is :
- (A) 252 m (B) 198 m
(C) 152 m (D) 298 m
25. Which of the following statement is false for PERT ?
- (A) To manage uncertain activities of any project
(B) Network is constructed based on activities
(C) Probability model
(D) Non-repetitive nature of job
26. Which of the following is an inversion of single-slider-crank chain?
- (A) Hand pump
(B) Oldham's coupling
(C) Elliptical trammels
(D) Scotch yoke

27. If I , ω_1 , ω_2 , ω , E , e and K represent the moment of inertia, maximum speed, minimum speed, mean speed, kinetic energy at mean speed, maximum fluctuation of energy and coefficient of fluctuation of speed of a fly wheel respectively, the maximum fluctuation of energy in that flywheel is equal to :

- (A) $2EK$ (B) $I\omega^2 K$
 (C) $I\omega(\omega_1 - \omega_2)$ (D) All of the above

28. For maximum power transmission, the velocity of the belt is obtained as

- (A) $\sqrt{\frac{T}{m}}$ (B) $\sqrt{\frac{T}{3m}}$
 (C) $\frac{T}{\sqrt{m}}$ (D) $\sqrt{\frac{T}{2m}}$

Where m = Mass per unit length of belt and

T = Maximum allowable belt tension

29. The ratio of friction torque with uniform wear to friction torque with uniform pressure in flat and conical pivots, is :

- (A) $2/3$ (B) $4/3$
 (C) $3/4$ (D) $3/2$

30. The height of Watt governor is :

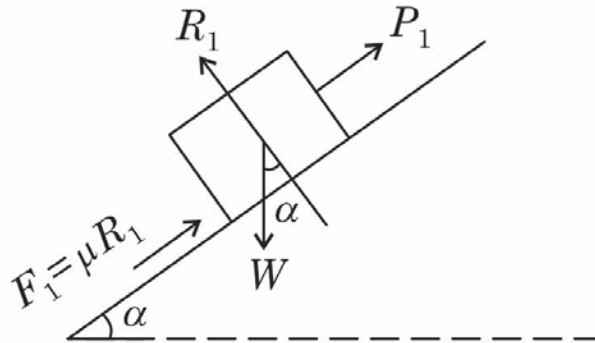
- (A) Directly proportional to the speed
 (B) Inversely proportional to the speed
 (C) Directly proportional to the square of the speed
 (D) Inversely proportional to the square of the speed

31. The equation of motion of a body over a smooth surface is given by the relation $s = 10t + 2t^2$ where (s) is in metres and (t) in seconds. If the mass of the body is 20 kg, find the magnitude of force responsible for the motion :

- (A) 50 N (B) 60 N
 (C) 70 N (D) 80 N

32. An inclined plane with the following details is shown in fig below :

W = Weight of the body, α = Angle which the inclined plane makes with the horizontal,
 R = Normal reaction, μ = Coefficient of friction between the body and the inclined plane and
 ϕ = Angle of friction, such that $\mu = \tan \phi$



Then the minimum force (P_1) required to keep the body in equilibrium when it is at the point of sliding downwards is obtained as :

- | | |
|---|---|
| (A) $P_1 = W \frac{\sin(\alpha - \phi)}{\cos \phi}$ | (B) $P_1 = W \frac{\cos(\alpha + \phi)}{\sin \phi}$ |
| (C) $P_1 = W \frac{\cos(\alpha - \phi)}{\sin \phi}$ | (D) $P_1 = W \frac{\sin(\alpha + \phi)}{\cos \phi}$ |

33. If the modulus of elasticity of a material is 150 GPa and its modulus of rigidity is 60 GPa, its Poisson's ratio is obtained as :

- | | |
|---------|---------|
| (A) 1/3 | (B) 1/4 |
| (C) 2/3 | (D) 3/4 |

34. Which one of the following is the value of bending moment at the centre of a simply supported beam carrying a uniformly distributed load w per unit length if the length of the beam is l ?

