

105/2022

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. _____ substances show magnetic properties strongly when subjected to a magnetizing force.
(A) Paramagnetic (B) Diamagnetic
(C) Ferromagnetic (D) Nonmagnetic
2. Absolute Permittivity of air _____ Farad per metre.
(A) 8.854×10^{-12} (B) 1
(C) 1.11 (D) 0
3. The power factor of a RLC series circuit at resonance is:
(A) 0 (B) 0.5
(C) 0.707 (D) 1
4. _____ provides a method for determining the direction of the induced e.m.f.
(A) Fleming's left hand rule (B) Fleming's right hand rule
(C) Lenz's law (D) Kirchhoff's law
5. Let L_1 and L_2 are the coefficients of self-inductance of two coils, M is the mutual inductance between the two coils, ϕ_1 is the flux produced by one coil due to current I flowing in it and ϕ_2 is the flux linking with the other coil, then the equation for coefficient of coupling (K) :
(A) $K = I / \sqrt{(L_1 L_2)}$ (B) $K = M / \sqrt{(L_1 L_2)}$
(C) $K = I / \sqrt{(\phi_1 \phi_2)}$ (D) $K = M / \sqrt{(\phi_1 \phi_2)}$
6. The e.m.f. induced in a straight conductor of length 1 metre, when it is moved at right angle to a uniform field of 2 Wb/m^2 at a speed of 0.5 m/s is :
(A) 10 volt (B) 5 volt
(C) 2 volt (D) 1 volt
7. An AC voltage wave is expressed as $e = 300 \sin 314 t$, what is its frequency?
(A) 314 Hz (B) 300 Hz
(C) 50 Hz (D) 25 Hz
8. Two alternating quantities are added :
(A) Graphically (B) Geometrically
(C) Arithmetically (D) Vectorially

A

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[P.T.O.]

9. _____ is an integrating instrument.
- (A) Ampere-hour meter (B) Voltmeter
(C) Ammeter (D) Wattmeter
10. In 3 phase power measurement by 2 wattmeter method, one of the wattmeter reads zero. What is the power factor of the load?
- (A) 0 (B) 0.5
(C) 0.8 (D) 1
11. A moving coil instrument has a resistance of $10\ \Omega$ and shows full-scale deflection for a current of 50 mA. The value of shunt resistance to be connected to measure a current of 100A :
- (A) $0.005\ \Omega$ (B) $0.5\ \Omega$
(C) $5\ \Omega$ (D) $50\ \Omega$
12. The maximum load connected in a power sub-circuit of domestic electrical installation :
- (A) 1000 watts (B) 1500 watts
(C) 3000 watts (D) 5000 watts
13. The size of conductors used in a power cable depends on the :
- (A) type of insulation used (B) circuit power factor
(C) operating voltage (D) current to be carried
14. Megger works on the principle of :
- (A) Electromagnetic induction (B) Kirchhoff's current law
(C) Ohm's law (D) Coulomb's law
15. With the rise in temperature, the insulation resistivity of a cable :
- (A) reduces exponentially (B) decreases linearly
(C) increase linearly (D) none of the above
16. The e.m.f. induced in a conductor rotating in a bipolar magnetic field is :
- (A) AC (B) DC
(C) AC and DC (D) Pulsating DC
17. Working principle of DC Motor is :
- (A) Fleming's right hand rule (B) Fleming's left hand rule
(C) Lenz's law (D) Kirchhoff's law
18. The frequency of armature current of an 8 pole DC generator running at 1500 rpm :
- (A) 25 Hz (B) 50 Hz
(C) 75 Hz (D) 100 Hz

