# BSNL Telecom Technical Assistant (TTA) 2008 Paper

1. If the matrix A = is singular, then ? =
a) 3 b) 4 c) 2 d) 5
2. A = is symmetric, then x =
a) 3 b) 4 c) 2 d) 5
3. If A is a 3 x 3 matrix and det(3 A) = k det(A) then k =
a) 9 b) 6 c) 1 d) 27
4. If A = , then A-1 =
a) b) c) d)
5. If A = then A2 is equal to
a) A b) –A c) Null Matrix d) I
6. is a
a) rectangular matrix b) singular matrix
b) non-singular matrix d) skew-symmetric matrix
7. The slope of the straight line whose inclination with negative x-axis is 120º is
a) b) c) 1 d) infinity
8. If two lines whose slopes are m1 and m2 are perpendicular iff
a) m1 = m2 b) m1m2 = 0 c) m1m2 = -1 d) m1 + m2 = -1
9. The rate of increase of the radius of a circle is 1 cm/sec, the rate of increase of its area is 4? cm2/sec at a particular instant. The radius at that instant is
a) 2 cm b) 3 cm c) 4 cm d) 6 cm
10.If the side of a square is increasing at the rate of 0.02 cm/min, the rate at which its area is increasing at the instant when the length of the side is 5 cm is
a) 0.2 cm 2/min b) 0.4 cm 2/min c) 0.1 cm 2/min d) 0.6 cm 2/min
11.A particle is moving on a plane according to the distance-time relationship is given by s = t3 + 6t2 + 8t – 4. When its acceleration is 8 m/sec2, its velocity is
a) 8 m/sec b) 11 m/sec c) 23 m/sec d) -1 m/sec
12.A stone moves vertically upwards according to the distance-time equation s = 16t – 2t2.The greatest height reached by the stone is
a) 4 b) 64 c) 32 d) 96
13.The distance moved by a particle traveling in a straight line in t seconds is given by s = 45t + 11t2 – t3. The time taken by the particle to come to rest is
a) 9 sec b) 5 sec c) 3 sec d) 2 sec
14.The distance s described by a particle in time t is given by the relation s = aet + be-t. The acceleration is equal to
a) velocity b) the distance traveled

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c) twice the distance traveled d) the square of the distance traveled

15.The slope of the normal to the curve y = at the point is

a) 9 b) -9 c) d)

17.The normal to the curve y = f(x) will be parallel to x-axis if

a) b) c) d)

18.The maximum point of the function 2×3 – 9×2 + 12x is

a) x = 0 b) x = 5 c) x = 1 d) x = 2

19.The minimum value of 2×3 – 9×2 + 12x – 4 is

a) 1 b) 3 c) 0 d) -2

20.The point of inflection of the function x3 – 3×2 + 3x is

a) (1,0) b) (1,1) c) (6,126) d) (-1,-7)

21.Velocity of sound is greatest in

a) Solids b) Liquids c) Gases d) None of these

22.If the phase difference between the two waves is 2? during superimposition, then the resultant amplitude is

a) Maximum b) Minimum c) Half of maximum d) None of these

23.If two waves of same frequency and same amplitude on superimposition produce a resultant disturbance of the same amplitude, the wave differ in phase by

a) b) c) d)

24.The equation of a plane progressive wave is given by y = 2sin?(0.5x – 200t) where x and y are expressed in cm and t in sec. The wave velocity is

a) 400 cm/sec b) 300 cm/sec c) 200 cm/sec d) 100 cm/sec

25.Equation of a plane progressive wave is given by y = 0.2 cos ?(0.04t + 0.02x – 1/6). The distance is expressed in cm and time in sec. The minimum distance between two particles separated by phase difference ?/2 is radian is

a) 25 cm b) 12.5 cm c) 8 cm d) 4 cm

26.Ultrasonic waves are those waves which

a) Human being can hear b) Human being cannot hear

c) Have high velocity d) Have large amplitude

27.It is possible to distinguish between the transverse and longitudinal waves by studying the property of

a) Interference b) Polarization c) Diffraction d) Reflection

28.The following phenomenon cannot be observed for sound waves

a) Refraction b) Polarization c) Diffraction d) Reflection

29.Doppler shift in frequency does not depend upon

a) Frequency of the wave produced b) Velocity of the source

c) Velocity of the listener/observer d) Distance between source and listener

30.A source of sound of frequency 450 cycles/second is moving towards a stationary observer

