TS Southern Junior Lineman Exam
Model Paper 8

Electrical Engineering

1. Behavior of conductors, semiconductors and insulators is explained on the basis of

1. Atomic nature
2. Molecular structure
3. Energy band structure
4. All of the above

2. In general, for a superconductor, which of the following statements is true?

1. A superconductor is a perfect paramagnetic material with the magnetic susceptibility equals to positive unity
2. A superconductor is a perfect diamagnetic material with the magnetic susceptibility equals to negative one
3. A superconductor is a perfect ferromagnetic material with the magnetic susceptibility equals to positive one
4. A superconductor is a perfect piezoelectric material with the magnetic susceptibility equals to negative one

3. Ferro-electric materials have a

1. High dielectric constant which varies non linearly
2. Low dielectric constant and is non-linear
3. High dielectric constant which varies linearly
4. Low dielectric constant but linear

4. In the magnetic core the electromotive forces (emf) induced in accordance with Faraday's law of electromagnetic induction give rise to

1. Eddy current
2. Excitation current
3. Armature current
4. Field current

5. Consider the following characterizing parameters of a material:

1.Magnetic permeability

2.Electron relaxation time

3.Electron effective mass

4.Energy band gap

In case of metals, increase in one of the above parameter decreases its conductivity, while increase in another increases the conductivity. There are respectively

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

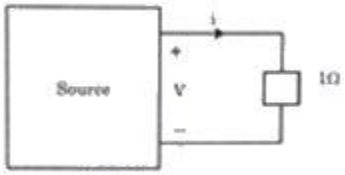
6. Some magnetic materials may be classified on the basis of

1.Susceptibility
2.Saturation
3.Spin arrangement
4.Nature of hysteresis loop
5.Domain structure
6.Critical temperature above

which it behaves as a paramagnetic material Which of these can be used to distinguish between ferri and ferromagnetic materials?

1. 1, 3 and 4 only
2. 2, 3 and 6 only
3. 3, 4 and 5 only
4. 1, 2, 3, 4, 5 and 6

7. As shown in the figure, 1 Ω resistance is connected across a source that has a load line v + i = 100. The current through the resistance is



1. 25 A

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2. 50 A
3. 100 A
4. 200 A

8. An RLC resonant circuit has a resonance frequency of 1-5 MHz and bandwidth of 10 kHz. If C = 150 PF, then effective resistance of the circuit will be

1. 29.5 Ω
2. 14.75 Ω
3. 9.5 Ω
4. 4.7 Ω

9. Consider the following two types of non-identical sources:
1.Voltage sources $e_1(t)$ and $e_2(t)$
2.Current source $i_1(t)$ and $i_2(t)$
Regarding the mode of their connection in a circuit,

1. 1 cannot be connected in parallel, and 2 cannot be connected in series
2. 1 cannot be connected in series, and 2 cannot be connected in parallel
3. Both 1 and 2 cannot be connected in series
4. Both 1 and 2 cannot be connected in parallel

10. In a series resonant circuit, maximum voltage across L occurs at

1. Resonant frequency
2. Slightly below Resonant frequency
3. Slightly above Resonant frequency
4. At a frequency where I is maximum

11. A coil having an inductance of 0.5 H and a resistance of 60 Ω is connected in series with a capacitance of 10μF . The coil is connected to 100V ac supply. What is the source frequency and current flowing in the circuit under resonance condition?

1. 7.121 Hz and 16.7 A
2. 7.121 Hz and 1.67 A
3. 71.21 Hz and 16.7 A
4. 71.21 Hz and 1.67 A

12. Consider the following properties attributed to state model of a system:
1.State model is unique

2.Transfer function for the system is unique

3.State model can be derived from transfer function of the system

Which of the above statements are correct?

