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Model Paper 4

1. In an induction type energy meter, the steady speed attained by the rotating disc is

1. Proportional to the deflecting torque.
2. Proportional to the resistance of the path of eddy currents.
3. Inversely proportional to the effective readings of disc from its axis.
4. Inversely proportional to the square of brake magnetic flux.

Which of the above are correct?

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

2. If 'KCLFTSB' stands for 'best of luck' and 'SHSWDG' stands for 'good wishes', which of the following indicates 'ace the exam'?

1. MCHTX
2. MXHTC
3. XMHCT
4. XMHTC

3. Consider the following statements associated with the basic electrostatic properties of ideal conductors:

1.The resultant field inside is zero.
2.The net charge density in the interior is zero.
3. Any net charges reside on the surface.
4.The surface is always equipotential.
5.The field just outside is zero.

Which of the above statements are correct?

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

4. A semiconductor device made out of a material having very high temperature coefficient of resistance is

1. Transistor
2. Varistor
3. Thyristor
4. Thermistor

5. The electrical conductivity of a semiconductor increases with increase in temperature because

1. The carrier concentration increases
2. The mobility of carrier increases
3. Both carrier concentration and mobility increases
4. The band gap decreases

6. Which of the following are associated with soft superconductors?

1.Silsbee's rule
2.Meissner effect
3.Faraday rotation
4.Curie-Weiss law

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

7. In an electric circuit, the number of independent meshes M is

1. 2B – N + 1
2. B – N + 1
3. 2B – N – 1
4. B – N – 1

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8. The generator which gives de supply to the rotor is called :

1. Converter
2. Exciter
3. Inverter
4. Rectifier

9. The power factor of a circuit in which voltage and current waves are non-sinusoidal is defined as

1. It is the cosine of the angle of phase difference between the voltage and current waves
2. It is the cosine of the angle of phase difference between two complex waves
3. It is the cosine of the angle of phase difference between two equivalent sine waves having respectively r.m.s. values equal to those of the voltage and current in the circuit
4. It is the sine of the angle of phase difference between the two complex waves

10. The low-frequency circuit impedance and the high-frequency circuit impedance for a series resonant circuit respectively are

1. Capacitive and inductive
2. Inductive and capacitive
3. Resistive and inductive
4. Capacitive and resistive

11. Which of the following is an invalid state in an 8-4-2-1 binary codede decimal counter

1. 1000
2. 1001
3. 0011
4. 1100

12. The maximum space rate of change of the function which is in increasing direction of the function is known as

1. Curl of the vector function
2. Gradient of the scalar function
3. Divergence of the vector function
4. Stokes theorem

13. For ammeters M_1, M_2, M_3 and M_4 with the following specifications are available. (Full scale, accuracy value as percentage of FS)

M_1 = 20 0.10;
M_2 = 10 0.20;
M_3 = 5 0.50;
M_4 = 1 1.00;

A current of 1 A is to be measured. To obtain minimum error in the reading one should select meter.

1. M_1
2. M_2
3. M_3
4. M_4

14. A dc voltmeter has a sensitivity of 1000Ω/V. When it measures half full scale in 100V range, the current through the voltmeter is

1. 100 mA
2. 50 mA
3. 1 mA
4. 0.5 mA

15. Two wattmeter method is employed to measure power in a 3-phase balanced system with the current coil connected in the A and C lines. The phase sequence is ABC. If the wattmeter with its current coil in A-phase line reads zero, then the power factor of the 3-phase load will be

1. Zero lagging

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2. Zero leading
3. 0.5 lagging
4. 0.5 leading

16. What is the number of turns of wire needed to provide a potentiometer with a resolution of 0.05 percent?

1. 200 turns
2. 2000 turns
3. 20 turns
4. 20000 turns

17. The principle of operation used in capacitive transducers to measure level of liquid is change of

1. Area of plates
2. Dielectric strength
3. Distance between plates
4. Shape of plates

18. In moving iron instruments, eddy current damping cannot be used as

1. They have a strong operating magnetic field
2. They are not normally used in vertical position
3. They need a large damping force, which can only be provided by air friction
4. The introduction of a permanent magnet required for eddy current damping would distort the existing weak operating magnetic field