19. In a DC machine sparkless commutation can be achieved by using :
- (A) compensating windings
 - (B) high resistance carbon compound brushes
 - (C) inter poles
 - (D) all of the above
20. Which of the following machine having same armature current and field current?
- (A) Shunt
 - (B) Series
 - (C) Separately excited
 - (D) All of the above
21. The flux of DC motor increases, its speed will :
- (A) fluctuate
 - (B) increase
 - (C) decrease
 - (D) no change
22. Ward Leonard speed control is ————— control method.
- (A) an armature voltage
 - (B) a field current
 - (C) an armature resistance
 - (D) a field resistance
23. A 2 kVA transformer has iron loss of 120 W and full load copper loss of 250 W. Its efficiency is maximum when the total loss is :
- (A) 120 W
 - (B) 130 W
 - (C) 240 W
 - (D) 370 W
24. Power transformers are designed to have maximum efficiency nearer to ————— of full load.
- (A) 25%
 - (B) 50%
 - (C) 75%
 - (D) 100%
25. In an alternator, the synchronous reactance represents :
- (A) a reactance at synchronous speed
 - (B) leakage reactance and armature reactance
 - (C) excitation field reactance
 - (D) none of the above
26. Which of the following is the most accurate method to find the voltage regulation of an alternator?
- (A) Direct load test
 - (B) Synchronous impedance
 - (C) Ampere-turn
 - (D) Zero power factor
27. Which of the following is the Pitch factor for a 36 stator slots, 4 poles, alternator of coil span 1 to 7?
- (A) 0.5
 - (B) 0.707
 - (C) 0.866
 - (D) 1.0

28. DC shunt motor can run above its rated speed by :
- (A) inserting a resistance in its armature circuit
 - (B) inserting a resistance in its field circuit
 - (C) reducing its supply voltage
 - (D) all of the above
29. A 3 phase, 4 pole 400 V, 50 Hz induction motor runs at 1440 rpm. The frequency of rotor induced e.m.f. is :
- (A) 50 Hz
 - (B) 25 Hz
 - (C) 5 Hz
 - (D) 2 Hz
30. The volt per turn in the primary winding of a 1000V/250V 50 Hz, single phase transformer is 4V. What is its secondary volt per turn?
- (A) 16V
 - (B) 8V
 - (C) 4V
 - (D) 1V
31. The primary of a single phase transformer having turn-ratio 1:2 is connected to 20 V dc supply and its secondary is connected to a 10 ohm resistor, then the current through the resistor is :
- (A) 0 A
 - (B) 1 A
 - (C) 2 A
 - (D) 4 A
32. Starting torque of an Induction Motor will be maximum when its slip at :
- (A) 0
 - (B) 0.5
 - (C) 1
 - (D) 2
33. Which of the following methods is used to start a synchronous motor?
- (A) Damper Winding
 - (B) DC motor
 - (C) AC motor
 - (D) All of the above
34. The speed of synchronous motor can be changed by changing its :
- (A) supply frequency
 - (B) supply voltage
 - (C) excitation current
 - (D) connected load
35. Which of the following machine can run as synchronous condenser?
- (A) Transformer
 - (B) Induction motor
 - (C) Synchronous generator
 - (D) Synchronous motor
36. For the same rupturing capacity, the actual current to be interrupted in HRC fuse is :
- (A) much more than that of any circuit breaker
 - (B) much less than that of any circuit breaker
 - (C) equal to that of any circuit breaker
 - (D) none of the above