with 34 m/s speed. If the speed of sound is 340 m/s then the apparent frequency will be
a) 410 cps b) 550 cps c) 500 cps d) 450 cps
31.An observer moves towards a stationary source of sound of frequency n. The apparent frequency heard by him is 2n. If the velocity of sound in air is 332 m/s, then the velocity of observer is
a) 166 m/s b) 664 m/s c) 332 m/s d) 1328 m/s
32.The equation of a wave traveling in a string can be written as y = 3 cos ?(100t – x).Its wavelength is
a) 100 cm b) 5 cm c) 3 cm d) 2 cm
33.Sound velocity is maximum in
a) O2 b) H2 c) He d) N2
34.Phon is the unit of
a) Pitch b) Quality c) Timbre d) Loudness
35.Loudness of sound L and corresponding intensity of sound I are related as
a) L = KI2 b) L = KI c) L = K d) L = K log I
36.The index of refraction of a medium is 1.5. If the speed of light in air is 3 x 108 m/s, then its speed in the medium will be
a) 2 x 108 m/s b) 1.2 x 108 m/s c) 4 x 108 m/s d) 3.2 x 108 m/s
37.The ratio of intensities of the two waves is given by 4:1. The ratio of amplitudes of two waves is
a) 2:1 b) 1:2 c) 4:1 d) 1:4
38.Two source of waves are called coherent if
a) Both have the same amplitude by vibrations
b) Both produce waves of different wavelength having constant phase difference
c) Both produce waves of same wavelength having constant phase difference
d) Both produce waves having the same velocity
39.Which of the following does not support the wave nature of light?
a) Interference b) Diffraction c) Polarization d) Photoelectric effect
40.Velocity of light will be minimum in
a) Vacuum b) Air c) Water d) Glass
41.Wavelength of light of frequency 100 Hz is
a) 2 x 106 m/s b) 3 x 106 m/s c) 4 x 106 m/s d) 5 x 106 m/s
42.A rocket is going away from earth at a speed of 106 m/s. If the wavelength of the light wave emitted by it be 5700 Å, its Doppler's shift will be
a) 200 Å b) 19 Å c) 20 Å d) 0.2 Å
43.Colour of light is known by its
a) Velocity b) Amplitude c) Frequency d) Polarization
44.A rocket is going away from the earth at a speed 0.2c where c = Speed of light. It emits a

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signal of frequency 4 x 107 Hz. The frequency observed by an observer on the earth will be
a) 4 x 106 Hz b) 3.3 x 106 Hz c) 3 x 106 Hz d) 5 x 107 Hz
45.A light wave has a frequency of 4 x 1014 Hz and a wavelength of 5 x 10-7 m in a medium. The refractive index of the medium is
a) 1.5 b) 1.33 c) 1.0 d) 0.66
46.Stars are twinkling due to optical phenomenon of
a) Refraction b) Scattering c) Reflection d) Diffraction
47.The splitting of white light into several colours on passing through a glass prism is due to
a) Refraction b) Reflection c) Interference d) Diffraction
48.In Bohr's model, if the atomic radius of the first orbit is ro, then the radius of the fourth orbit is
a) 16 ro b) ro c) 4 ro d) ro/16
49.The average binding energy per nucleon in the nucleus of an atom is approximately
a) 8 eV b) 8 MeV c) 8 KeV d) 8 Volt
50.The mass equivalent of 931 MeV energy is
a) 1.66 x 10-20 kg b) 1.66 x 10-27 kg
c) 6.02 x 10-24 kg d) 6.02 x 10-27 kg
51.The energy equivalent to 1 a.m.u. is
a) 931 MeV b) 931 eV c) 931 KeV d) 9.31 MeV
52.The ratio of kinetic energy and total energy of an electron in a Bohr orbit is
a) + 2 b) – 1 c) + 1 d) – 2
53.The size of an atom is of the order of
a) 1 Å b) 1 fermi c) 1 nm b) 1 micron
54.The mass defect per nucleon is called
a) Packing fraction b) Binding Energy
c) Ionization Energy d) Excitation Energy
55.Nuclear Binding Energy is equal to
a) Mass of Nucleus b) Mass defect of Nucleus
c) Mass of Proton d) Mass of Neutron
56.The Pfund series of Hydrogen spectrum lies in the region\
a) Infrared b) Visible c) Ultraviolet d) X-Ray
57.The number of neutrons in 92U238 is
a) 92 b) 238 c) 330 d) 146
58.The energy required to remove an electron in a hydrogen atom from n = 10 state is
a) 136.0 eV b) 13.60 eV c) 1.36 eV d) 0.136 eV
59.The angular momentum of electron in nth orbit is given by
a) b) c) d)
60.The rest energy of an electron is

