TNEB ECE Model Question Paper 3

1. For a 5Kw DC motor the number of slots per pole should be
   a)4 **b)5**
   c)12 d)16

2. Kirchhoff's second law is based on law of conservation of
   a)Charge **b)Energy**
   c)Momentum d)Mass

3. The charge on an electron is known to be $1.6*10^{-19}$ coulomb. In a circuit the current flowing is 1A. How many electrons will be flowing through the circuit in a second?
   a)$1.6*10^{19}$ b)$1.6*10^{-19}$
   c)$0.625*10^{19}$ d)$0.625*10^{12}$

4. DC motor yoke is generally made of
   a)Wood b)Copper
   c)Aluminum **d)Steel**

5. Ampere second could be the unit of
   a)Power b)conductance
   c)Energy **d)Charge**

6. Two bulbs marked 200 watt -250 volts and 100 watt-250 volts are joined in series to 250 volts supply. Power consumed in circuit is
   a)33 watt **b)67 watt**
   c)100 watt d)300 watt

7. A circuit contains two un-equal resistances in parallel
   a)Current is same in both
   b)Large current flows in larger resistor
   c)Potential difference across each is same
   d)Smaller resistance has smaller conductance

8. The unit of electrical conductivity is
   a)mho/metre b)mho/Sq.m
   c)ohm/metre d)ohm/Sq.m

9. The resistance of a 100 W, 200 V lamp is
   a)100 ohm b)200 ohm
   c)400 ohm d)1600 ohm

10. Which mode of radiation occurs in an helical antenna due to smaller dimensions if helix as compared to a wave length?
    a)Normal b)Axial
    c)Both a and b **d)None**

11. Sometimes a reactor is connected in series with a transformer to
    a)Improve regulation
    b)Control fault current
    c)Improve efficiency
    d)Improve power factor

12. The transformer noise is mainly because of
    a)Cooling oil b)Sinusoidal current
    c)Magnetic flux d)All of the above

13. A dipole carriers r.m.s current of about 300A across the radiation resistance 2Ω.What would be the power radiated by an antenna?
    a)90KW b)135KW
    c)180 KW d)200 KW

14. In a transformer iron losses vary as _____ of voltage
    a)Inverse b)Inverse square
    c)Square d)Cube

15. In a transformer, with change in frequency

a)Copper losses increase
b)Copper losses decrease
c)Copper losses remain unchanged
d)None

16. If a synchronous motor fails to start, the probable cause could be
a)Low voltage
b)Too much load at starting
c)Single phasing
d)Any of the above

17. In overhead transmission lines the effect of capacitance can be neglected when the length of line is less than
a)200km b)160km
c)100 km **d)80km**

18. Resistivity of a wire depends on
a)Length **b)Material**
c)Cross section area d)None

19. The fact that a conductor carries more current on the surface as compared to core, is known as
a)Skin effect
b)Corona
c)Permeability
d)Unsymmetrical fault

20. Conductors for high voltage transmission lines are suspended from towers
a)To reduce clearance from ground
b)To increase clearance from ground
c)To reduce wind and snow loads
d)To take care of extension in length during summer

21. Boosters are basically
a)Inductors
b)Capacitors
c)Transformers
d)Synchronous motors

22. Which of the following is usually not the generating voltage?
a)6.6kV **b)9.9 kV**
c)11 kV d)13.2 kV

23. The surge impedance for over head line is taken as
a)10 – 20 ohms b)50-60 ohms
c)100 -200 ohms d)1000 -2000ohms

24. Pin insulators are normally used up to voltage of about
a)100kV b)66kV
c)33kv **d)25kV**

25. When n resistance each of value r are connected in parallel, then resultant resistance is X. When these n resistances are connected in series, total resistance is
a)nX b)rnX
c)X/n **d)n^2X**

26. The effect of corona is
a)Increased energy loss
b)Increased reactance
c)Increased inductance
d)All of the above

27. Between two supports due to sag the conductor takes the form of
a)Catenary b)Triangle
c)Ellipse d)Semi circle

28. For 66 kV lines the number of insulators discs used are
a)3 **b)5**

c)8 d)12

29. _____increases the steady state accuracy
a)Integrator
b)Differentiator
c)Phase lead compensator
d)Phase lag compensator

