COMBINED TECHNICAL SERVICES EXAMINATION

(NON-INTERVIEW POST)

COMPUTER BASED TEST

DATE OF EXAM: 20.08.2026 AN

PAPER–II–ELECTRICAL AND ELECTRONICS ENGINEERING (DEGREE STANDARD)

(CODE: 400)

1. As per MNRE, a wind farm requires ———— in sites having wind power density in excess of ———— at 50 m hub-height.

(A) 12 hectares/MW, 200 W/m^2
(B) 200 Acres/MW, 12 W/m^2
(C) 12 Acres/MW, 200 W/m^2
(D) 1200 hectares/MW, 102 W/m^2
(E) Answer not known

2. Based on specific energy (Ragone plot) arrange in ascending order.

1. Fuel cell
2. Lead acid battery
3. Li-ion battery
4. Electrolytic capacity
5. Super capacitor

(A) 4, 5, 2, 3, 1
(B) 1, 2, 3, 4, 5
(C) 1, 3, 4, 5, 2
(D) 4, 2, 3, 5, 1
(E) Answer not known

3. State advantage of wind energy.

(A) design is complex
(B) wind energy is irregular
(C) energy tapped free of fuel cost
(D) which are capital intensive
(E) Answer not known

4. An Induction Generator Controller (IGC) controls,

(A) Only the voltage and not the frequency
(B) Only the frequency and not the voltage
(C) Both the voltage as well as the frequency
(D) The power input to the generator
(E) Answer not known

5. Small Hydro Plants (SHPs) have

(A) High head and small capacity
(B) Low head and small capacity
(C) Low head and large capacity
(D) Large head and large capacity
(E) Answer not known

6. What is the formula for "grid short circuit impedance angle ratio" formula?

(A) X/R
(B) V/I
(C) $\frac{X}{Y}$
(D) $\frac{R}{Z}$
(E) Answer not known

7. Total power developed by the wind stream is

(A) $P = VI$
(B) $P = \frac{1}{2}\rho AV^3$
(C) $P = \frac{W}{\Delta t}$
(D) $P = \frac{V^3}{R}$
(E) Answer not known

8. Grid connected wind generator usually have maximum penetration of

(A) 10 to 20 %
(B) 20 to 30 %
(C) 30 to 40 %
(D) 40 to 50 %
(E) Answer not known

9. Which electric vehicle architecture involves two power sources feeding power to propel the vehicle?

(A) Parallel Hybrid
(B) Battery electric vehicle
(C) Series Hybrid
(D) Plug-in hybrid
(E) Answer not known

10. The polymer Electrolyte Membrane Fuel Cell is also termed as

(A) Phosphoric Acid Fuel Cell
(B) Solid Oxide Fuel Cell
(C) Alkaline Fuel Cell
(D) Protone Exchange Fuel Cell
(E) Answer not known

11. The device used to measure 50/60 Hz sinusoidal waveforms of voltages and currents at high sampling rate (upto 1200 samples / second) using microprocessor and GPS is ————————.

(A) Intelligent Electronic Device
(B) Phasor Measurement Unit
(C) Phasor Data Concentrators
(D) Advanced Voltmeters
(E) Answer not known

12. During day time the surface wind flows

(A) From sea to land
(B) From land to sea
(C) On sea only
(D) On land surface only
(E) Answer not known

13. In a horizontal axis wind turbine, the gear box is located

(A) at the ground in the control room
(B) at the bottom of the tower
(C) at the top of the tower
(D) inside and in the middle of the tower
(E) Answer not known

14. There are ———— ways in which finite word length affects the performance of FIR digital filters.

(A) 2
(B) 5
(C) 4
(D) 6
(E) Answer not known

15. In solar pV system FSCC MPP tracking, I_{mpp} can be estimated by multiplying I_{sc} by a constant value (k), where

(A) $0.78 < k < 0.92$
(B) $0.68 < k < 0.72$
(C) $0.48 < k < 0.62$
(D) $0.28 < k < 0.32$
(E) Answer not known

16. Typically a silicon solar pV module of one square feet gives peak output power of

(A) 10 to 12 kW
(B) 10 to 12 W
(C) 10 to 12 MW
(D) 10 to 12 TW
(E) Answer not known

17. One electrical energy unit is equal to 1 kilowatt-hour (kWh) which is equivalent to

(A) 3600 kJ
(B) 4.182 J
(C) 1055 J
(D) 3600 J
(E) Answer not known

18. Find the complex multiplications required for 16 point of DFT.

(A) 256
(B) 64
(C) 216
(D) 1024
(E) Answer not known

19. What is the best time to use solar panels, to receive maximum amount of radiation?

(A) 6 am - 9 am
(B) 9 am - 11 am
(C) 11 am - 2 pm
(D) 2 pm - 5 pm
(E) Answer not known

