

# DRDO CEPTAM 10

Electrical Engineering

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Sample Question Paper  
with Answer Key



9. In bringing an electron towards another electron, electrostatic potential energy
- A. increases
  - B. decreases
  - C. becomes zero
  - D. remains the same

Ans. A

10. When the gate-to-source voltage  $V_{GS}$  of an n-channel JFET is made more and more negative, the drain current:
- A. increases
  - B. decreases
  - C. remains unchanged
  - D. may increase or decrease

Ans. B

11. SCR is a :
- A. 2 layer device
  - B. 3 layer device
  - C. 4 layer device with one gate
  - D. 4 layer device with two gates

Ans. C

12. FET:
- A. has a very high input impedance
  - B. depends on minority carrier flow
  - C. uses a forward biased junction
  - D. uses a high concentration emitter junction

Ans. A

13. Which of the following logic family is fastest of all?
- A. TTL
  - B. RTL
  - C. DCTL
  - D. ECL

Ans. D

14. For a matched transmission line, the voltage standing wave ratio (VSWR) is
- A. unity
  - B. infinite
  - C. zero
  - D. 0.25

Ans. A

15. Radiation loss arises because a transmission line may act as
- A. an antenna
  - B. magnetic field
  - C. electric field
  - D. none of these

Ans. A

16. The maximum power that can be transmitted over a line without danger of insulation breakdown is called its
- A. strength of the transmission line
  - B. power of the transmission line
  - C. power capacity of the transmission line
  - D. capacity of the transmission line

Ans. C

17. In a block diagram, arrows represent
- A. Bilateral information or double flow
  - B. Unilateral information or single flow
  - C. Output within the tetrahedral dimension
  - D. none of the above

Ans. B

18. Regenerative feedback implies:

- A. feedback with negative sign
- B. feedback with positive sign
- C. feedback with step input
- D. feedback with oscillations

Ans. B

19. In radar tracking systems, the type of Control Systems used is

- A. Relay Control Systems
- B. Continuous Control Systems
- C. Non-continuous Control Systems
- D. Discrete data Control Systems

Ans. D

20. When feedback is negative the first derivative output control will

- A. increase the damping of the system
- B. decrease the velocity lag error
- C. decrease the damping of the system
- D. None of the above

Ans. A

21. In an open system the control action

- A. is independent of the output
- B. depends on size of the system
- C. depends on the input signal
- D. none of the above

Ans. A

22. Negative feedback in an amplifier results in:

- A. more gain, more bandwidth
- B. more gain, less bandwidth
- C. less gain, more bandwidth
- D. less gain, less bandwidth

Ans. C

23. Main advantage of hexadecimal number system is:

- A. ease of conversion from hexadecimal to decimal and vice-versa
- B. ease of conversion from hexadecimal to binary and vice-versa
- C. ease of conversion from hexadecimal to gray code and vice-versa
- D. use of number and alphabets

Ans. B

24. Donor impurity atom in a semiconductor result in new:

- A. wide energy band
- B. narrow energy band
- C. discrete energy level just below conduction level
- D. discrete energy level just above valence level

Ans. C

25. In which of the following tests only one motor is required?

- A. Brake test
- B. Hopkinson's test
- C. Field's test
- D. All of the above

Ans. A

26. One of the following methods can be used to determine the relative stability of a Control Systems

- A. Routh stability criterion
- B. Hurwitz stability criterion
- C. Root-Locus Technique
- D. None of these

Ans. C

27. A Causal system is the one in which the output depends upon

- A. Input as well as Output
- B. Present and past Inputs
- C. Present as well as future inputs
- D. None of the above