30. Which of the following is not the dame as watt?
a)Joule/sec **b)Amperes/volt**
c)Amperes*volts d)(amperes)^2*ohm

31. On which of the following factors does the sensitivity of a closed loop system to gain changes and load disturbances depend?
a)Frequency b)Loop gain
c)Forward gain **d)All of the above**

32. Lowest critical frequency is due to pole and it may be present origin or nearer to origin, then it is which type of network?
a)LC b)RL
c)RC d)Any of the above

33. By which of the following elements, mechanical translational systems are obtained?
a)Mass element b)Spring element
c)Dash pot **d)All of the above**

34. Force balancing equation for elastic element (K) is (Where X= displacement)
a)K d^2X/dt^2 b)K dX/dt
c)K*X d)None

35. Two six pulse converters used for bipolar HVDC transmission system, are rated at 1000 MW, + -200 kv. Find the dc current in the transmission line
a)500 A b)5A
c)2500A d)25A

36. A triac is equivalent to two SCRs____
a)In parallel b)In series
c)In inverse parallel d)None

37. Which property of an antenna is likely to be evidenced in accordance to Reciprocity theorem?
a)Equality of impedances
b)Equality of directional patterns
c)Equality of effective length
d)All of the above

38. Voltage communication circuit can be converted in to a current communication by interchanging the portions of
a)Diode and capacitor b)Capacitor & SCR
c)Inductor and capacitor d)Capacitor & load

39. In a three phase converter, the number of notches per cycle is
a)One b)Three
c)Six d)Nine

40. The conduction losses in IGBT is
a)More than that of MOSFET
b)Lower than that of MOSFET
c)Equal to that of MOSFET
d)Equal to that of BJT

41. The input current waveform of a bridge controller rectifier when the load is perfectly filtered is
a)Sine wave **b)Square wave**
c)Saw tooth wave d)Trapezoidal wave

42. A step down choppers can be used in
a)Electric traction b)Electric vehicles
c)Machine tools **d)All of these**

43. Storage of 1KB means the following number of bytes

a)1000 b)964
c)1024 d)1064

44. Which of the following gate is a two level logic gate
a)OR gate b)NAND gate
c)EXCLUSIVE OR gate d)NOT gate

46. The binary code of$(21.125)_{10}$ is
a)10101.001 b)10100.001
c)10101.010 d)10100.111

47. How ,any Flip-Flops are required for mod-16 counter?
a)5 b)6
c)3 **d)4**

48. Which of the following signals is/are periodic?
a)s(t)=cos 2t+cos 3t+cos 5t
b)s(t)=exp(j8πt)
c)s(t)=exp(-7t)sin 10πt
d)s(t)=cos 2t cos 4t

49. If a signal f(t) has energy E, the energy of the signal f(2t) is equal to
a)E **b)E/2**
c)2E d)4E

45. In case of induction motor, with increase in supply voltage, which of the following increases?
a)Power factor b)Slip
c)Torque d)All of the above

50. The trigonometric Fourier series of an even function of time does not have
a)The dc term
b)sine term
c)Cosine term
d)Odd harmonic term

51. A system with an input x(t) and output y(t) is described by the relation y(t)=t.x(t).This system is
a)Linear and time invariant
b)Linear and time varying
c)Non linear& time invariant
d)Non linear and time varying

52. Convolution of x(t+5) with impulse function δ(t-7) is equal to
a)x(t-12) b)x(t-2)
c)x(t+12) d)x(t+2)

53. A system is defined by its impulse response $h(n)=2^n u(n-2)$.The system is
a)Stable and causal
b)stable but not causal
c)Causal but not stable
d)Unstable and non causal

54. Demodulation is the process of?
a)Converting digital signals to analog signals
b)Converting analog signals to digital signals
c)Dividing the high speed signals in to frequency bands
d)None

55. Which of the following is an important characteristics of LAN?
a)Application independent interface
b)Low cost access for low bandwidth channels
c)Unlimited expansion
d)Parallel transmission

56. Mobile computers and personal digital assistant (PDAs) are the examples of?
a)Radio broadcasting
b)Wireless network
c)Geosynchronous
d)LAN

57. Why was the OSI developed?
a)Manufactures disliked the TCP/IP protocol
b)The rate of data transfer was increasing exponentially
c)Standards were needed to allow any two systems to communicate
d)None