19. The function $Y=A+\bar{B}.C$ in canonical sum of product form is

1. $Y = \Sigma$ 1, 3, 5, 6, 7
2. $Y = \Sigma$ 1, 4, 5, 6, 7
3. $Y = \Sigma$ 2, 3, 5, 6
4. $Y = \Sigma$ 2, 3, 5, 7

20. The correct instruction execution sequence is

1. Execute, Decode and Fetch
2. Fetch, Execute and Decode
3. Execute, Fetch and Decode
4. Fetch, Decode and Execute

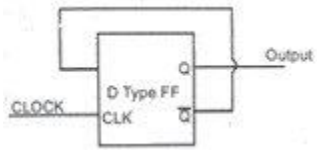
21. A half adder can be constructed using

1. One XOR and one OR gate with their outputs connected in parallel
2. One XOR and one OR gate with their outputs connected in series
3. One XOR gate and one AND gate
4. Two XNOR gates

22. For an SR flip-flop, S and R are made equal to 1. What is the value of Q?

1. Unchanged
2. Clear to 0
3. Set to 1
4. Indeterminate

23. What is the frequency of the output Q for the circuit shown in the figure?



1. Twice the input clock frequency
2. Half the input clock frequency
3. Same as the input clock frequency
4. Inverse of the propagation delay of the flip-flop

24. Four memory chips of 16 × 4 sizes have their address buses connected together. This system will be of size

1. 64 × 4

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2. 32 × 8
3. 16 × 16
4. 256 × 1

25. In a pn junction diode, $|\frac{dv}{dt}|$ is equal to

1. 2.3 mV/°C
2. 3.5 mV/°C
3. 10.0 mV/°C
4. 12.5 mV/°C

26. Examples of an active display and a passive display respectively are

1. LCD and Gas discharge plasma
2. LED and LCD
3. Gas discharge plasma and LED
4. Electrophoretic Image display and LED

27. The dc resistivity and permeability exhibited by a type 1 superconductor are respectively

1. Zero and zero
2. Zero and unity
3. Unity and xero
4. Unity and unity

28. What is an advantage of MOS transistor structure in integrated circuits?

1. Faster switching
2. Less capacitance
3. Higher component density and lower cost
4. Lower resistance

29. An LTI system has a wide-sense stationary (WSS) input signal with zero mean. Its output is

1. Non-zero mean and non-WSS signal
2. Zero mean and WSS signal
3. Non-zero mean and WSS signal
4. Zero mean and non-WSS signal

30. In degenerately doped n conduction n-type semiconductor, the Fermi level lies in conduction band when

1. Concentration of electrons in the conduction band exceeds the density of states in the valence band
2. Concentration of electrons in the valence band exceeds the density of states in the conduction band
3. Concentration of electrons in the conduction band exceeds the product of the density of states in the valence band and conduction band
4. None of the above

31. A ripple counter with n flip-flops can function as a

1. n : 1 counter
2. $\frac{n}{2}$: 1 counter
3. $2n$: 1 counter
4. 2^n: 1 counter

32. The relation among IC (Instruction Cycle), FC (Fetch Cycle) and EC (Execution Cycle) is

1. IC = FC – EC
2. IC = FC + EC
3. IC = FC + 2EC
4. EC = IC + FC

33. Among the given instructions, the one which affects maximum number of flags is

1. RAL
2. POP PSW
3. XRA A
4. DCR A

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34. Race-around condition occurs in

1. Multiplexer
2. ROM
3. Flip-flops
4. Voltage regulator

35. Which one of the following is used for serial I/O transfer in 8085 based system?

1. 8251
2. 8255
3. 8259
4. 8279

36. An analog voltage is in the range of 0 to 8 V. It is divided in 8 equal intervals for conversion to 3-bit digital output. The maximum quantization error is