- | | |
|--------------------|----------------------|
| (A) wl | (B) $\frac{wl^2}{8}$ |
| (C) $\frac{wl}{2}$ | (D) $\frac{wl^2}{4}$ |

35. What is the equation for estimating Euler's crippling load for columns with one end fixed and the other end free?

- | | |
|------------------------------|------------------------------|
| (A) $\frac{\pi^2 EI}{4 I^2}$ | (B) $\frac{\pi^2 EI}{I^2}$ |
| (C) $\frac{4 \pi^2 EI}{I^2}$ | (D) $\frac{2 \pi^2 EI}{I^2}$ |

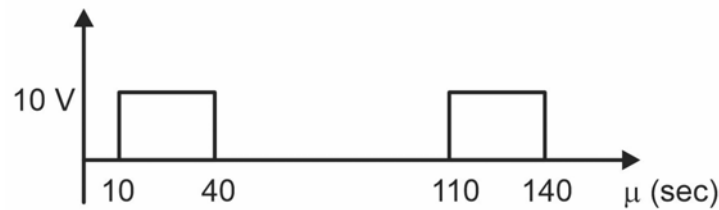
36. Rankine cycle comprises of
- (A) two isentropic processes and two reversible constant volume processes
 - (B) two reversible isothermal processes and two reversible constant pressure processes
 - (C) two isentropic processes and two reversible constant pressure processes
 - (D) two reversible constant pressure and two reversible constant volume processes
37. Efficiency of Otto cycle is more than that of Diesel cycle for the same compression and heat input because, in Otto cycle
- (A) combustion is at constant volume
 - (B) expansion and compression are isentropic
 - (C) maximum temperature is higher
 - (D) heat rejection is lower
38. The velocity of steam at the outlet of a nozzle under ideal conditions, for a heat drop of 500 kJ/kg will be :
- (A) 1000 m/s
 - (B) 75 m/s
 - (C) 1500 m/s
 - (D) the same as the sonic velocity
39. As pressure increases, the enthalpy of evaporation of water :
- (A) increases
 - (B) decreases
 - (C) remains same
 - (D) changes randomly
40. In an office, the drinking water needs are met by cooling tap water in a refrigerated water fountain from 35 to 18°C with an average flow rate being 18 kg/h. If the COP of this refrigerator is 3.1, the required power input to this refrigerator is :
- (A) 200 W
 - (B) 1000 W
 - (C) 115 W
 - (D) 40 W
41. When the barometer reads 750.0 mm of mercury, a pressure of 10 kPa suction at that location is equivalent to :
- (A) 10.2 m of water (abs)
 - (B) 9.87 m of water (abs)
 - (C) 4.3 kPa (abs)
 - (D) 90 kPa (abs)
42. If the unit of dynamic viscosity of a fluid is stated as Poise, one unit of poise is equivalent to :
- (A) 10 Pa.s
 - (B) $\frac{1}{10}$ Pa.s
 - (C) $10^{-4} \text{ m}^2 / \text{s}$
 - (D) $\frac{1}{10}$ dynes.s/cm²

43. The equation of a stream line in a two-dimensional flow is given by :
- (A) $\frac{dx}{u} = \frac{dy}{v}$ (B) $\frac{dy}{u} = \frac{dx}{v}$
 (C) $\frac{dx}{dt} = u, \frac{dy}{dt} = v$ (D) $\frac{u}{dx} = \frac{dy}{v}$
44. It is required to measure the velocity of air with density equal to 1.2 kg/m^3 using a pitot tube (coefficient = 1). If the head difference in a vertical U tube fitted with water is 12 mm, then the approximate velocity of air in m/s is :
- (A) 5 m/s (B) 10 m/s
 (C) 14 m/s (D) 20 m/s
45. A similar model of a pump is built to a ratio of 1:2. If the model pumps the same fluid as the prototype at the same rotation speed, the ratio of model power to prototype power input is :
- (A) $\frac{1}{32}$ (B) $\frac{1}{2\sqrt{2}}$
 (C) $\frac{1}{8}$ (D) $\frac{1}{16\sqrt{2}}$
46. The time taken to drill a hole through a 25 mm thick plate with the drill rotating at 100 rpm and moving at a feed rate of 0.25 mm/rev is :
- (A) 30 s (B) 100 s
 (C) 50 s (D) 60 s
47. Among the following Non-destructive testing methods, which method would be used to examine a completed weld for surface defects?
- (A) Ultrasonics (B) Radiography
 (C) Dye-penetrant (D) Acoustics
48. Which one of the following is the composition of 18-4-1 high-speed steel?
- (A) 18 percent chromium, 4 percent nickel and 1 percent vanadium
 (B) 18 percent tungsten, 4 percent chromium and 1 percent vanadium
 (C) 18 percent tungsten, 4 percent nickel and 1 percent molybdenum
 (D) 18 percent tungsten, 4 percent nickel and 1 percent vanadium
49. Which one of the following is Scab?
- (A) Sand casting defect (B) Welding defect
 (C) Machining defect (D) Forging defect