37. Which device operates first when a fault occurs in a high voltage transmission line?
(A) Circuit breaker (B) Relay
(C) Isolator (D) Fuse
38. An isolator is meant for :
(A) breaking abnormal current
(B) making under fault condition
(C) breaking the circuit under no load condition
(D) none of the above
39. A transmission line has a span of 100 m, weighs 200 kg/km is at the same level. The tension in the conductor is 1000 kg. Then the sag is :
(A) 0.25 m (B) 0.5 m
(C) 5 m (D) 50 m
40. Buchholz relay is a :
(A) oil actuated relay (B) current actuated relay
(C) gas actuated relay (D) oil temperature actuated relay
41. In three phase system, what is the minimum number of relays used to detect phase to phase faults :
(A) 1 (B) 2
(C) 3 (D) 6
42. Merz Price protection is a type of :
(A) distance protection (B) differential protection
(C) both (A) and (B) (D) neither (A) nor (B)
43. What is the Short Circuit kVA of a system, if the percentage reactance upto the fault point is 20% and the base kVA is 20,000?
(A) 10,000 (B) 20,000
(C) 1,00,000 (D) 2,00,000
44. The highest transmission voltage in India is :
(A) 765 kV (B) 400 kV
(C) 220 kV (D) 132 kV
45. If 3MW power is to be transmitted over a distance of 30 km, the desirable transmission voltage will be :
(A) 3.3 kV (B) 11 kV
(C) 33 kV (D) 66 kV

46. Corona loss can be reduced by the use of hollow conductors because :
- (A) the current density is reduced
 - (B) the eddy current in the conductor is eliminated
 - (C) for a given cross-section the radius of the conductor is increased
 - (D) of better ventilation in the conductor
47. The skin effect of a conductor reduces with the increase in :
- (A) supply frequency
 - (B) resistivity of the conductor material
 - (C) cross section of the conductor
 - (D) permeability of conductor material
48. If the frequency of a transmission system is changed from 50 Hz to 100 Hz, the string efficiency :
- (A) remains unchanged
 - (B) will increase
 - (C) will decrease
 - (D) may increase or decrease depending on the line parameters
49. For a medium length transmission line, the constant A is :
- (A) equal to constant B
 - (B) a constant
 - (C) equal to constant D
 - (D) not equal to any of the above
50. Which of the following is neglected while analyzing a short transmission line?
- (A) shunt admittance
 - (B) power loss
 - (C) series impedance
 - (D) none of the above
51. Which of the following expression is used to determine the fusing current of a round wire?
- (A) $I = Kd^{2/3}$
 - (B) $I = Kd^{1/3}$
 - (C) $I = Kd^{3/2}$
 - (D) $I = Kd^2$
52. IS code of Practice for earthing is :
- (A) 3043-1987
 - (B) 3055-1987
 - (C) 4347-1987
 - (D) 3047-1987
53. Which of the following principle is/are employed for the design of street light installation?
- (i) The diffusion principle
 - (ii) The specular reflection principle
 - (iii) The scattering principle
- (A) Only (ii) and (iii)
 - (B) Only (i) and (iii)
 - (C) Only (i) and (ii)
 - (D) All of the above (i), (ii) and (iii)

54. The factor indicating the ratio of lumens reaching the working plane to the total lumen given out by the lamp is :
- (A) Multiplication factor (B) Depreciation factor
(C) Maintenance factor (D) Utilization factor
55. What is the criteria for deciding number of sub circuits connected to a supply system as per number of points and maximum connected load?
- (A) 8 points or 1000 watts (B) 10 points or 800 watts
(C) 10 points or 1000 watts (D) 8 points or 800 watts
56. The IS code of practice for interior illumination is :
- (A) IS 6646:1992 (B) IS 8646:1992
(C) IS 3464:1992 (D) IS 3646:1992
57. Which of the following gas is added with metallic sodium to start discharge in a Sodium Vapour lamp?
- (A) Hydrogen (B) Neon
(C) Nitrogen (D) Argon
58. A lamp has a mean spherical candle power of 20. What is the total flux of light from the lamp?
- (A) 62.8 lumen (B) 20 lumen
(C) 12.56 lumen (D) 251.2 lumen
59. One candle power equal to :
- (A) 4π lumen (B) π lumen
(C) 2π lumen (D) 40π lumen
60. Which of the following IE rule gives importance to the periodical inspection and testing of consumer's installation?
- (A) IE Rule 39 (B) IE Rule 40
(C) IE Rule 46 (D) IE Rule 41A
61. The range of input values over which there is no change in output value is referred as :
- (A) Linearity (B) Dead zone
(C) Resolution (D) Backlash
62. The errors occurred while taking electrical measurements due to human mistakes is known as :
- (A) Gross error (B) Instrumental error
(C) Rando error (D) Creeping error