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a) 510 MeV b) 51 MeV c) 931 MeV d) 93.1 MeV
61.In the lowest energy level of hydrogen atom, the electron has the angular momentum
a) ?/h b) h/? c) h/2? d) 2?/h
62.Laser is working in the principle of
a) Stimulated emission of radiation b) Spontaneous emission of radiation
c) Population inversion d) Normal population
63.The output beam of Ruby Laser has the wavelength of
a) 6943 Å b) 6328 Å c) 6300 Å d) 5500 Å
64.In the He-Ne Laser , the He-Ne in the mixture of
a) 10:1 b) 2:1 c) 4:1 d) 5:1
65.The full form of LIDAR is
a) Light Amplitude and Ranging
b) Light Detection and Ranging
c) Light Defect and Ranging
d) Laser Detection and Ranging
66.Which one of the following is solid state laser?
a) Nd:YAG Laser b) He-Ne Laser c) CO2 Laser d) GaAs Laser
67.Populaton Inversion is achieved by means of
a) Optical pumping b) Gas pumping
c) Mechanical pumping d) Solid pumping
68.GRASERS are
a) Galium Arsenide Lasers b) Gamma Ray Lasers
c) General Ranging Lasers d) Gallium Radium Lasers
69.LASER Beam is
a) Highly monochromatic b) Highly Intense
c) Highly Coherent d) All of the above
70.Which one of the following cannot be used as a pulsed device?
a) CFA b) BWO c) TWT d) Magnetron
71.Klystron works in the principle of
a) Velocity Modulation b) Amplitude Modulation
c) Frequency Modulation d) Phase Modulation
72.Strapping in Magnetron is used to
a) prevent mode jumping b) ensure bunching
c) improve the phase focusing effect d) prevent cathode back heating
73.Which is not a TWT slow wave structure
a) Coupled cavity b) helix c) ring bars d) periodic permanent magnet
74.30 to 300 MHz frequency range is categorized as
a) MF b) VHF c) UHF d) SHF

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75.Find the centre of the circle whose two extremities of diameter are (2,3) & (4,-1) is
a) (3,1) b) (6,8) c) (3,-2) d) (-6,8)
76.The centre and radius of the circle x2+y2+4x–6y+2=0 are
a) (-2,3) & 5 b) (-2,3) & 5 c) (2,-3) & 5 d) (2,-3) & 2
77.The angle between the straight lines x + 2y -3 = 0 & 2x + 4y -4 = 0 is
a) ? = 90º b) ? = 60º c) ? = 0º d) ? = 45º
78.The condition for the pair of straight lines ax2+2xy+by2+2x+2y+3=0 to be perpendicular is
a) h2–ab = 0 b) ab = 2 c) a+b = 0 d) a-b = 0
79.The particular integral of +3 + 2y = 2e-x is
a) 2xe-x b) 2e-x c) x2e-x d) xe-x
80.The particular integral of +4 + 4y = 3sin2x is
a) – cos2x b) cos2x c) sin2x d) 3xcos2x
81.The complementary function of (D2+3)y = e-x is
a) Ae x + Be x b) (A+Bx) e x
c) A cos3x + B sin3x d) A cos x + B sin x
82.The solution of (D2-2D-15)y = 0 is
a) y = Ae3x + Be5x b) y = Ae-3x + Be-5x
c) y = Ae5x + Be-3x d) y = Ae-5x + Be3x
83.The particular integral of + y = 3 is
a) 3 b) x/3 c) 3/y d) -3
84.The area bounded by x2 = 2y, the x-axis and the lines x = 1 and x = 3 is
a) b) c) d)
85.The area of the curve y = sin x bounded by the x-axis from x = 0 to x = 2? is
a) 0.5 b) 1.0 c) 1.5 d) 2.0
86.The area enclosed by the curve xy = 8 and x-axis from x = 1 to x = 4 is
a) 8 log 2 b) 16 log 2 c) 4 log 2 d) 2 log 4
87.The area bounded by the curve x = 3y2 – 9 and the lines x = 0, y = 0 and y = 1 is
a) 8 b) c) d) 3
88.When the area enclosed by the curve y = and the x-axis from x = 0 and x = 4 is rotated about the x-axis, the volume generated is
a) b) c) d)
89.The area included between the curve y = x – x2 and the x-axis revolves about the x-axis. The volume generated by the area is
a) b) c) d)
90.If the area enclosed between the curve y2 = x3 + 5x and the x-axis from x = 2 to x = 4 is revolved about the x-axis, the volume of the solid generated is
a) 45? b) 90? c) 120? d) 60?
91.