50. Pearlite consists of :
- (A) 6.7% C and 93.3% ferrite (B) 13% Fe and 87% cementite
(C) 13% C and 87 % ferrite (D) 13% cementite and 87 % ferrite
51. An initially relaxed system of input $x(t)$ and output $y(t)$ is represented as $3dy(t)/dt + 3y(t) = 6x(t)$. The impulse response of the system is :
- (A) $3e^{-t}u(t)$ (B) $e^{-t}u(t)$
(C) $2e^{-t}u(t)$ (D) $0.5e^{-t}u(t)$
52. The transfer function of a second order system is given by $36/(S^2 + 8S + 36)$. What is the nature of the system?
- (A) Critically damped (B) Over damped
(C) Under damped (D) None of these
53. Choose the relationship between a and b , such that the transfer function $(S + a)/(S + b)$ is a lead compensator :
- (A) $a > b$ (B) $a < b$
(C) $a = b$ (D) None of these
54. In a wattmeter, the nature of the pressure coil is :
- (A) highly inductive (B) highly capacitive
(C) highly resistive (D) purely inductive
55. The voltage source is give its output as per the equation $5 + 2\sin(2t)$ volts. What is the reading of the PMMC voltmeter connected across the voltage source?
- (A) 2 volts (B) 5 volts
(C) $\sqrt{29}$ volts (D) 7 volts
56. The effect which give protection against overload in MCB is :
- (A) Magnetic (B) Electrical
(C) Thermal (D) Mechanical
57. A generating station supplies power to four different regions with their maximum demand are 10 MW, 20 MW, 40 MW and 50 MW. The generating station maximum demand is observed as 80 MW. Calculate the diversity factor of the generating station :
- (A) 2.5 (B) 1.5
(C) 2 (D) 1

58. A house consists of 7 light points and 5 fan points. As per the Indian standard, how many sub-circuit are needed?
- (A) 1 (B) 3
(C) 4 (D) 2
59. A cable of 50 km long have an insulation resistance of 2 M Ω . Find the insulation resistance of the same cable of length 100 km from the following :
- (A) 2 M Ω (B) 1 M Ω
(C) 4 M Ω (D) 0.5 M Ω
60. In a cable, the thickness of insulation around the conductor depends on :
- (A) Current (B) Voltage
(C) Frequency (D) Power factor
61. The power device suitable for an application in which high switching frequency and lower power is :
- (A) MOSFET (B) BJT
(C) IGBT (D) Thyristor
62. In a thyristor, the multimeter shows positive voltage at the anode terminal with respect to the cathode terminal, then the number of blocked p-n junction is:
- (A) 2 (B) 3
(C) 1 (D) 4
63. The ripple free current flow through the load at the output of a single phase full converter is 40 A. Then the average current through each thyristor is :
- (A) 13.3 A (B) 40 A
(C) 10 A (D) 20 A
64. The ripple peak to peak current flowing through the filter capacitor of a buck converter is found to be 2 A. The ripple free DC current flow through the output load resistance is 10 A. Then the peak current flow through the semiconductor switch is :
- (A) 9 A (B) 11 A
(C) 10 A (D) 2 A

65. The gate signal for the switching of a buck converter is shown below. Determine the output voltage of the converter, if the input voltage is 100 V :



- (A) 100 V (B) 30 V
(C) 10 V (D) 40 V
66. The speed and torque of a DC motor at a particular output power are 1000 rpm and 100 Nm. Calculate the torque of the DC motor rotate at a speed of 500 rpm under the same output power is :
- (A) 100 Nm (B) 200 Nm
(C) 50 Nm (D) 400 Nm
67. The power factor of the possible load connected at the secondary side of a transformer for a zero voltage regulation at full load is :
- (A) Unity (B) Lagging
(C) Leading (D) Zero
68. It is observed that the frequency of the stator and rotor currents of a three phase 4-pole induction motor are 50 Hz and 2 Hz respectively. Calculate the slip of the motor :
- (A) 0.5 (B) 0.02
(C) 0.01 (D) 0.04
69. The developed reluctance torque in a salient pole synchronous motor is maximum at a load angle of :
- (A) 45° (B) 75°
(C) 0° (D) 90°
70. The main losses responsible to damp the hunting phenomena in a synchronous machine is :
- (A) Rotor iron losses (B) Rotor copper losses
(C) Stator iron losses (D) Stator copper losses
71. The synchronous reactance (X_d) of a generator 100 MVA and 10 kV is 0.5 pu. The X_d value in pu for a base of 200 MVA and 20 kV is :
- (A) 0.5 (B) 0.25
(C) 2 (D) 1