63. Which among the following is an integrating type instrument?
(A) Watt meter (B) Voltmeter
(C) Ammeter (D) Energy meter
64. If fluid friction damping is used in a measuring instrument then the meter must be kept _____ position during measurement.
(A) Horizontal (B) Vertical
(C) Inclined (D) All of the above
65. The Duddell's Oscillograph is a _____ type of instrument.
(A) Vibration galvanometer (B) Static galvanometer
(C) Anemometer (D) None of the above
66. The controlling torque produced by phosphor bronze springs with spring constant 4 in a moving coil instrument and the pointer deflects through an angle 90 degrees is :
(A) 6π Nm (B) 4π Nm
(C) 3π Nm (D) 2π Nm
67. Which of the following method is used for measuring earth resistance?
(A) Volt-ampere method (B) Fall of potential method
(C) Ground fault method (D) Short circuit test method
68. Which of the following device is used for the measurement of medium resistance?
(A) Schering Bridge (B) Maxwell Bridge
(C) Wheatstone Bridge (D) Hay's Bridge
69. The signal whose amplitude is measured using a CRO is applied to :
(A) Vertical deflection plates (B) Horizontal deflection plates
(C) Both (A) and (B) (D) None of the above
70. Which of the following device is used for the measurement of pressure?
(A) LVDT (B) Strain gauge
(C) Bellows (D) Wave analyzer

71. Which of the following statement is/are correct about NPN Transistor?
- (i) The Minority carriers in a NPN transistor is positively charged holes.
 - (ii) The Majority carriers in a NPN transistor is positively charged holes.
 - (iii) The Minority carriers in a NPN transistor is negatively charged electrons.
 - (iv) The Majority carriers in a NPN transistor is negatively charged electrons.
- (A) Only (ii) and (iii)
(B) Only (i) and (iv)
(C) Only (iii) and (iv)
(D) Only (i) and (ii)
72. When a Signal is applied to Base of a common emitter transistor circuit the signal is transferred from _____ to _____ of the circuit.
- (A) High resistance to low resistance
(B) High resistance to high resistance
(C) Low resistance to low resistance
(D) Low resistance to high resistance
73. When a transistor is operated in common collector configuration then its voltage gain obtained is?
- (A) Less than 1 (B) Greater than 1
(C) Zero (D) None of the Above (A), (B) and (C)
74. Which of the following statement is/are correct about a common base transistor configuration?
- (i) A Common base transistor configuration provide voltage gain without current gain.
 - (ii) A Common base transistor configuration provide impedance matching at high frequencies.
 - (iii) A Common base transistor configuration provide large power gain without impedance matching.
- (A) Only (i) and (ii)
(B) Only (i) and (iii)
(C) Only (ii) and (iii)
(D) All of the above (i), (ii) and (iii)
75. The amplifier which transfers maximum power from source to load in common base configuration, It is known as :
- (A) Power amplifier (B) Emitter follower
(C) Buffer amplifier (D) Operational amplifier

76. Which of the following process is utilized for achieving constant operating point in a transistor amplifier?
- (A) Oscillation (B) Stabilization
(C) Rectification (D) Amplification
77. In a single stage common emitter amplifier the phase shift between input and output signal is _____ degrees.
- (A) 0 (B) 90
(C) 360 (D) 180
78. The power amplifier in which the collector current flows only during the positive half cycle of the input signal then it is a :
- (A) Class A amplifier (B) Class B amplifier
(C) Class C amplifier (D) Class D amplifier
79. Which of the following statement is/are correct about a Hartley oscillator?
- (i) The tank circuit is made up of a capacitor connected across midpoint earthed series inductors.
(ii) The tank circuit is made up of an inductor connected across midpoint earthed series capacitors.
(iii) The tank circuit is made up of a quartz crystal connected across midpoint earthed series inductors.
- (A) Only (i)
(B) Only (iii)
(C) Only (ii)
(D) Only (i) and (ii)
80. Which of the following circuit is associated with the Barkhausen's Criterion?
- (A) Rectifier (B) Amplifier
(C) Oscillator (D) Multivibrator
81. The ratio of differential voltage gain to the common mode voltage gain of a differential amplifier is known as :
- (A) SVRR (B) CMRR
(C) Slew Rate (D) PSRR
82. When the gain of an operational amplifier is set to unity then it is called :
- (A) the voltage follower (B) the inverting amplifier
(C) the differentiator (D) the integrator