58. To deliver a message to the correct application program running on a host, the ____ address must be consulted?
a)Port b)Physical
c)IP d)None

59. A network that requires human intervention o route signals is called a ?
a)Bus network
b)Ring network
c)Star network
d)T-switched network

60. A 741-type OP-AMP has a gain bandwidth product of 1Mhz.A non-inverting amplifier using this opamp & having a voltage gain of 20db will exhibit 3db bandwidth of
a)50KHz **b)100KHz**
c)1000/17 KHz d)1000/7.07 KHz

61. The frequency of the male voice is
1) greater than female voice
2) less than female voice
3) equal to the female voice
4) double than female voice

62. A combination of two or more notes which produces a pleasing effect on the car is called
1) internal **2) concord**
3) chord 4) harmony

63. The velocity of sound in air is
1) 340 m/s 2) 15 m/s
3) 1500 m/s 4) 5000 m/s

64. In Simple Harmonic Motion (SHM), y = 0.01 sin $\left(20\pi t + \frac{\pi}{6}\right)$, the frequency of oscillation is
1) $\frac{\pi}{3}$ **2) 10 Hz**
3) 20π Hz 4) 20 Hz

65. Among the following laser sources which source will give visible light radiation?
1) Ruby laser 2) Nd YAG laser
3) CO_2 laser **4) He-Ne laser**

66. Vander Waal's equation of state of a gas is
1) PV = nRT
2) $\left(P + \frac{a}{v^2}\right)(U + b) = RT$
3) $\left(\mathbf{P + \frac{a}{v^2}}\right)\mathbf{(V - b) = RT}$
4) $\left(P - \frac{a}{v^2}\right)(V - b) = RT$

67. In a cyclic heat engine operating between a source temperature of 600° C and a sink temperature of 20° C, the least rate heat rejection per kw net output of the engine is
1) 0.460 kw **2) 0.505 kw**
3) 0.588 kw 4) 0.650 kw

68. In a Carnot's engine, when the working substance rejects its heat to sink, the temperature of the sink
1) increases
2) remains the same
3) decreases
4) first increases and subsequently decreases

69. The translational kinetic energy of gas molecules for one mole of the gas is equal to
1) $\mathbf{\frac{3}{2}RT}$ 2) $\frac{2}{3}$KJ

3) $\frac{1}{2}$RT 4) $\frac{3}{2}$KJ

70. A gas having a negative joule thompson coefficient ($\mu < 0$) when throttle will
1) become cooler
2) become warmer
3) remain at the same temperature
4) either be cooler (or) warmer depending on the type of gas

71. In the regenerative cycle, port of the steam is withdrawn from the turbine and used in heating the
1) exhaust fan
2) feed water
3) steam being supplied to the turbine
4) all of the above

72. Soft super conductors observe
1) Meissner effect
2) Silsbee's rule
3) both (1) and (2)
4)AC Josephsan's rule

73. At frequencies around $5\times10^{14}H^2$, the ionic polarization becomes
1) unity 2) infinity
3) zero 4) positive

74. The band gap of silicon is about
1) 0.8 eV **2) 1.1 eV**
3) 0.2 eV 4) 2 eV

75. Double extended format should have at least bits
1) 64 2) 120
3) 80 4) 44

76. How many views' thus memory exist in Pentium memory management
1) 2 2) 3
3) 4 4) 5

77. To find length of string
1) strlen ( ) 2) len ( )
3) string len( ) 4) str lenth ( )

78. Gas A at 125 Kpa (abs) is compressed. Isothermally and gas B at 100 Kpa (abs) is compressed is entropically (r= 1.4) which gas is more compressible.
$Z = \frac{1}{K} = \frac{-(dv/v)}{dp}$
1) 0.008, 0.007143 m^2/KN
2.) 0.08, 0.07143 m^2/KN
3) 0.8, 0.7143 m^2/KN
4) None of the above

79. The intensity of pressure at any point in a liquid at rest is the same in all directions?
1) Pascal's Law 2) Kirchhoff's law
3) Either of the above 4)None of the above

80. The buoyancy depends on
1) mass of liquid displaced
2) viscosity of the liquid
3) depth of immersion
4) pressure of the liquid displaced

81. In turbulant flow, which of the following gives the exact velocity distribution?
1) Logarithmic distribution
2) Blasius equation
3) Prandl's one-seventh power
4) Power law with index varying

