TS Southern Junior Lineman Exam
Model Paper 7

1. Which of the following semiconducting compounds is used in photoconductive devices?

1. Caesium antimonide
2. Barium oxide
3. Lead sulphide
4. Zinc oxide

2. Consider the following transducers:

1.LVDT

2.Piezoelectric

3.Thermocouple

4.Photovoltaic cell

Which of the above are active transducers?

1. 1, 2 and 3
2. 1, 2 and 4
3. 2 and 3 only
4. 2, 3 and 4

3. Consider the following statements regarding magnetic materials:

1.A diamagnetic material has no permanent dipole

2.Paramagnetic material has anti-parallel orientation of equal moments with neighboring dipoles

3.Ferrimagnetic material has anti parallel orientation of unequal moments between neighboring dipoles

4.Anti-ferromagnetic material has negligible interaction between neighboring dipoles

Which of these statements are correct?

1. 1 and 2
2. 3 and 4
3. 2 and 4

4. 1 and 3

4. Consider the following statements regarding hysteresis loops of hard and soft magnetic materials:

1.Hysteresis loss of hard magnetic material will be less than that of soft material

2.Coercivity of hard materials will be greater than that of soft material

3.Retentivity of the two materials will always be equal

Which of these statements are correct?

1. 1, 2 and 3
2. 2 only
3. 3 only
4. 1 and 3 only

5. Loss-tangent in plane waves in lossy dielectrics will be

1. Proportional to the Y component of the magnetic field intensity (H_Y)
2. Inversely proportional to the Y component of the magnetic field intensity (H_Y)
3. Inversely proportional to the X component of the magnetic field intensity (H_X)
4. proportional to the X component of the magnetic field intensity (H_X)

6. Orientational polarization is

1. Inversely proportional to temperature and proportional to the square of the permanent dipole moment
2. proportional to temperature as well as to the square of the permanent dipole moment
3. proportional to temperature and inversely proportional to the square of the permanent dipole moment
4. Inversely proportional to temperature as well

as to the square of the permanent dipole moment

7. In time domain specification, decay ratio is the ratio of the

1. Amplitude of the first peak and the steady-state value
2. Amplitudes of the first two successive peaks
3. Peak value to the steady-state value
4. None of the above

8. A lossless transmission line has a characteristic impedance of Z_0 and capacitance per unit length of C. The velocity of propagation of the travelling wave on the line is

1. $Z_0 C$
2. $\dfrac{1}{Z_0 C}$
3. $\dfrac{Z_0}{C}$
4. $\dfrac{C}{Z_0}$

9. A pair of high-frequency parallel transmission lines has distributed capacitance and inductance of 0.8 F and 9.8 mH respectively. What is the characteristic impedance of the line?

1. $98.26\ \Omega$
2. $110.68\ \Omega$
3. $125\ \Omega$
4. $128.2\ \Omega$

10. The propagation constant of a transmission line is $0.15 \times 10^{-3} + j1.5 \times 10^{-3}$ The wavelength of the travelling wave is

1. $\dfrac{1.5 \times 10^{-3}}{2\pi}\ m$

2. $\dfrac{2\pi}{1.5 \times 10^{-3}}\ m$

3. $\dfrac{1.5 \times 10^{-3}}{\pi}\ m$

4. $\dfrac{\pi}{1.5 \times 10^{-3}}\ m$

11. The skin effect in a transmission line is affected by

1. The resistivity of the transmission line
2. The current magnitude in the transmission line
3. The cross-sectional area of the transmission line
4. The voltage applied across the transmission line

12. There are no transient in pure resistance circuit because they

1. Offer high resistance
2. Obey Ohm's law
3. Have no stored energy
4. Are linear circuits

13. A DVM uses 10 MHz clock and has a voltage controlled generator which provides a width of 5 s/volt of unit signal. 10V input signal would correspond to a pulse count of

1. 500
2. 750
3. 250
4. 1000

14. A resistance strain gauge with a gauge factor is 2.0 is fastened to a steel member subjected to a stress of $100 N/mm^2$. The modulus of elasticity of steel is approximately $2 \times 10^5\ N/mm^2$. The percentage of change in resistance is