83. The digital circuit that converts decimal digits into Binary code is known as :
- (A) Multiplexer (B) Decoder
(C) Encoder (D) Counter
84. The binary equivalent of decimal number 109 is :
- (A) 1001010 (B) 1101101
(C) 1110001 (D) 1101011
85. The hexadecimal equivalent of binary number 11110011000.1110 is :
- (A) 398.E (B) 448.F
(C) 388.A (D) 449.E
86. Which of the following device can be expressed as two transistor model?
- (A) TRIAC (B) MOSFET
(C) SCR (D) FET
87. The PN junction of a Schottky diode is made of :
- (A) Aluminium and Silicon (B) Germanium and Silicon
(C) Copper and Aluminium (D) Silver and Copper
88. Which of the following statement is/are true for an effective method to SCR turn off?
- (i) Reduce anode to cathode voltage below holding current and remove the charge by applying reverse voltage across anode to cathode.
(ii) Reduce gate to cathode voltage below latching current and remove the charge by applying reverse voltage across gate to cathode.
(iii) Reduce anode to cathode voltage below holding current and remove the charge by applying reverse voltage across gate to cathode.
- (A) Only (ii) and (iii)
(B) All of the above (i), (ii) and (iii)
(C) Only (ii)
(D) Only (i)
89. Which of the following device is most suitable for speed control of a single phase induction motor?
- (A) BJT (B) UJT
(C) FET (D) TRIAC
90. Which of the following device exhibits negative resistance characteristics?
- (A) Zener diode (B) LED
(C) UJT (D) FET

91. The Dual converter provides a maximum of _____ operation.
 (A) one quadrant (B) four quadrant
 (C) two quadrant (D) three quadrant
92. Which of the following triggering method is suitable for varying firing angle of SCR from zero to 180 degrees?
 (A) R triggering (B) RL triggering
 (C) LC triggering (D) RC triggering
93. Which of the following device is used to prevent negative voltage to appear across the R-L load in thyristor converter?
 (A) Bipolar junction transistor (B) Forward biased diode
 (C) Reverse biased diode (D) Unijunction Transistor
94. The 8051 microcontroller has _____ number of 8 bit I/O ports.
 (A) 4 (B) 8
 (C) 2 (D) 16
95. Which of the following instruction is used to copy the contents of memory whose address is in register R1 to the accumulator?
 (A) MOV@ A,R1 (B) MOVX A,R1
 (C) MOV A,@R1 (D) MOVC A, R1
96. The number of Special Function register in 8051 is :
 (A) 8 (B) 21
 (C) 22 (D) 16
97. The PCON register in 8051 Microcontroller indicates :
 (A) Power control (B) Program control
 (C) Program counter (D) None of the above
98. Which among the following is normally not used for programming in PLC?
 (A) C programming (B) Ladder diagram
 (C) Function block diagram (D) Machine language
99. Which of the following I/O ports in 8051 are used as address and data transfer for external memory?
 (A) Port 1 and 2 (B) Port 0 and 2
 (C) Port 3 and 4 (D) All of the above
100. The timer of 8051 will function as 16 bit timer in :
 (A) Mode 3 (B) Mode 0
 (C) Mode 4 (D) Mode 1
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