Ans. B

28. The characteristic impedance of a lossless transmission line is given by

- A. LC
- B.  $\sqrt{LC}$
- C.  $\sqrt{L/C}$
- D.  $\sqrt{C/L}$

Ans. C

29. The main principle behind cooling in refrigerators and airconditioners is

- A. Evaporation
- B. Compression
- C. Expansion
- D. Condensation

Ans. A

30. In a balanced 3-Phase Star connection, the magnitude of line currents are ..... phase currents.

- A. equal to
- B. greater than
- C. less than
- D. unequal to 1

Ans. A

31. Which of the following devices can be used to give an indication for temperature changes?

- A. Bourdon Gage
- B. Thermister
- C. Thermocouple
- D. All of these

Ans. D

32. Hydrometer is used to determine

- A. Specific gravity of liquids
- B. Relative Humidity
- C. Specific gravity of solids
- D. Specific gravity of gases

Ans. A

33. In an industry, maximum demand is 2 KW and annual consumption is 8.76 million units per year. The load factor will be

- A. 0.2
- B. 0.4
- C. 0.5
- D. can not be determined by this data

Ans. C

34. At every instant the direction of secondary current in a transformer must be such as to oppose any change in flux. This is in accordance with
- A. Faraday's law
  - B. Joule's law
  - C. Lenz's law
  - D. Coulomb's law

Ans. C

35. To get 230 V from three phase 20 KV / 400 V supply transformer, the three windings of its secondary side should be connected in
- A. Delta
  - B. Parallel
  - C. Star
  - D. Series

Ans. C

36. If  $P$  is the true power,  $P_r$  is the reactive power and  $P_a$  is the apparent power then the Power factor is given by
- A.  $P/P_a$
  - B.  $P_a/P$
  - C.  $P_r/P$
  - D.  $P/P_r$

Ans. A

37. A triac is like a
- A. Unidirectional SCR
  - B. Bidirectional SCR
  - C. NPN transistor
  - D. PNP transistor

Ans. B

38. Counters are used in measurement of
- A. frequency
  - B. time
  - C. distance
  - D. All of the above

Ans. D

39. One of the applications of register is in
- A. Delay line
  - B. Modem
  - C. Multiplexer
  - D. Decoder

Ans. D

40. A flip-flop is the fundamental building block of ..... logic circuit.
- A. Sequential
  - B. Combinational
  - C. Arithmetic
  - D. None

Ans. A

41. The full adder can be constructed using two-half adders and one
- A. AND gate
  - B. NOT gate
  - C. OR gate
  - D. NAND gate

Ans. C

42. The phase difference between the output and input voltages of a CE amplifier is
- A.  $180^\circ$
  - B.  $0^\circ$
  - C.  $90^\circ$
  - D.  $270^\circ$

Ans. A

43. Emitter follower is used for .....
- A. current gain
  - B. impedance matching
  - C. voltage gain
  - D. None

Ans. B

44. As per IE rules the permissible variation of voltage at the consumer end is:
- A.  $\pm 6\%$
  - B.  $\pm 10\%$
  - C.  $\pm 12\%$
  - D.  $\pm 2\%$

Ans. A

45. A polyphase synchronous machine excited with DC exciter is known as –
- A. Alternator
  - B. Three phase induction machine
  - C. Single phase induction motor
  - D. DC Machine

Ans. A

46. Oxy-acetylene welding is categorised in
- A. Arc welding
  - B. Gas welding
  - C. Chemical welding
  - D. Resistance welding

Ans. B

47. Which type of earthing is suitable in transmission lines
- A. Rod earthing
  - B. pipe earthing
  - C. strip earthing
  - D. plate earthing

Ans. C

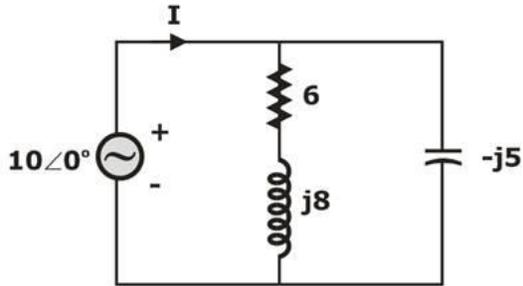
48. Replacement of wiring is not easy in which type of wiring \_\_\_\_\_.
- A. conduit system
  - B. Lead sheathed
  - C. concealed wiring
  - D. cleat system