20. Measure of solar radiation shows that, 99% of the sun's radiation is obtained upto a wavelength of ————————.

(A) 5 μM
(B) 6 μM
(C) 3 μM
(D) 4 μM
(E) Answer not known

21. What instrument is used to measure solar radiation?

(A) Galvanometer
(B) Pyranometer
(C) Thermometer
(D) Calorimeter
(E) Answer not known

22. Which of the following is incorrectly paired?

1. World wide potential of Tidal energy – 63800 MW
2. World wide potential of Wind energy – 370 TW
3. World wide potential of Solar energy – 89000 TW
4. World wide potential of Fossil Fuel – 5 TW

(A) 1
(B) 2
(C) 3
(D) 4
(E) Answer not known

23. The energy from the sun received on a unit area perpendicular to the solar rays at the mean distance from the sun outside atmosphere i.e solar constant. Value is

(A) 1000 W/m^2
(B) 1367 W/m^2
(C) 900 W/m^2
(D) 800 W/m^2
(E) Answer not known

24. What are the main features of renewable energy sources?

(A) Storable

(B) Erasable

(C) Depletable

(D) Regenerative or inexhaustible

(E) Answer not known

25. How many solar cells are connected together to get minimum 12 volt from a solar panel?

(A) 12 cells

(B) 18 cells

(C) 36 cells

(D) 54 cells

(E) Answer not known

26. A bilinear transformation that maps a point in the Z-plane to a point in the S-plane is given by

(A) $S = \frac{2}{T}\left(\frac{1-Z^{-1}}{1+Z^{-1}}\right)$

(B) $S = \frac{2}{T}\left(\frac{1+Z^{-1}}{1-Z^{-1}}\right)$

(C) $S = \frac{1}{T}\left(\frac{1-Z^{-1}}{1+Z^{-1}}\right)$

(D) $S = \frac{1}{T}\left(\frac{1+Z^{-1}}{1+Z^{-1}}\right)$

(E) Answer not known

27. The discrete system $y(n) = x(n) + nx(n-1)$ is

(A) Time Variant
(B) Time Invariant
(C) Neither time Variant nor Invariant
(D) None
(E) Answer not known

28. In FDM, signals are modulated onto separate carrier frequencies by using

(A) AM and FM
(B) Only FM
(C) Only AM
(D) Either AM or FM
(E) Answer not known

29. The adaptive delta modulation minimizes

(A) Slope overload distortion and granular noise
(B) Quantizer error
(C) Filter error
(D) Comparative error
(E) Answer not known

30. The computation of DFT and IDFT requires ———— complex multiplications and ———— complex additions respectively.

(A) N^2 and $N(N-1)$
(B) $N(N-1)$ and N^2
(C) N^2 and $N-1$
(D) N and $N(N-1)$
(E) Answer not known

31. The following statements describe features of 8253 timers. Identify the correct one.

(1) Three independent 16-bit down counters

(2) Counter can be programmed in six different modes

(3) Three counters are identical, presettable and can be programmed for either binary or BCD count

(A) (1) only

(B) (2) only

(C) (1), (2) and (3)

(D) (2) and (3) only

(E) Answer not known

32. The 8051 µC has ———— ROM and ———— RAM.

(A) 4 KB, 128 B

(B) 128 B, 4 KB

(C) 4B, 128 KB

(D) 128 KB, 4B

(E) Answer not known

33. Which port of the 8255 PPI is used for performing the handshaking function with the interfaced devices?

(A) Port A and C

(B) Port B and C

(C) Port A, B and C

(D) Port A and B

(E) Answer not known

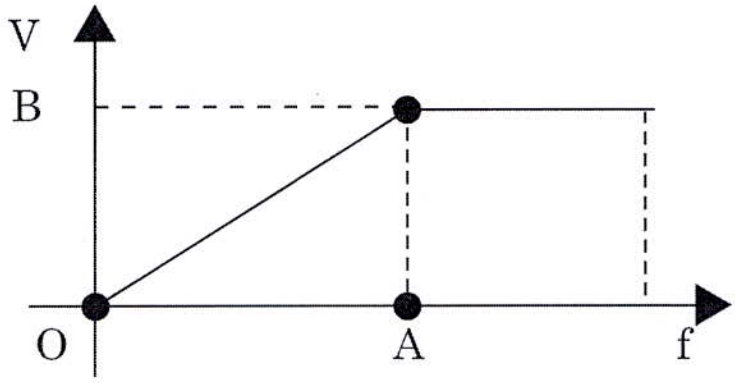
34. The microprocessor is get interrupted by this mode of operation of 8253 Programmable Timer