72. An alternator of rating 10 MVA, 11 kV with 10% of reactance is connected to a busbar. Find the short circuit level at the busbar :
- (A) 10 MVA (B) 50 MVA
(C) 100 MVA (D) 200 MVA
73. Which of the following are provided to reduce the ferrantic effect in the transmission line?
- (A) Series reactor (B) Shunt capacitor
(C) Series capacitor (D) Shunt reactor
74. The generator bus of per unit voltage $1.5\angle 5^\circ$ is connected to an infinite bus of per unit voltage $1.0\angle 5^\circ$ through a 0.5 per unit reactance. Then the active power will flow from :
- (A) infinite bus to generator bus
(B) no active power will flow
(C) generator bus to infinite bus
(D) none of the above
75. A long underground cable of 200 km length have a surge impedance of 50Ω . What is the value of surge impedance of the same cable length 100 km?
- (A) 100Ω (B) 25Ω
(C) 50Ω (D) 200Ω
76. A mechanism for carrier motion in semiconductor which occurs when an electric field is applied :
- (A) Carrier diffusion (B) Recombination
(C) Carrier drift (D) Diffusivity
77. A $0.9 \mu F$ capacitor is charged to 50 V is discharged to 25 V through a resistive path of 20 k Ω . How long in milliseconds, it will take for the discharge operation?
- (A) 1.25 (B) 12.5
(C) 125 (D) 0
78. At _____ Hz, is an RLC series circuit, maximum voltage occurs across the capacitor C if $R = 2 \Omega$ $L = 1 H$ and $C = 0.1 \mu F$.
- (A) $\frac{1}{\sqrt{2} \pi}$ (B) $\frac{\sqrt{2}}{\pi}$
(C) $\frac{\sqrt{3}}{2 \pi}$ (D) None

79. If ' f_1 ' is the resonant frequency of parallel LC circuit and ' f_2 ' is that of parallel RLC circuit, then which of the following is correct?
- (A) $f_1 = f_2$ (B) $f_1 = \sqrt{2\pi} f_2$
 (C) $f_2 = \sqrt{2\pi} f_1$ (D) $f_1 = 2\pi f_2$
80. Which of the following amplifier configuration has highest input impedance?
- (A) Cascaded amplifier (B) Cascode amplifier
 (C) Push pull amplifier (D) Boot strap darlington amplifier
81. In a CE amplifier circuit, transistor is biased in such a way that the quiescent operating point is situated towards saturation on the load line. Which of the following is correct regarding the output voltage?
- (A) Sinusoidal waveform with clipped positive half cycles
 (B) Sinusoidal waveform with clipped negative half cycles
 (C) Pure Sinusoidal waveform
 (D) Sinusoidal waveform with clipped positive and negative half cycles
82. In hexadecimal system, the decimal 5^4 is :
- (A) 314 (B) OCB
 (C) 271 (D) IBC
83. Due to _____, MOS logic gates do not have current hogging problem.
- (A) High impedance of gate terminal
 (B) High impedance of source terminal
 (C) Low impedance of drain terminal
 (D) Low impedance of source and gate terminals
84. Dynamic power consumed by a CMOS, logic circuit operating at frequency ' f ' is proportional to :
- (A) V_{DD} (B) fV_{DD}
 (C) f^2V_{DD} (D) fV_{DD}^2
85. CMOS inverter can act as amplifier, when :
- (A) NMOS in saturation, PMOS in linear
 (B) NMOS in linear, PMOS in saturation
 (C) NMOS and PMOS in saturation
 (D) NMOS and PMOS in linear