1. 0 V
2. 0.5 V
3. 1 V
4. 2 V

37. A discrete-time system has input x[.] and output y[.] satisfying

$y[m] = \sum_{j=-\infty}^{m} x[j]$

The system is

1. Linear and unstable
2. Linear and stable
3. Non-linear and stable
4. Non-linear and unstable

38. The Fourier transform of rectangular pulse for a period t= $-\frac{T}{2}$ to $t = \frac{T}{2}$ is

1. A sinc function
2. A sine function
3. A cosine function
4. A sine-squared function

39. If a continuous time signal x(t) can take, on any value in the continuous interval (∞, ∞), it is called

1. Deterministic signal
2. Random signal
3. Analog signal
4. Digital signal

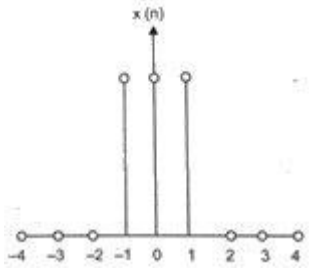
40. A continuous time system will be BIBO stable if all the Eigne values are

1. One
2. Distinct and their real parts negative
3. Negative
4. Zero

41. The ramp function can be obtained from the unit impulse at t =0 by

1. Differentiating unit impulse function once
2. Differentiating unit impulse function twice
3. integrating unit impulse function once
4. integrating unit impulse function twice

42.



The signal x(n) shown in the above figure is a

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1. Periodic discrete time signal
2. Periodic signal
3. Non-periodic signal
4. Periodic discrete time signal consisting of 3 non-zero samples

43. Consider the following functions:

1. $\frac{(s^2+1)(s^2+3)}{s(s^2+2)}$
2. $\frac{s(s^2+1)(s^2+3)}{(s^2+0.5)(s^2+2)}$
3. $\frac{(s^4+4s^2+3)}{s^2+2s}$
4. $\frac{(s^5+4s^3+3s)}{s^4+2.5s+1}$

Which of the above functions are LC driving point impedances?

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

44.The dominant poles of servo-system are located at s=(-2$\pm j$2) The damping ratio of the system is

1. 1
2. 0.8
3. 0.707
4. 0.6

45. For a unity feedback control with $G(s)=\frac{9}{s(s+3)}$ **, the damping ratio is**

1. 0.5
2. 1
3. 0.707
4. 0.33

46. The overall transfer function of a second order control system is given by

$$\frac{c(s)}{R(s)} = \frac{2}{S^2+3s+2}$$

The time response of this system, when subjected to a unit step response is

1. $1-e^{-2t}+2e^{-t}$
2. $1+e^{-2t}+2e^{-t}$
3. $1-2e^{-t}+e^{-2t}$
4. $1+e^{-2t}$

47.The position and velocity error coefficients for the system of transfer function

$$G(s) = \frac{50}{(1+0.1s)(1+2s)}$$

are respectively

1. Zero and zero
2. Zero and infinity
3. 50 and zero
4. 50 and infinity

48.Consider the open-loop transfer function:

$$G(s)H(s) = \frac{5(s+1)}{S^2(s+5)(s+12)}$$

The steady state error due to a ramp input is

1. 0
2. 5
3. 12
4. ∞

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49.For obtaining very quick braking of a 3-phase, wound-rotor induction motor running on load

1. A large external resistance has to be inserted in the rotor-circuit
2. A large external resistance has to be inserted in the stator-circuit
3. Interchange any two terminals of the stator supply
4. Interchange any two terminals of the rotor to the slip-rings

50.Consider the following statements: As a three-phase induction motor is loaded from no-load to rated load

1.There is an improvement in the power factor
2.The torque increases almost in proportion to slip
3.The air-gap flux falls sharply

Which of the above statements are correct?