(A) Mode 5
(B) Mode 2
(C) Mode 0
(D) Mode 1
(E) Answer not known

35. The number of active flags in the flag register of 8086 is,

(A) 5
(B) 6
(C) 9
(D) 10
(E) Answer not known

36. The variation of terminal voltage with frequency is shown in Fig. Which of the following statements are true?



(1) Between point OA V/f maintained constant

(2) After point A V/f maintained constant

(3) After point A V is increased

(4) After point A V is kept constant

(A) (1) and (2) are true

(B) (3) and (4) are true

(C) (1) and (3) are true

(D) (1) and (4) are true

(E) Answer not known

37. In a 3ϕ, 4 pole, 50 Hz synchronous motor, the frequency, pole number and load torque all are halved. The motor speed will be

(A) 1500 rpm

(B) 750 rpm

(C) 3000 rpm

(D) 1800 rpm

(E) Answer not known

38. The speed of a 415 V, 3ϕ, 50 Hz, 2850 rpm induction motor is controlled using inverter with V/f control. The motor runs with the inverter output frequency of 40 Hz and with half the rated slip. The running speed of the motor is

(A) 2800 rpm
(B) 1225 rpm
(C) 2340 rpm
(D) 1800 rpm
(E) Answer not known

39. A DC chopper feeds armature circuit of a DC motor. If the value of back emf is increased by 10% then the current ripple will

(A) increase by 10%
(B) decrease by 10%
(C) remain the same
(D) be doubled
(E) Answer not known

40. Methods only applicable to control the speed of three phase wound rotor induction motors are;

(i) Stator voltage control

(ii) Stator frequency control

(iii) Stator voltage and frequency control

(iv) Stator current control

(v) Static rotor-resistance control

(vi) Slip-energy recovery control

(A) (i), (ii), (iv), (vi)
(B) (i), (ii), (iii), (iv)
(C) (v), (vi)
(D) (i), (v), (vi)
(E) Answer not known

41. A separately excited DC motor when fed from 1ϕ full converter with firing angle 60° runs at 1000 rpm. If this motor is connected to 1ϕ semi converter with the same firing angle of 60°, the motor will run at

(A) 2000 rpm
(B) 3000 rpm
(C) 1500 rpm
(D) 1450 rpm
(E) Answer not known

42. The relation between torque (T) and speed (ω) in fans and compressors is

(A) $T \propto \sqrt{\omega}$ (B) $T \propto \omega^2$

(C) $T \propto \omega$ (D) $T \propto 1/\omega$

(E) Answer not known

43. A single phase voltage source inverter is operating with pure inductive load. The supply voltage is constant and free from inductance. The current through the load is

(A) Sine wave (B) Square wave

(C) Pulsed wave (D) Triangular wave

(E) Answer not known

44. In a single pulse modulation of PWM inverter 5th Harmonic can be eliminated if pulse width is equal to

(A) 30° (B) 72°

(C) 36° (D) 108°

(E) Answer not known

45. Consider a MOSFET with a C_{gs} = 4000 pf. From the basic charge – potential relationship $Q = CV$, the voltage across the gate-source capacitance that would get developed for a charge Q 1 μC is

(A) 50 V (B) 250 μV

(C) 250 mV (D) 250 V

(E) Answer not known

46. Voltage Ripple factor is defined as the ratio of

(A) ripple voltage to the average output voltage
(B) ripple voltage to the rms output voltage
(C) rms output voltage to the average output voltage
(D) average output voltage to ripple voltage
(E) Answer not known

47. Inductors and capacitors used in the switched-mode regulators act as

(A) Energy storage elements
(B) Filter elements
(C) Energy storage elements and filter elements
(D) Boosting elements
(E) Answer not known

48. For power semiconductor devices, a junction with _____ doped layer on its one side requires _____ breakdown voltage.

(A) lightly, low
(B) lightly, large
(C) heavily, low
(D) heavily, large
(E) Answer not known

49. Which of the following speed control method of three phase induction motor is similar to the armature - voltage speed control of DC motor.

(A) Stator Voltage and Frequency Control
(B) Stator Voltage Control
(C) Stator Current Control
(D) Static Rotor - Resistance Control
(E) Answer not known

50. The chopper used for on-off control of a dc separately excited motor has supply voltage of 230 V dc, an on-time of 10m sec and off-time of 15m sec. Calculate chopper duty cycle.