1. 1.50
2. 1.00
3. 0.15

4. 0.10

15. The resistance of 125 Ω strain gauge changes by 1 Ω for 4000 micro-strain. The gauge factor for strain gauge is

1. 1.5
2. 2.0
3. 2.5
4. 3.0

16. Delay line is essential in a CRO, to ensure that

1. Vertical signal starts after the retrace period of sweep signal
2. The sweep reaches the horizontal plates before the desired signal under consideration
3. Initial part of signal to be observed is not lost
4. All of the above

17. Which of the following ADC has highest accuracy?

1. Successive approximation type
2. Flash or parallel type
3. Single slope integration type
4. Dual slope integration type

18. Volt-box is basically a device used for

1. Measuring the voltage
2. Extending the range of voltmeter
3. Extending the voltage range of the potentiometer
4. Measuring power

19. D input of a clocked D-flip flop receives an input $A \oplus Q_n$ where A is an external logic input and Q_n is the output of the nth D-FF before the clock appears. The circuit works as

1. Ex OR gate

2. T-FF
3. D-FF
4. JK-FF

20. Which one of the following is the correct answer when 11011_2 is subtracted from 11011_2 by using the 1's complement method?

1. 01001
2. 10001
3. 00011
4. 00010

21. An Excess-3 code arithmetic operation is used to perform the

1. Binary addition
2. Binary subtraction
3. BCD addition
4. BCD subtraction

22. Convert the decimal 41.6875 into octal.

1. 51.54
2. 51.13
3. 54.13
4. 51.51

23. Ready pin of a microprocessor is used

1. To indicate that microprocessor is ready to receive inputs
2. To indicate that microprocessor is ready to receive outputs
3. To introduce wait state
4. To provide direct memory access

24. A bus connected between the CPU and the main memory that permits transfer of information between main memory and the CPU is known as

1. DMA bus

2. Memory bus

3. Address bus

4. Control bus

25. While measuring the voltage developed by a thermocouple, it is found that there is always an offset voltage. This is due to

1. A voltage across thermocouple even at very low temper

2. Some photoelectric voltage across the junction due to ambient light

3. A barrier potential across the junction

4. An additional thermocouple is formed due to the connecting wires and one of the metals.

26. For an antenna, radiation intensity is defined as

1. The time-averaged radiated power per unit solid angle

2. The peak radiated power per unit solid angle

3. The peak radiated power per unit area

4. The time-averaged radiated power per unit area

27. A source of (power/energy) feeds the input port of an amplifier and the output port is connected to a 'load'. The input impedance of the ideal amplifier should ideally be

1. Zero

2. ∞

3. Low

4. high

28. Medium doping in Silicon and Germanium corresponds to impurity of the order of

1. 1 part in 10^6

2. 1 part in 10^5

3. 1 part in 10^4

4. 1 part in 10^8

29. An electric field is applied to a semiconductor. Let the number of charge carriers be *n* and the average drift speed by *v*. If the temperature is increased then

1. Both n and v will increase

2. n will increase but v will decrease

3. v will increase but n will decrease

4. Both n and v will decrease

30. A heavily doped semiconductor has

1. A resistivity which decreases exponentially with temperature

2. A resistivity which rises almost linearly with temperature

3. A negative temperature coefficient of resistance

4. A positive temperature coefficient of resistance

31. Consider the following expressions:
1.Y = *f*(A, B, C, D) = ∑(1, 2, 4, 7, 8, 11, 13, 14)
2.Y = *f*(A, B, C, D) = ∑(3, 5, 7, 10, 11, 12, 13, 14)
3.Y = *f*(A, B, C, D) = ∏(0, 3, 5, 6, 9, 10, 12, 15)
4.Y = *f*(A, B, C, D) = ∏ (0, 1, 2, 4, 6, 8, 9, 15)Which of these expressions are equivalents of the expression
Y = A ⊕ B ⊕ C ⊕ D?

1. 1 and 2

2. 1 and 4

3. 2 and 3

4. 1 and 3

32. In a 5 × 7 dot matrix format

1. 64 bits are required to store 64 alphanumeric characters

2. 560 bits are required to store 64 alphanumeric characters

3. 1120 bits are required to store 64 alphanumeric characters

4. 2240 bits are required to store 64 alphanumeric characters

33. Consider the following statements:

1.SRAM is made up of flip-flops
2.SRAM stores bit as voltage
3.DRAM has high speed and low density
4.DRAM is cheaper than SRAM

Which of the above statements are correct?