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

13. To minimize voltmeter loading

1. Voltmeter operating current has to be very small
2. Voltmeter operating current has to be very high
3. Resistance connected in series with the coil should be low
4. Resistance connected in parallel with the coil should be high

14. A 3-phase moving coil type power factor meter has three fixed and symmetrically spaced current coils, inside of which are three other similarly placed moving potential coils. While in operation, rotating magnetic field is produced

1. In the current coils but not in the potential coils
2. In the potential coils but not in the current coils
3. In both potential coils and current coils
4. In neither the potential coils nor the current coils

15. In a low power factor wattmeter, sometimes compensating coil is connected in order to

1. Neutralize the capacitive effect of pressure coil

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2. Compensate for inductance of pressure coil
3. Compensate for power loss in the pressure coil
4. Reduce the error caused by eddy current

16. The current and potential coils of a wattmeter were accidentally interchanged while connecting. After energizing the circuit, it was observed that the wattmeter did not show the reading. This would be due to

1. Damage done to the potential coil
2. Damage done to the current coil
3. Damage done to both potential current coils
4. Loose contact

17. A current i = 5 + 14.14 sin (314t + 45^0) is passed through a center-zero PMMC, hot-wire and moving-iron instrument, the respective readings are

1. -5, 15 and $\sqrt{125}$
2. 5,$\sqrt{125}$ and $\sqrt{125}$
3. -5,$\sqrt{125}$ and 19.14
4. 5, 10 and 10

18. A frequency counter needs to measure a frequency of 15 Hz. Its signal gating time is 2s. What is the percentage accuracy of the counter, taking into account the gating error?

1. 3.33%
2. 13.33%
3. 98.67%
4. 96.67%

19. A microprocessor is designed to access 2 k ROM, 4 k PROM and 64 k RAM. The number of address lines required to access these memories by the μP is

1. 16
2. 17
3. 18
4. 19

20. With reference to 8085 microprocessor, which of the following statements are correct?

1.INR-is 1-byte instruction
2.OUT is 2-byte instruction
3.STA-is 3-byte instruction

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

21. Consider the following registers:
1.Accumulator and Flag register
2.B and C registers
3.D and E registers
4.H and L registers

Which of these 8-bit registers of 8085 P can be paired together to make a 16-bit register?

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

22.The first microprocessor to include virtual memory in the Intel microprocessor family is

1. 80236
2. 80386
3. 80486
4. Pentium

23. In 8085 microprocessor, which mode of addressing does the instruction CMP M use?

1. Direct addressing
2. Register microprocessor
3. Indirect microprocessor
4. Immediate microprocessor

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24. Which of the following 8085 instruction will require maximum T-states for execution?

1. XRI byte
2. STA address
3. CALL address
4. JMP address

25. A Zener diode has the following properties:

1.It is properly doped crystal diode with sharp breakdown.

2.It is reverse biased

3.Its forward characteristics are just that of ordinary diode

4.Its reverse characteristics are like and ordinary diode

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

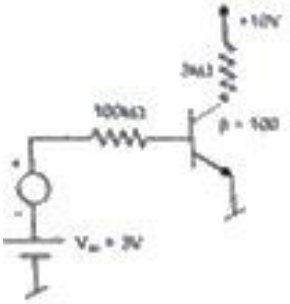
26. A tunnel diode is a *p-n* junction in which

1. *n*-region is degenerately doped
2. *p*-region is degenerately doped
3. either *n* or *p*-region is degenerately doped
4. both *n* and *p*-regions are degenerately doped

27. Which is the diode used for measuring light intensity?

1. Junction diode
2. Varactor diode
3. Tunnel diode
4. Photo diode

28.



The trans-conductance g_m of the transistor used in the CE amplifier shown in the above circuit, operating at room temperature is

1. 92 mA/V
2. 46 mA/V
3. 184 mA/V
4. 25 mA/V

29. Which of the following are essentials of a transistor biasing circuit?

1.Proper zero signal collector current flow

2.V_{CE} should not fall below 0.5 V for Germanium and 1 V for Silicon

3.Ensure stabilization of operating point

4.Loading to the source

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

30. When a transistor is saturated,

1. The emitter potential is more than the

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base-collector potential

2. The collector potential is more than the base-emitter potential
3. The base potential is more than the emitter-collector potential
4. The base, emitter and collector are almost the same potential

31. For the V-I characteristics of an SCR, which of the following statements are correct?

1.It will trigger when the applied voltage is more than the forward break over voltage.

2.Holding current is greater than latching current.

3.When reverse biased, a small value of leakage current will flow.

4.It can be triggered without gate current.

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

32. Which of the following transistors is symmetrical in the sense that emitter and collector or source and drain terminals can be interchanged?