Ans. C

49. In a synchronous machine, the synchronous reactance is the:
- A. reactance due to either armature reaction or leakage flux
  - B. reactance due to armature reaction of the machine
  - C. reactance due to leakage flux
  - D. combined reactance due to leakage flux and armature reaction

Ans. D

50. For the a.c circuit given below, what is the value of I?



- A. 0.6 A  
 B. j1.2 A  
 C. 0.6 -j1.2 A  
 D. 0.6 +j1.2 A

Ans. D

51. In a series RLC circuit with  $R = 3\Omega$ ,  $L = 2H$  and  $C = \frac{1}{16}F$ . The current in the circuit is  $14.14 \sin(2t + 30^\circ)$ . The apparent power in the circuit will be:

- A. 100 VA  
 B. 500 VA  
 C. 200 VA  
 D. 450 VA

Ans. B

52. For a 100 MVA, 12 KV transmission line of reactance value of  $1.20 \Omega$ . The pu value of reactance is:

- A. 1.2 pu  
 B. 0.1 pu  
 C. 0.83 pu  
 D. 0.2 pu

Ans. C

53. In a single-line diagram, equivalent representation of transformer is.

- A. reactance only  
 B. Voltage Source only  
 C. Both A and B  
 D. None of the above

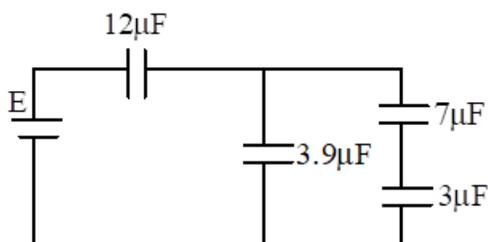
Ans. A

54. Nano sized polymers built from branched units are called.....

- A. Dendrimers  
 B. Composites  
 C. Carbon-based molecules  
 D. Metal-base molecules

Ans. A

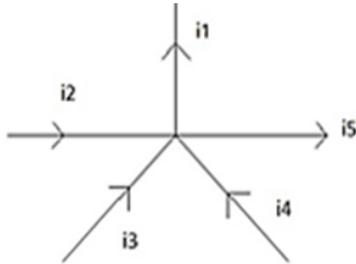
55. Four capacitors and a battery are connected as shown. The potential drop across the  $7\mu F$  capacitor is 6V. Then which is incorrect.



- A. potential difference across the  $3\mu\text{F}$  capacitor is 10 V.
- B. charge on the  $3\mu\text{F}$  capacitor is  $42\ \mu\text{C}$
- C. e.m.f. of the battery is 30 V
- D. potential difference across the  $12\ \mu\text{F}$  capacitor is 10 V.

Ans. A

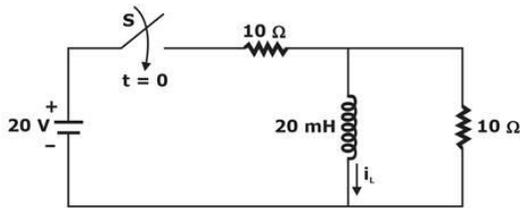
56. Relation between currents according to KCL is



- A.  $i_1 = i_2 = i_3 = i_4 = i_5$
- B.  $i_1 + i_4 + i_3 = i_5 + i_2$
- C.  $i_1 - i_5 = i_2 - i_3 - i_4$
- D.  $i_1 + i_5 = i_2 + i_3 + i_4$

Ans. D

57. For the circuit shown, the initial inductor current is 2 A, then at  $t > 0$ ,  $i_L$  is \_\_\_\_\_ A.



- A. 0
- B. 1
- C. 2
- D.  $\infty$

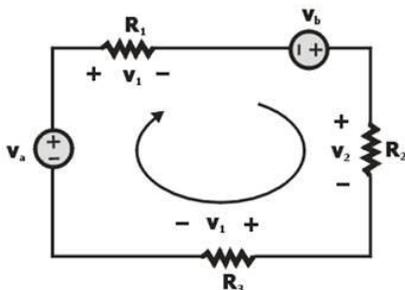
Ans. C

58. A charge Q is moving  $d\vec{l}$  distance in the magnetic field  $\vec{B}$ . Find the value of work done by  $\vec{B}$ .