1. 1, 2 and 3
2. 1, 3 and 4
3. 2, 3 and 4
4. 1, 2 and 4

34. Consider the following statements: SCR can be turned on by

1.Applying anode voltage at a sufficiently fast rate

2.Applying sufficiently large anode voltage

3.Increasing the temperature of SCR to sufficiently large value

4.Applying sufficiently large gate current

Which of the above statements are correct?

1. 1, 2 and 3
2. 1, 3 and 4
3. 1, 2 and 4
4. 2, 3 and 4

35. Which of the following is the fastest switching device?

1. JFET
2. BJT
3. MOSFET
4. Triode

36. Which of the following does not cause damage of an SCR?

1. High current

2. High rate of rise of current

3. High temperature rise

4. High rate of rise of voltage

37. The property of Fourier transforms which states that the compression in time domain is equivalent to expansion in the frequency domain is

1. Duality
2. Scaling
3. Time scaling
4. Frequency shifting

38. The Fourier transform of a rectangular pulse is

1. Another rectangular pulse
2. Triangular pulse
3. Sinc function
4. Impulse function

39. If F(s) and G(s) are the Laplace transforms of *f(t)* and *g(t)*, then their product F(s).G(s) = H(s), where H(s) is the Laplace transform of *h(t)*, is defined as

1. $(f.g)(t)$

2. $\int_0^1 f(\tau)\, g(t-\tau)d\tau$

3. Both (a) and (b) are correct

4. $f(t).\, g(t)$

40. With the following equations, the time-invariant systems are

1. $\frac{d^2 y(t)}{dt^2} + 2t\frac{d}{dt}y(t) + 5y(t) = x(t)$
2. $y(t) = e^{-2x(t)}$
3. $y(t) = \left[\frac{d}{dt}x(t)\right]^2$
4. $y(t) = \frac{d}{dt}\left[e^{-2t}x(t)\right]$

1. 1 and 2

2. 1 and 4

3. 2 and 3

4. 3 and 4

41. H ($e^{j\omega}$) is the frequency response of a discrete time LTI system and H_1 ($e^{j\omega}$) is the frequency response of its inverse function. Then

1. $H(e^{j\omega})H_1(e^{j\omega}) = 1$

2. $H(e^{j\omega})H_1(e^{j\omega}) = \delta(\omega)$

3. $H(e^{j\omega})+ H_1(e^{j\omega}) = 1$

4. $H(e^{j\omega})+ H_1(e^{j\omega}) = \delta(\omega)$

42. The impulse response of a discrete time system is given by
H(n)=$\frac{1}{2}\{\delta[n] + \delta[n-2]\}$

The magnitude of the response can be expresses as

1. $|\cos \Omega|$

2. $\cos \Omega$

3. $|\sin \Omega|$

4. $\sin \Omega$

43. A unity feedback second order control system is characterized by the open loop transfer function(s) $=\frac{k}{s(js+B)}$
J =moment of inertia, B = damping constant and K = system gain The transient response specification which is not affected by system gain variation is

1. Peak overshoot

2. Rise time

3. Settling time

4. Time to peak overshoot

44. The number of 2 µF, 300 V capacitors needed to obtain a capacitance value of 2 µF rated for 1200 V is

1. 16

2. 12

3. 10

4. 08

45. Consiter the following statements regarding advantages of closed loop negative feedback control systems over open loop system

1. The overall reliability of the closed loop system is more than that of open loop system.

2.The transient response in a closed loop system decays more quickly than in open loop system.

3.In an open loop system, closing of the loop increases the overall gain of the system.

4.In the closed loop system, the effect of variation of component parameters on its performance is reduced.

Which of these statements are correct?

1. 1 and 2

2. 1 and 3

3. 2 and 4

4. 3 and 4

46. A forcing function (t^2-2t) u (t-1) is applied to a linear system. The $\mathcal{L}$ - of the forcing function is

1. $\frac{2-s}{s^3}\epsilon^{-2s}$

2. $\left(\frac{1-s^2}{s}\right)\epsilon^{-s}$

3. $\frac{1}{s}e^{-s} - \frac{1}{s^2}\epsilon^{-2s}$

4. $\left(\frac{2-s^2}{s^3}\right)\epsilon^{-s}$

47. In control systems, excessive bandwidth is *not* employed because

1. Noise is proportional to bandwidth

2. It leads to low relative stability

3. It leads to slower time response

4. Noise is proportional to the square of the bandwidth

48. The transfer function of a system is $\dfrac{1}{1+sT}$ **.**

The input to this system is the ramp function, *tu(t).* the output would track this system with an error given by