1. JFET
2. MOSFET
3. NPN transistor
4. PNP transistor

33. The snubber circuit used to shape the turn-on switching trajectory of thyristor and/or to limit $\frac{di}{dt}$ during turn on is

1. L – R snubber polarized
2. R – C snubber polarized
3. R – C snubber unpolarized
4. L – R snubber unpolarized

34. In a forward convertor, a tertiary winding is used. What is the reason?

1. To provide $\frac{di}{dt}$ protection to the switching device
2. To provide $\frac{dv}{dt}$ protection to the switching device
3. To provide electrical isolation between the input and output
4. To demagnetize the core before the application of the next switchi

35. A 200/100 V, 50 Hz transformer is to be excited at 40 Hz from the 100V side. For the exciting current to remain same, the applied voltage should be

1. 150 V
2. 125 V
3. 100 V
4. 80 V

36. Consider the following statements: The intrinsic carrier concentration of a semiconductor

1.Depends on doping

2.increases exponentially with decrease of band gap of semiconductor

3.increases non-linearly with increase of temperature

4.increases linearly with increase of temperature

Which of the above statements are correct?

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

37. The discrete time described by $y(n)= x(n)^2$ is

1. Causal and linear

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2. Causal and non-linear
3. Non-causal and linear
4. Non-causal and non-linear

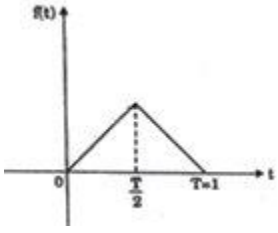
38. The Z-transform corresponding to the Laplace transform function G(s)=$\frac{10}{s(s+5)}$ is

1. $\frac{2Z\,e^{-sZ}}{(Z-1)(Z-e^{-T})}$
2. $\frac{2(1-e^{-5T})Z}{(Z-1)(Z-e^{-5T})}$
3. $\frac{e^{-5Z}}{(Z-1)^2}$
4. $\frac{e^{-T}}{Z(Z-e^{-3T})}$

39. The step response of a discrete time system will transfer function H(z) = $\frac{10}{(z-1)(z+2)}$ is given by

1. $\frac{-10}{9}+\frac{10}{3}n+\frac{10}{9}(-2)^n$
2. $-5+\frac{n}{2}+(-2)^n$
3. $\frac{-7}{9}+\frac{5}{3}n+(-3)^n$
4. $-2+5(1-2^n)$

40. Laplace Transform of the function f(t) shown in the figure is



1. $\frac{2}{s^2}[1-e^{-0.5s}]^2$
2. $\frac{2}{s^2}[1+e^{-0.5s}]^2$
3. $\frac{2}{s^2}[1-e^{0.5s}]^2$
4. $\frac{2}{s^2}[1+e^{0.5s}]^2$

41. Which one of the following relations is not correct?

1. $f(t)\delta(t)=f(0)\delta(t)$
2. $\int_{-\infty}^{\infty}f(t)\delta(\tau)d\tau=1$
3. $\int_{-\infty}^{\infty}f(t)d\tau=1$
4. $f(t)\delta(t-\tau)=f(\tau)\delta(t-\tau)$

42. Unit step response of the system descried by difference equation y(n)+y(n-1)=x(n) is

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

43. A unit impulse response of a second order system is $\frac{1}{6}e^{-0.8t}\sin(0.6t)$ Then natural frequency and damping ratio of the system are respectively

1. 1 and 0.6
2. 1 and 0.8
3. 2 and 0.4
4. 2 and 0.3

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44. Consider the following statements about Routh-Hurwitz criterion: If all the elements in one row of Routh array are zero, then there are

1.Pairs of conjugate roots on imaginary axis.

2.Pairs of equal roots with opposite sign.

3.Conjugate roots forming a quadrate in the s-plane.

Which of these statements are correct?

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

45. The characteristic equation of a control system is given by s(s+4)(s+5)(s+6)+k(s+3)=0 The number of asymptotes and the centroid of the asymptotes of this control system are

1. 3 and (4, 0)
2. -3 and (-4, 0)
3. -3 and (-12, 0)
4. 3 and (-4, 0)

46. An effect of phase-lag compensation on servo-system performance is that

1. For a given relative stability, the velocity constant is increased
2. For a given relative stability, the velocity constant is decreased
3. The bandwidth of the system is increased
4. The time response of the system is made faster

47. The system matrix of a linear time invariant continuous time system is given by

$A=\begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix}$. What are the roots of the characteristic equation?