- A. Infinite
- B. 1
- C. -1
- D. Zero

Ans. D

59. Find the KVL equation for the following circuit.



A.  $v_a + v_b = i(R_1 - R_2 + R_3)$

B.  $v_a + v_b = i(R_1 + R_2 - R_3)$

C.  $v_a - v_b = i(R_1 + R_2 - R_3)$

D.  $v_a + v_b = i(R_1 + R_2 + R_3)$

Ans. D

60. For proper earthing, according to I.E Rules, of power equipments-

A. Either single or double earthing

B. Single earthing is sufficient

C. Doble earthing system has to be adopted

D. No earthing is required

Ans. B

61. The disc of domestic supply energy meter is made of which material?

A. Zinc

B. Copper

C. Aluminium

D. Silver

Ans. C

62. The dielectric loss of a capacitance can be measured by

A. Hay bridge

B. Maxwell bridge

C. Anderson bridge

D. Schering bridge

Ans. D

63. The most efficient form of damping employed in electric instruments is

A. Air friction damping

B. Fluid friction damping

C. Eddy current damping

D. None of the above

Ans. C

64.  $A + AB$  gets simplified to:

A. AB

B. B

C.  $A + B$

D. A

Ans. D

65. The circuit which produces the best stabilisation of an operating point is \_\_\_\_\_.

A. base bias

B. collector feedback

C. emitter bias

D. voltage divider

Ans. D

66. The current drawn by a 220 V DC motor of armature resistance  $0.5\Omega$  and back emf 180 V is \_\_\_\_\_.

A. 0.8 A

B. 80 A

C. 8 A

D. 18 A

Ans. B

67. The direction of rotation of field in a three-phase induction motor depends on the \_\_\_\_\_.

A. Supply voltage

B. Number of poles

C. Supply frequency

D. Phase sequence of supply voltage

Ans. D

68. \_\_\_\_\_ is a type of single-phase motor which has the lowest speed.

- A. Hysteresis
- B. Universal
- C. Shaded pole
- D. Repulsion

Ans. C

69. The primary of a \_\_\_\_\_ should never be energised when its secondary is open circuited.

- A. potential transformer
- B. current transformer
- C. autotransformer
- D. power transformer

Ans. B

70. Leakage flux in a transformer \_\_\_\_\_.

- A. helps in the transfer of energy
- B. produces mutually induced emf
- C. is minimised by interleaving the primary and secondary windings
- D. is negligible at full load

Ans. C

71. The magnetic flux path in a transformer must have \_\_\_\_\_.

- A. high resistance
- B. low resistance
- C. high reluctance
- D. low reluctance

Ans. D

72. The armature of a DC machine is placed on the rotor to \_\_\_\_\_.

- A. reduce losses
- B. save iron
- C. support commutation
- D. decrease armature reaction

Ans. C

73. A two-pole alternator is running at 1500 rpm. Its angular velocity will be \_\_\_\_\_.

- A. 192 rad/s
- B. 157 rad/s
- C. 212 rad/s
- D. 118 rad/s

Ans. B

74. A transformer has 400 W as iron loss at full load. The iron loss at half load will be:

- A. 400 W
- B. 800 W
- C. 100 W
- D. 200 W

Ans. A

75. A coil of resistance  $20 \Omega$  and inductance  $10 \text{ mH}$  is in series with a capacitance and is supplied with a constant voltage, variable frequency source. The maximum current is  $2 \text{ A}$  at  $1000 \text{ Hz}$ . The Q-factor of the circuit is \_\_\_\_\_.