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

51. A small 3-phase induction motor has a short-circuit current 5 times of full-load current and full-load slip 5%. If starting resistance starter is used to reduce the impressed voltage to 60% of the normal voltage, the starting torque obtained in terms of full load torque would be

1. 30%
2. 45%
3. 55%
4. 80%

52. The frequency of rotor emf of an 8-pole induction motor is 2 Hz. IF the supply frequency is 50 Hz, then the motor speed is

1. 1500 rpm
2. 750 rpm
3. 375 rpm
4. 720 rpm

53. For a given applied voltage and current, the speed of a universal motor would be

1. Higher in dc excitation than in ac excitation
2. Higher in ac excitation than in dc excitation
3. Same in both dc and ac excitation
4. Dangerously high in dc excitation

54. Two single-phase transformers A and B with equal turn's ratio have reactance of j3 Ω and j9 Ω referred to secondary. When operated in parallel, the load-sharing of 100 kW at 0.8 pf lag between A and B transformers would respectively be

1. 75 kW and 25 kW
2. 60 kW and 40 kW
3. 20 kW and 80 kW
4. 25 kW and 75 kW

55. No load test was conducted on a three phase induction motor at different input voltages and the input power obtained was plotted against the input voltage. The intersection of the extrapolated curve on the Y-axis, would give:

1. Rated core loss
2. Windage and friction loss
3. Rates copper loss
4. Rated core loss and windage and friction loss

56. A power generating station has a maximum demand of 1000 MW. The annual load factor is 75% and plant capacity factor is 60%. Calculate the reserve capacity.

1. 250 MW

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2. 500 MW
3. 750 MW
4. 1250 MW

57. In order to have lower cost of power generation:

1. The load factor and diversity factor should be low
2. The load factor and diversity factor should be high
3. The load factor should be low but diversity factor should be high
4. The load factor should be high but diversity factor should be low

58. Consider the following statements: The calculation performed using short line approximate model instead of nominal-∏ model for a medium length transmission line delivering lagging load at a given receiving and voltage always results in higher:

1.Sending end current
2.Sending end power
3.Regulation
4.Efficiency

Which of these statements are correct?

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

59.The locus constant received power is a circle of radius:

1. $\frac{|V_S||V_R|}{|B|}$
2. $\frac{|V_S|^2}{|B|}$
3. $\frac{|V_R|^2}{|B|}$
4. $\frac{|V_S - V_R|^2}{|B|}$

60. Consider the following statements regarding convergence of the Newton-Raphson procedure:

1.It does not converge to a root when the second differential coefficient changes sign
2.It is preferred when the graph of (X) is nearly horizontal where it crossed the X-axis
3.It is used to solve algebraic and transcendental equations

Which of these statements are correct?

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

61.Consider the following statements about IGBT

1.It has high input impedance
2.It has low ON state voltage drop
3.Its switching speed is higher than that of the MOSFET.
4.It is a voltage controlled device.

Which of the above statements are correct?

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

62. The input power factor of the convertor circuit may be defined as the ratio of

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1. Total mean input power to the total rms input volt amperes
2. Total rms input volt amperes to the total mean input power
3. Total peak input volt amperes to the total rms input volt amperes
4. Total input rms volt amperes to the total input peak volt amperes

63.In a mutually coupled circuit, the primary current is reduced from 4A to zero in 10 s. A voltage of 40000 V is observed across the secondary. The mutual inductance between the coils is

1. 100 H
2. 10 H
3. 0.1 H
4. 0.01 H

64. A CRO screen has 10 divisions on the horizontal scale. If a voltage signal 5 sin (314t + 45°) is examined with a line base setting of 5 ms/div, the number of signals displayed on the screen will be

1. 1.25 cycles
2. 2.5 cycles
3. 5 cycles
4. 10 cycles

65. Which one of the following conditions will be correct when three identical bulbs forming a star are connected to a three-phase balanced supply?