1. -1,-4
2. -1,-5
3. -4,-5
4. 0,-1

48. In a closed loop system for which the output is the speed of a motor, the output rate control can be used to

1. Reduce the damping of the system
2. Limit the torque output of the motor
3. Limit the speed of the motor
4. Limit the acceleration of the motor

49. The ratio of starting to full load current for a 10 kW, 400V, 3-phase induction motor with star delta starter, given the full load efficiency as 0.86, the full load pf is 0.8 and short circuit current is 30A at 100 V is

1. 1.9
2. 1.8
3. 2.4
4. 3.2

50. In the core-type two-winding transformer, the low-voltage winding is placed adjacent to the steel core, in order to

1. Facilitate dissipation of heat during the operation of the transformer
2. Minimize the amount of insulation required
3. Reduce the chances of axial displacement with respect to the high-voltage winding space outside
4. Reduce the mutual radial stress between the two windings

51. Transient state stability is generally improved by

1. Using high speed governors on machines
2. Using low inertia machines
3. Dispensing with neutral grounding

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4. Any of the above

52. When a transformer is first energized, the transient current during first few cycles is:

1. Less than full load current
2. Equal to full load current
3. Equal to no load current
4. Much higher than full load current

53. For power transformers of larger ratings, the tappings are located in the middle portion of the winding to:

1. Increase the breakdown strength of the winding insulation
2. Enable better cooling of the windings
3. Enable better distribution of interturn voltage
4. Reduce the mechanical forces affecting the windings during short circuits

54. Tappings are normally provided on the high voltage winding of a transformer only, because:

1. It has larger number of turns which allows smoother variation of voltage
2. It has to handle low currents
3. It is easily accessible physically
4. It has larger number of turns, has to handle low currents and is also easily accessible physically

55. The method used to implement an asynchronous link is

1. DC back to back connected convertor
2. 0 - 360° static phase shifter
3. Rotary transformer
4. Static Var Compensator

56. With reference to hydropower station, the graphical representation of the discharge as a function of time is known as:

1. Monograph
2. Hectrograph
3. Load duration curve
4. Hydrograph

57. One million cubic meters of water is stored in a reservoir feeding a water turbine. The density of water is 993 kg/m^3. If the center of mass of water is 50 meters above the turbine and the losses are negligible, the energy produced by that volume of water is:

1. 135.3 MWhr
2. 130 MWhr
3. 120 MWhr
4. 140 MWhr

58. For harnessing low variable water loads, the suitable hydraulic turbine with reaction and adjustable vanes runners is:

1. Frames
2. Impeller
3. Kaplan
4. Pelton

59. In a thermal power station, a typical heat balance sheet, for a large turbine and surface condenser taken together, is the percentage distribution of heat energy in:

1.Work done or thermal efficiency
2.Friction and windage loss
3.Heat to circulating water
4.Heat in condensate to be retained to the boiler

The percentage amount of heat in the heads stated above, in the descending order is:

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

60. The incremental cost characteristics of two generators delivering a load of 200 MW are as follows:

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$\frac{dF1}{dp1}$ = 2.0 +0.01P_1

$\frac{dF2}{dp2}$ =1.6 +0.02p_2

For economic operation the generation of P_1 and P_2 should be:

1. 120 MW and 80 MW
2. 80 MW and 120 MW
3. 120 MW and 120 MW
4. 80 MW and 80 MW

61. Which of the following regulator provides output voltage polarity reversal without a transformer?

1. Buck regulator
2. Boost regulator
3. Buck-boost regulator
4. CUK regulator

62. In a 3-ϕ controller bridge rectifier, the maximum conduction of each thyristor is

1. 60°
2. 90°
3. 120°
4. 150°

63.The desirable features of a servomotor are

1. low rotor inertia and low bearing friction
2. high rotor inertia and high bearing friction.
3. low rotor inertia and high bearing friction
4. high rotor inertia low bearing friction

64. Permeance is inversely related to

1. resistance
2. conductance
3. reluctance
4. capacitance

65. Consider the following statements regarding an ideal core material:

1. It has very high permeability.

2. It loses all its magnetism when there is no current flow.

3. It does not saturate easily.

Which of the above statements are correct?