- A. 31.8
- B. 3.14
- C. 314
- D. 31.4

Ans. B



- A. 375 mA
- B. 200 mA
- C. 150 mA
- D. 100 mA

Ans. A

81. A shaded pole induction motor does not have the advantage of

- A. Rugged construction
- B. Low initial as well as maintenance cost
- C. High starting torque
- D. Comparatively small starting current

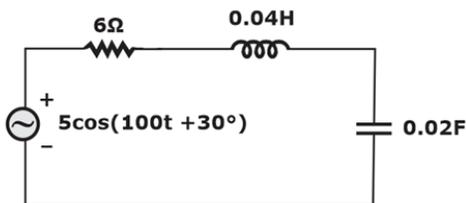
Ans. C

82. Nichrome is an alloy of

- A. Manganese 2.5%, Nickel 81% to 84%, Chromium 14% to 17% and a little percentage of Iron.
- B. Manganese 2.0%, Nickel 78% to 81%, Chromium 17% to 20% and a little percentage of Iron.
- C. Manganese 1.5%, Nickel 75% to 78%, Chromium 20% to 23% and a little percentage of Iron.
- D. Manganese 0.5%, Nickel 72% to 75%, Chromium 23% to 26% and a little percentage of Iron.

Ans. B

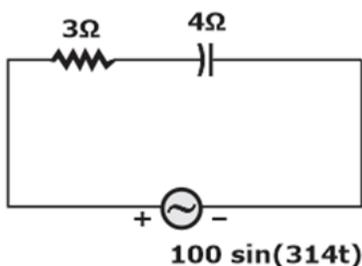
83. What is the approximate steady state current in the above circuit?



- A. 0.612 A
- B. 0.7198 A
- C. 0.5 A
- D. 5 A

Ans. B

84. Find the RMS value of current flowing through the circuit.



- A. 14.14 A
- B. 20 A
- C. 10 A
- D. 7.07 A

Ans. A

85. In the given circuit, the switch is closed for a long time and opened at  $t = 0$ . If

$i_{L1}(0^-) = 2 A$  and  $i_{L2}(0^-) = 4 A$  and, then the voltage across the resistor at  $t = 0$  will be:



90. For a closed loop control system, Negative feedback

- A. Decreases the gain
- B. Increases the Bandwidth
- C. Both A & B are correct
- D. Neither A nor B is correct

Ans. C

91. A conducting material should be

- A. highly malleable, less ductile
- B. Less malleable, less ductile
- C. Highly malleable, highly ductile.
- D. Less malleable, highly ductile.

Ans. C

92.  $\alpha$ -Iron or ferrite converts to \_\_\_\_\_Austenite at 912°C temperature.

- A. BCC
- B. SC
- C. FCC
- D. HCP

Ans. C

93. Temperature at which antiferromagnetic material converts to paramagnetic material is known as \_\_\_\_\_ temperature.

- A. Curie
- B. Curie-Weiss
- C. Neel
- D. Debye

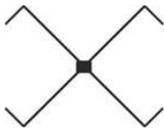
Ans. C

94. Which of the following material used for making compass needle?

- A. Carbon steel
- B. Silicon steel
- C. Barium ferrite
- D. Garnets

Ans. A

95. The given symbol belongs to which of the following 'switch' and switch outlets'?



- A. Two -way bell push
- B. Two-way switch
- C. Intermediate switch
- D. Two-pole one way switch

Ans. C

96. According to IE rules maximum load on a power board should not exceed ..... watts.

- A. 1000
- B. 1500
- C. 3000
- D. 800

Ans. C

97. According to IE rules, final sub circuits beyond the distribution board for light fan and 5A socket outlet\_\_\_\_\_

- A. Should not exceed 6 points/800 watts
- B. Should not exceed 5 points/600 watts
- C. Should not exceed 15 points/1000 watts
- D. Should not exceed 10 points/800 watts

Ans. D

98. Which of the following wiring systems is most economical for house wiring?
- A. PVC casing and capping wiring
  - B. Concealed conduit wiring
  - C. Cleat wiring
  - D. Metal sheathed wiring

Ans. C

99. Which type of switch is indicated by the given symbol?



- A. Three-pole switch
- B. Multi-position switch
- C. Two-pole switch
- D. Single-pole switch

Ans. C

100. In Three-phase induction motor rotating magnetic field rotates at?
- A. Slip speed
  - B. Blow synchronous speed
  - C. Synchronous speed
  - D. Shaft speed

Ans. C

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