86. Let the $z = 0$ plane in rectangular coordinate system has uniform surface charge distribution of ρ_s Coulombs/m². The permittivity of the medium is ϵ and \hat{z} is the unit vector along z direction. Then the flux density at any point z units away from the plane is :
- (A) $\frac{\rho_s}{2z} \hat{z}$ (B) $\frac{\rho_s}{\epsilon} \hat{z}$
 (C) $\frac{\rho_s}{2} \hat{z}$ (D) $\frac{\rho_s}{\epsilon}$
87. Which of the following statements about the field quantities at the interface two different media is **not** correct?
- (A) with finite surface current, the normal component of magnetic field is discontinuous through the interface
 (B) with finite surface charge, the normal component of electric field is discontinuous through the interface
 (C) with finite surface current, the tangential component of magnetic field is discontinuous through the interface
 (D) with finite value of magnetic flux, the tangential component of electric field is continuous through the interface
88. Which one of the following represents the equation for the E -field of linearly polarized uniform plane wave propagating in the x -direction?
- (A) $E = E_0 \cos(\omega t - \beta y) \hat{x}$
 (B) $\frac{\partial^2 E_x}{\partial z^2} = \mu \epsilon \frac{\partial^2 E_x}{\partial t^2}$
 (C) $E = E_0 [\cos(\omega t - \beta x) \hat{y} + \sin(\omega t - \beta x) \hat{z}]$
 (D) $\frac{\partial^2 E_y}{\partial x^2} = \mu \epsilon \frac{\partial^2 E_y}{\partial t^2}$
89. For the far field, E , of electromagnetic wave, radiated from a current element, which of the following is **not** correct?
- (A) E is inversely proportional to the square of the distance from the element
 (B) E is proportional to current through the element
 (C) E is inversely proportional to current through the element
 (D) E is directly proportional to frequency of the wave

90. A 65Ω lossless transmission line is terminated with load impedance $Z_L = 65 - j75 \Omega$. If the incident power to the load is 100 mW, the power absorbed by the load is :
- (A) 68 mW (B) 75 mW
(C) 81 mW (D) 90 mW
91. Impulse-train sampling of $x[n]$ is used to obtain $g[n] = \sum_{k=-\infty}^{\infty} x[n] \delta[n - kN]$. If $X(e^{jw}) = 0$ for $\frac{3\pi}{7} \leq |w| \leq \pi$, determine the largest value for the sampling interval N which ensures that no aliasing takes place while sampling $x[n]$:
- (A) 2 (B) 3
(C) 4 (D) 7
92. The unit sample response of the system described by the difference equation $y[n] = \frac{1}{2}y[n-1] + 2x[n]$ is :
- (A) $2\left(\frac{1}{2}\right)^n u[n]$ (B) $n\left(\frac{1}{2}\right)^n u[n]$
(C) $-n\left(\frac{1}{2}\right)^n u[-n-1]$ (D) $\left(\frac{1}{2}\right)^n u[n]$
93. The first three DFT coefficients of the four-point DFT of a real sequence are given as $X[0] = 10$, $X[1] = -2 + j2$ and $X[2] = -2$. The remaining DFT coefficient is :
- (A) $2 + j2$ (B) $2 - j2$
(C) $-2 - j2$ (D) $-2 + j2$
94. If $x[n] \xrightarrow{F} X(w)$, then the time shifting property of the Fourier transform is given by :
- (A) $x[-n] \xrightarrow{F} X(-w)$
(B) $e^{jw_0 n} x[n] \xrightarrow{F} X(w - w_0)$
(C) $x[n - k] \xrightarrow{F} e^{-jwk} X(w)$
(D) $n x[n] \xrightarrow{F} j \frac{dX(w)}{dw}$

95. Which of the following is not a technique for designing FIR filters?
- (A) Windows method
 - (B) Frequency sampling method
 - (C) Optimal design based on Chebyshev approximation
 - (D) Bilinear Transformation design
96. A band limited message signal $x(t)$ is multiplied by a high frequency sinusoidal carrier $c(t)$ will result ————— types of modulation.
- (A) Double Side Band Suppressed Carrier Modulation
 - (B) Standard Amplitude Modulation
 - (C) Single Side Band Suppressed Carrier Modulation
 - (D) Vestigial Side Band Modulation
97. An FM broadcast station uses a message signal bandwidth of 15 KHz and a frequency deviation of 75 KHz. The transmission bandwidth as per the Carson's rule is :
- (A) 200 KHz
 - (B) 180 KHz
 - (C) 220 KHz
 - (D) 210 KHz
98. The minimum bandwidth needed for transmitting 4 KHz signal using PCM with 1024 quantising levels is :
- (A) 8 KHz
 - (B) 16 KHz
 - (C) 32 KHz
 - (D) 40 KHz
99. An image uses 1024×1024 pixel elements. Each of the pixel can take any of the eight distinguishable intensity levels. The maximum entropy of the above mentioned image will be :
- (A) 3×2^{10} bits
 - (B) 3×2^{20} bits
 - (C) 2×2^{20} bits
 - (D) 2×2^{22} bits
100. For a (7, 4) cyclic code with a generator polynomial $x^3 + x^2 + 1$. Find the code word for the data 1010 :
- (A) 1001011
 - (B) 0001101
 - (C) 1110010
 - (D) 1101000

SPACE FOR ROUGH WORK

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