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

General Knowledge

66. which of the following statements regarding consolidation of British power in 18th century Benfal is/are correct

1. The Nawab granted the Company the Nizamat powers in 1765

2. The duties of collecting revenues and administration of justice were entrusted with the European officials of the East Indian Company

1. 1 only
2. 2 only
3. both 1 and 2
4. neither 1 nor 2

67. Tipu Sultan major interest building ships was to

1. fight the English at sea
2. promote trade and commerce
3. maintain diplomatic relations with Muscat
4. establish an overseas settlement at Port Basra which would be under his control on lines of

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the European companies

68. Who was the head of the Provisiona government of Russia in 1917?

1. Leon Trotesky
2. Kerensky
3. Nicolas ll
4. Vladimir llych Lenin

69. Which of the following latitudes passes through India?

1. Equator
2. Arctic Circle
3. Tropic of Capricorn
4. Tropic of Cancer

70.Temperate cyclones bring along with them:

1. Pleasant weather
2. Snowfall and hail
3. Thunderstorms and torrential rainfall
4. Mild rainfall

Solution: 4

71. Chelliah Committee of 1992 deals with the overhauling of our

1. financial system
2. tax system
3. patents and copyrights
4. Public sector undertakings

72. Who among the following was the chairman of the Union Constitution Committee of the Constituent Assembly?

1. BR Ambedkar
2. JB Kripalani
3. Jawaharlal Nehru
4. Alladi Krishnaswami Ayyar

73. Name the Village of Telangana, in which coal was found for the first time .

1. Bellampalli .
2. Bhupalpalli
3. Yellandu
4. Ramagundam

74. Who established the Asian Largest Sugar Factory in Shakkar Nagar ?

1. Sharad Pawar
2. Mir Osman Ali Khan
3. Azam Khan
4. N.T. Rama Rao

75. How many Mandals of Khammam District are merged in Andhra Pradesh after bifurcation of the State ?

1. 6.
2. 7
3. 8
4. 9.

76. Choose the correct statement (a) for a cricket ball that is spinning clockwise through air
S1 : Statemlines of air are symmetric around the ball.
S2 : The velocity of air above the ball relative to it is larger than that below the ball.

S3 : The velocity of air above the ball relative to it is smaller than that below the ball.

S4 : There is a net upward force on the ball.

1. S1,S2 and S4
2. S2 and S4
3. S4 only
4. S3 only

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77. In electrophilic aromatic substitution reaction, the nitro group is meta directing because it

1. decreases electron density at ortho and para positions
2. decreases electron density at meta position
3. increases electron density at meta position
4. increases electron density at ortho and para position

78. Compare the statements A and B.

Statement A: Auxins promote apical dominance by suppressing the activity of lateral buds.
Statement B: In moriculature, periodic pruning of shoot tips is done to make mulberry plants bushy.

Select the correct description.

1. Both the statements A and B are correct and A is the reason for B
2. Statement A is correct and B is wrong
3. Statement A is wrong and B is correct
4. Both the statements A and B are correct and A is not the reason for B

79. What is the theme of the Rare Diseases Day 2022 ?

1. Empowering Girls for a Brighter Tomorrow
2. Protection of Children, our responsibility
3. Rare is Many, Rare is strong, Rare is Proud
4. Patient and Researchers - Partners for Life

80. The Centre has approved the procurement of how many indigenous light combat helicopters from Hindustan Aeronautics Limited for the Indian Air Force in March 2022 ?

1. 7
2. 10
3. 12
4. 15

Model paper 8 key

Electrical Engineering

1.3, 2.2, 3.1, 4.1, 5.2, 6.2, 7.2, 8.4, 9.1, 10.3, 11.4, 12.3, 13.1, 14.1, 15.3, 16.2, 17.2, 18.4, 19.1, 20.4, 21.2, 22.1, 23.3, 24.3, 25.2, 26.4, 27.4, 28.1, 29.1, 30.3, 31.2, 32.1, 33.1, 34.4, 35.4, 36.3, 37.2, 38.2, 39.1, 40.1, 41.2, 42.1, 43.2, 44.4, 45.4, 46.1, 47.1, 48.4, 49.1, 50.2, 51.1, 52.4, 53.4, 54.4, 55.1, 56.4, 57.1, 58.3, 59.3, 60.1, 61.3, 62.3, 63.1, 64.3, 65.2

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General Knowledge

66.3, 67.2, 68.1, 69.4, 70.4, 71.2, 72.3, 73.3, 74.2, 75.2, 76.2, 77.4, 78.1 , 79.4, 80.4

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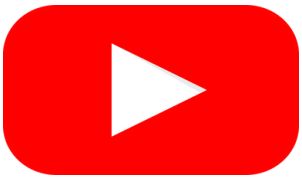

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