1. The bulb in R phase will be the brightest
2. The bulb in Y phase will be the brightest
3. The bulb in B phase will be the brightest
4. All the bulbs will be equally bright

General Knowledge

66. The sculpture with the three faces of Brahma, Vishnu and Mahesh known as Trimurti appears in

1. Ajanta Caves
2. Elephnat Cave
3. Ellora Cave
4. Kalva Cave

67. The tendency for increased litigation, was visible after the introduction of the land settlement system of Lord Cornwalls in 1793 the reason for this is normally traced to which of the following provisions

1. Making zamidar's position stronger vis-à-vis the ryot
2. making East India Company an overload of Zamidars
3. making judicial system more efficient
4. none of the above

68. Which of the following are among the permanent member of the Security Council of the United Nations Organisation?

1. Germany
2. Russia
3. Japan
4. China

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

69. The length of India's coastline is about:

1. 5500 km
2. 6000 km
3. 7000 km
4. 7500 km

70. The cold and dense air blowing down the mountain slope during the night is known as:

1. Anabatic wind

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2. khamsin
3. Katabatic wind
4. harmattan

71. In India rural incomes are generally lower than the urban incomes, which of the following reasons account for this

1. a large number of farmers are illiterate and know little about scientific agriculture

2. prices of primary products are lower than those of manufactured products

3. Investments in agriculture has been low when compared to investment in industry

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

72. Consider the following statements

1. Article 301 pertains to the right to property.
2. Right to property is a legal right but not a Fundamental Right.

3. Article 300 A was inserted in the Constitutional Amendment.

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

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

73. Who was the incharge of 'port - Cities' during Qutubshahi period ?

1. Ain-Ul-Mulk
2. Shah-Bandhar
3. Dabir
4. Kotwal

74. For the maintenace of the Hyderabad Contingent Forces, which area was surrendered to the British by the Nizam's Government ?

1. Aurangabad
2. Warangal
3. Mahaboobnagar
4. Berar

75. Who was the founder of the Salarjung Museum in Hyderabad?

1. Salarjung - I
2. Salarjung - II
3. Salarjung - III
4. Osman Ali Khan

76. Two sources are said to be coherent if they produce waves

1. having a constant phase difference
2. of equal wavelength
3. of equal speed
4. having same shape of wavefront

77. Vapour pressure of pure 'A' is 70 mm of Hg at 25°C. It forms an ideal solution with 'B' in which mole fraction of A is 0.8. if the vapour pressure of the solution is 84 mm of Hg at 25°C, the vapour pressure of pure 'B' at 25°C is

1. 28 mm
2. 56 m
3. 70 mm
4. 140 mm

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78. An animal, which has both exoskeleton and endoskeleton structures is a

1. fresh-water mussel
2. tortoise
3. frog
4. jelly fish

79. Name the world's first airport fully powered by solar energy, that is set to become power-positive ?

1. Chennai International Airport
2. Cochin International Airport
3. Thriuvanthapuram International Airport
4. SardarVallabh Bhai Patel International Airport

80. Which bank acquired the Indian consumer banking business of Citi Bank ?

1. HDFC Bank
2. Axis Bank
3. ICICI Bank
4. Yes Bank

Model Paper 4 KEY

Electrical Engineering

1.3, 2.2, 3.1, 4.4, 5.3, 6.3, 7.2, 8.2, 9.3, 10.1, 11.1, 12.2, 13.4, 14.4, 15.3, 16.2, 17.2, 18.4, 19.2, 20.4, 21.2, 22.4, 23.2, 24.3, 25.1, 26.2, 27.1, 28.3, 29.2, 30.2, 31.4, 32.2, 33.2, 34.3, 35.1, 36.2, 37.1, 38.1, 39.3, 40.3, 41.4, 42.3, 43.3, 44.3, 45.1, 46.3, 47.3, 48.1, 49.3, 50.2, 51.2, 52.4, 53.1, 54.1, 55.2, 56.1, 57.2, 58.1, 59.1, 60.3, 61.3, 62.1, 63.3, 64.2, 65.4

General Knowledge

66.2, 67.2, 68.4, 69.4, 70.3, 71.4, 72.2, 73.4, 74.4, 75.3, 76.1, 77.3, 78.2, 79.2, 80.2