a) 12 b) 0 c) 6 d) 18

92. =

a) sin-1x b) cos-1x c) tan-1x c) cot-1x

93.

a) log f(x) b) 2 c) f(x) d) f(x)/2

94.

a) sec x b) tan x c) cos x d) cot x

95.The acceleration of a particle at any time t is given by 3×2 – 2x + 1, then the velocity of the particle at any time is

a) x3 -2x 2 + x b) x3 -x 2 + x c) x 2 + x d) x 2 + x +1

96.The Laplace transform of f(t) = t2 e-3t is

a) b) c) d)

97.The Laplace transform of f(t) = 1 + cos2t is

a) b) c) d)

98.The Laplace transform of unit step function is

a) b) c) 1 d)

99.The initial value of the function F(S) =

a) 1 b) 0 c) 2 d)

100.The inverse Laplace transform of is

a) e-t b) 1-e-t c) 1- et d) 2(1+ e-t)

101.The inverse Laplace transform of is

a) et cos2t b) et sin2t c) e-t cos2t d) e-t sin2t

102.(1+i)3 is equal to

a) 3 + 3i b) 1 + 3i c) 3 – 3i d) 2i – 2

103.The value of i13+i14+i15+i16 is

a) 0 b) -1 c) i d) –i

104. The polar form of complex number -1- i is

a) 2(cos + i sin ) b) 2(cos + i sin )

b) 2(cos – i sin ) d) 2(cos + i sin )

105.The modulus of a complex number is

a) b) 2 c) 1 d)

106.The value of (3+?+3?2)4 is

a) 16 b) 16 ? c) -16 ? d) 0

107.The value of is

a) cos 2? + i sin 2? b) cos ? + i sin ?

c) cos ? – i sin ? d) cos 26? + i sin 26?

108.The value of the fourier coefficient bn for the function f(x) = cosx defined in (-?, ?) is

a) 0 b) 1 c) ? d) -2 ?

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109. The value of the fourier coefficient a0 for the half range series for f(x) defined in (0, ?) is
a) a0 = b) a0 =
c) a0 = d) 0
110.The value of the fourier coefficient an for the function f(x) is odd is
a) 0 b) an =
c) an= d) a0 =
111.The value of the fourier coefficient bn for the function f(x) is even is
a) 0 b) bn =
c) bn = d) bn =
112.If u = exy then x
a) u b) u logeu c) logeu d) ueu
113.If u = then the value of is
a) b) 0 c) x+y d) -1
114.If u = sin-1 , then the value of is
a) b) c) d)
115.If u = xy, then is
a) y/x b) xyx-1 c) yxy-1 d) xy-1
116. Given = = 6 and . = 18, the angle between and is
a) b) c) d)
117.( – ) x ( + ) =
a) 2 x b) x c) 2 x d) 2 – 2
118.The volume of the parallelepiped whose three coterminous edges are represented by the vectors + , + , + is
a) 2 b) 3 c) 4 d) 1
119.The value of p such that the vectors -2 + 3 , 4 +3 – and 11 +p + 7 are coplanar is
a) -7 b) 0 c) -12 d) 12
120.Reverberation of sound means
a) existence of sound in a room
b) vibration of sound waves
c) existence of sound eventhough the source of sound is cutoff
d) strong echoes
121.Ultrasonic waves can be produced by
a) Piezo-electric effect b) Inverse Piezo-electric effect
c) Magnetostriction effect d) Both b & c
122.The Sabine's formula for reverberation time is
a) T = b) T =
c) T = d) T = 0.16 aAS

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