1. Zero

2. $\dfrac{T}{2}$

3. T

4. $\dfrac{T^2}{2}$

49. The synchronous reactance of a 500 V, 50 kVA alternator having an effective resistance of 0.2 Ω, if an excitation current of 10 A produces 200 A armature current on short circuit and an emf of 450 volts on open circuit is

1. 2.6 Ω

2. 5.2 Ω

3. 2.24 Ω

4. 4.5 Ω

50. The main advantage of distributing the winding in slots is to

1. Reduce the size of the machine

2. Add mechanical strength to the winding

3. Reduce the amount of copper required

4. Reduce the harmonics in the generated emf

51. When the rotor speed, in a synchronous machine, becomes more than the synchronous speed during hunting, the damper bars develop

1. Induction motor torque

2. Induction generator torque

3. Synchronous motor torque

4. DC motor torque

52. In a split phase motor, the running winding should have

1. High resistance and low inductance

2. High resistance as well as low inductance

3. Low resistance and high inductance

4. Low resistance as well as low inductance

53. A 3-phase induction motor draws 50 kW from a 220V, 50 Hz mains. The rotor emf makes 100 oscillations/minute. If the stator losses are 2 kW the rotor copper loss would be

1. 0.16 kW

2. 0.32 kW

3. 1.6 kW

4. 3.2 kW

54. Starting torque can be obtained in the case of a single phase induction motor with identical main and auxiliary windings by connecting

1. A capacitor across the mains

2. A capacitor in series with the machine

3. A capacitor in series with the auxiliary winding

4. The main and the auxiliary winding in series

55. In the load-frequency control system with free governor action, the increase in load demand under steady condition is met

1. Only by increased generation due to opening of steam valve

2. Only by decrease of load demand due to drop in system frequency

3. Partly by increased generation and party by decrease of load demand

4. Partly by increased generation and party by increased generator excitation

56. Fault calculations using computer program are usually done by

1. Y_{bus} method
2. Z_{bus} method
3. Both of the above
4. None of the above

57. The per unit of a 4Ω resistor at 100 MVA base and 10 kV base voltage is

1. 2 pu
2. 4 pu
3. 0.4 pu
4. 40 pu

58. An unloaded generator with a pre-fault voltage 1 pu has the following sequence impedances: $Z_0 = j\,0.15$ pu, $Z_1 = Z_2 = j\,0.25$ pu The neutral is grounded with a reactance of 0.05 pu. The fault current in pu for a single-line to ground fault is

1. 3.75 pu
2. 4.28 pu
3. 6 pu
4. 7.25 pu

59. For a fault in a power system, the term critical clearing time is related to

1. Reactive power limit
2. Transient stability limit
3. Short circuit current limit
4. Steady state stability limit

60. The rate of rise of re-striking voltage (RRRV) is dependent upon

1. Resistance of the system only
2. Inductance of the system only
3. Capacitance of the system only
4. Inductance and Capacitance of system

61. A voltage source inverter is used when source and load inductances are respectively

1. Small and large
2. Large and small
3. Large and large
4. Small and small

62. Consider the following statements: Phase controlled converters at small values of output voltage have

1. Large harmonics in utility system

2. Poor power factor

3. High efficiency

4. Notches in line voltage waveform

Which of the above statements are correct?

1. 1 and 2 only
2. 1, 2 and 4
3. 2, 3 and 4
4. 1 and 4 only

63. A piezoelectric crystal has a coupling coefficient K of 0.32. How much electrical energy must be applied to produce output energy of 7.06×10^{-3} J?

1. 25.38 mJ
2. 22.19 mJ
3. 4.80 mJ

4. 2.26 mJ

64. A wattmeter reads 10 kW, when its current coil is connected in R phase and the potential coil is connected across R and neutral of a balanced 400 V (RYB sequence) supply. The line current is 54 A. If the potential coil reconnected across B-Y phases with the current coil in R phase, the new reading of the wattmeter will be nearly

1. 10 kW
2. 13 kW
3. 16 kW
4. 19 kW

65. For a type-I system, the intersection of the initial slope of the Bode plot with 0dB axis gives

1. steady-state error
2. error constant
3. phase margin
4. cross-over frequency

General knowledge

66. Which of the following was /were reason for the success of European trading companies in South India during the 17th century