82. $F(x,y)=x^2+xyz+z$ find f_x at(1,1,1)
a)0 b)1
c)3 d)-1

83. The gradient of a function is parallel to the velocity vector of the level curve
a)True **b)False**

84. Maximize the function x+y-z=1 with respect to the constraint xy=36
a)0 b)-8
c)8 **d)Nomaxima exists**

85. The span of a Astroid is increased along both the x and y axes equally. Then the maximum value of : z=x+y along the asteroid
a)Increases
b)Decreases
c)Invariant
d)The scaling of Astroid is irrelevant

86. If f(a) equals to f(b) in mean value theorem, then it becomes
a)Lebniz theorem
b)Rolle's theorem
c)Taylor series of a function
d)Leibnit'x theorem

87. If f(t)=sqrt(t), then its laplace transform is given by
a)1/2 b)1/s
c)sqrt(π)/2sqrt(s) d)Does not exist

88. If α and β are the eigen values of $\begin{bmatrix} 3 & -1 \\ -1 & 5 \end{bmatrix}$. Form the matrix whose eigen values are α^3 and β^3.
1) $\begin{bmatrix} \mathbf{38} & \mathbf{-50} \\ \mathbf{-50} & \mathbf{138} \end{bmatrix}$ 2) $\begin{bmatrix} 70 & 60 \\ 138 & 38 \end{bmatrix}$
3) $\begin{bmatrix} 0 & 150 \\ 138 & 43 \end{bmatrix}$ 4) $\begin{bmatrix} 27 & -1 \\ -1 & 125 \end{bmatrix}$

89. For a diagonal matrix the eigen values are
1) the main diagonal elements
2) first row elements
3) first column elements
4) none of these

90. Find the eigen values of A = $\begin{bmatrix} 1 & 0 & 0 \\ 2 & 8 & 0 \\ 3 & 1 & 3 \end{bmatrix}$
1) 1, 8, 3 2) 3, 4, 2
3) 4, 5, 6 4) 1, 1, 2

91. Particular integral for $(D^2 - 4D + 4)\, y = \cos 2x$ is
1) $\frac{\sin 2x}{4}$ **2)** $\mathbf{\frac{-\sin 2x}{8}}$
3) $\frac{\cos 2x}{8}$ 4) 0

92. Particular integral for $(D^2 - 4D + 13)\, y = e^{2x} \cos 3x$ is
1) xsin3x 2) $\frac{x \sin 3x}{6}$
3) $\frac{xe^{2x} \sin 3x}{6}$ **4)** $\mathbf{\frac{xe^{2x}}{6}}$

93. Solution of (xD2 + D) y = 0 is
1) $y = A \log x + Be^x$ 2) $y = Ae^x + B$
3) y = A log x + B 4) $y = e^x + e^{-x}$

94. Find the particular integral for $\frac{d^2y}{dx^2} = xe^x$
1) $e^x(x+1)$ 2) $e^x(2x-1)$
3) $\mathbf{e^x(x-2)}$ 4) $e^x(x^2 + 2x)$

95. If $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$ and $r = |\bar{r}|$ thcn ∇r^4 is
1) r^2 **2)** $\mathbf{4r^2\bar{r}}$
3) 0 4) 1

96. If $\bar{A}$ and $\bar{B}$ are irrotational then $\bar{A} \times \bar{B}$ is
1) solenoidal 2) irrotational
3) 1 4) 0

97. The circulation of $\bar{F}$ round the curve C where $\bar{F} = y\bar{i} + z\bar{j} + x\bar{k}$ and C is the circle $x^2 + y^2 = 1$, z = 0 is
1) π **2)** $\mathbf{-\pi}$

3) 0 4) r

98. If $\bar{F} = ax\bar{i} + by\bar{j} + cz\bar{k}$ where a, b, c are constants, then $\iint_S \bar{F} \cdot \hat{n}\, ds$ where S is surface of a unit sphere is
1) (a + b + c) 2) P (a + b + c)
3) $\frac{4\pi}{3}(a + b + c)$ 4) 0

99. Which of the following is a vector quantity?
1) temperature 2) distance
3) mass **4) momentum**

100. The force of friction between two bodies is contact
1) depends upon the area of the contact
2) is always normal to the surface of their contact
3) depends upon the relative velocity between their
4) depends upon the velocity of the body