1. the presence of the Mughals in the South was not as much as in the North
2. The Vijay Nagar kingdom had been overthrown in the late 16th century
3. The South had many small and weak states

Select the correct answer using the code given below

1. 1,2, and 3
2. 1 and 2
3. 2 and 3
4. 1 only

67. Which one among the following was not a possible reason for the success of Nadir Shah's military campaign in Delhi

1. weak Mughal Emperor
2. Lack of strong defence in the North West Fronter
3. Late prepration for the defence of Delhi
4. use of superior military technology by the invading army

68. What is the correct sequence of the following events occurred during the war of American Independence?

1. Boston Tea Party
2. Battle of Bunker Hill
3. Declaration of American Independence
4. George Washington named chief of the continental forces

1. 1, 2, 3, 4
2. 2, 1, 4, 3
3. 3, 1, 4, 2
4. 4, 2, 3, 1

69. The Karakoram Highway connects which of the following pairs of countries?

1. India-Nepal
2. India-China
3. India-Pakistan
4. China-Pakistan

70. Which one of the following is not a correct example of tropical cyclone?

1. Tornadoes
2. typhoons
3. Hurricanes
4. nor westers

71. National income is the

1. net national product at market price

2. net national product at factor cost

3. net domestic product at market price

4. net domestic product at factor cost

72. Consider the following statements

1. The Constitution of India has 40 parts.

2. There are 390 Articles in the Constitution of India in all.

3. Ninth, Tenth, Eleventh and Twelfth Schedules were added to the Constitution of India by the Constitution

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

1. 1 and 2

2. Only 2

3. Only 3

4. 1, 2 and 3

73. Tank irrigation area predominantly found in the district of

1. Khammam

2. Karimnagar

3. Nizamabad

4. Warangal

74. 'Gusadi' Dance is popular in which district of Telangana ?

1. Nizamabad

2. Khammam

3. Warangal

4. Adilabad

75. The other popular name of Komaravelli Veerabhadra Swamy is

1. Ellanna

2. Mallanna

3. Rajanna

4. Beeranna

76. Adding detergents to water helps in removing dirty greasy stains. This is because

1. It increases greasy stains. This is because

2. It decreases the oil-water surface tension

3. It increases the viscosity of the solution

4. Dirt is held suspended surrounded by detergent molecules

1. 2 and 4

2. 1 only

3. 3 and 4

4. 4 only

77. A compound of 'A' and 'B' crystallises in a cubic lattice in which 'A' atoms occupy the lattice points at the corners of the cube. The 'B' atoms occupy the centre of each face of the cube. The probable empirical formula of the compound is

1. AB_2

2. A_2B

3. AB

4. AB_3

78. What is/are true about heart wood?
(A) It does not help in water conduction.
(B) It is also called laburnum.
(C) It is dark in colour but very soft.
(D) It has tracheary elements which are filled with tannin, resin, etc.

1. B,C and D
2. A and D
3. B and D
4. A, B and C

2. Shooting
3. Wushu
4. Table Tennis

79. Sadia Tariq is associated with which sports who won Gold medal recently in a world championship ?
1. Archerv

80. Who has been appointed as the Non-Executive Non-independent Director of CASHe in March 2022 ?
1. Subhash Kumar
2. Alka Mittal
3. Naresh Karia
4. Shashi Shanker

MODEL PAPER 7 KEY

Electrical Engineering

1.3, 2.4, 3.4, 4.2, 5.2, 6.1, 7.4, 8.2, 9.2, 10.2, 11.3, 12.3, 13.1, 14.4,15.2, 16.4, 17.4, 18.3, 19.2, 20.4, 21.3, 22.1, 23.3, 24.2, 25.4, 26.1, 27.2,28.1, 29.2, 30.4, 31.4, 32.4, 33.4, 34.3, 35.3, 36.4, 37.3, 38.3, 39.2, 40.3, 41.1, 42.1, 43.3, 44.1, 45.3, 46.4, 47.1, 48.3, 49.3, 50.4, 51.2, 52.3, 53.3, 54.3, 55.1, 56.1, 57.2, 58.1, 59.2, 60.4, 61.4, 62.2, 63.2, 64.2, 65.2

General knowledge

66.3, 67.4, 68.3, 69.4, 70.4, 71.2, 72.3, 73.4, 74.4, 75.2, 76.1, 77.2, 78.2,79.3, 80.3