(A) 2.5
(B) 0.25
(C) 0.4
(D) 4
(E) Answer not known

51. The gain crossover frequency is the frequency at which the open-loop magnitude on the Bode magnitude plot is

(A) 30 dB
(B) 0 dB
(C) 180 dB
(D) 90 dB
(E) Answer not known

52. The nature of transient response of a linear control system is depend upon

(A) System poles
(B) Type of the input
(C) System zeros
(D) Both system poles and zeros
(E) Answer not known

53. The compensator using op-amp circuits for $G(s) = K_c \frac{(\alpha T_s + 1)}{(T_s + 1)}$ where $\alpha < 1$, $K_c > 0$ and $T > 0$ is

(A) Proportional plus integrator action
(B) Proportional plus gain limited integrator action
(C) Proportional plus derivative action
(D) Proportional plus bandwidth-limited derivative action
(E) Answer not known

54. The state equation and initial condition vector of an linear time invariant system.

$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}1 & 0\\ 1 & 1\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}; x_0=\begin{bmatrix}1\\ 0\end{bmatrix}$, then solution of state equation is

(A) $\begin{bmatrix}te^t\\ e^t\end{bmatrix}$

(B) $\begin{bmatrix}e^t\\ te^t\end{bmatrix}$

(C) $\begin{bmatrix}te^t & e^t\end{bmatrix}$

(D) $\begin{bmatrix}e^t & te^t\end{bmatrix}$

(E) Answer not known

55. A unity feedback control system has a open loop transfer function $G(s)=\dfrac{10}{s(s+2)(s+1)}$. Then, angle of asymptotes is

(A) $\pm 60°$

(B) $\pm 30°$

(C) $\pm 20°$

(D) $\pm 40°$

(E) Answer not known

56. The model canonical representation of following closed loop transfer function $\frac{Y(s)}{U(s)} = \frac{20(s+2)}{(s+3)(s+4)}$ is

(A) $A = \begin{bmatrix} -4 & 0 \\ 0 & -3 \end{bmatrix}; B = \begin{bmatrix} 40 \\ -20 \end{bmatrix}; C = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$

(B) $A = \begin{bmatrix} 4 & 0 \\ 0 & 3 \end{bmatrix}; B = \begin{bmatrix} 40 \\ -20 \end{bmatrix}; C = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$

(C) $A = \begin{bmatrix} -4 & 0 \\ 0 & -3 \end{bmatrix}; B = \begin{bmatrix} 20 \\ 20 \end{bmatrix}; C = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$

(D) $A = \begin{bmatrix} -4 & 0 \\ 0 & -3 \end{bmatrix}; B = \begin{bmatrix} 20 \\ 0 \end{bmatrix}; C = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$

(E) Answer not known

57. The open loop transfer function is $G(s) = \frac{10000}{s(s+10)^2}$. The magnitude of G(s) in dB at angular frequency W = 20 rad/sec is

(A) 0 dB
(B) 10 dB
(C) 20 dB
(D) 30 dB
(E) Answer not known

58. The transfer function of a compensating network is given as $G_C(s) = \frac{s+z}{s+p}$ when $|z| < |p|$, the network is called as

(A) phase-lag
(B) phase-lead
(C) phase lead-lag
(D) phase shifting
(E) Answer not known

59. The steady state error for $G(s)=\dfrac{\left(s/k\right)(s+k)}{(s+1)(s+16)}$ with position error constant 100 is

(A) 2
(B) 0.5
(C) 4
(D) –0.5
(E) Answer not known

60. The system of equation $G(s)=s^4+2s^3+3s^2+6s+K$, by Routh Hurwitz's criteria is

(A) Unstable for all values of K
(B) Stable for $K \geq 0$
(C) Stable for $K < 0$
(D) Stable for all values of K
(E) Answer not known

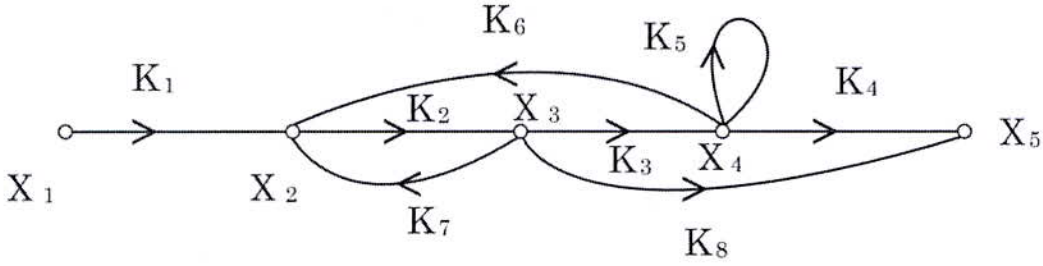
61. A second order system has a damping ratio of 0.6 and natural frequency of oscillation is 12 rad/sec. The damped frequency of oscillation is

(A) 9.6 rad/sec
(B) 96 rad/sec
(C) $\sqrt{9.6}$ rad/sec
(D) $\sqrt{96}$ rad/sec
(E) Answer not known

62. The position and velocity errors of type 2 system are

(A) constant – constant
(B) constant – infinity
(C) zero – constant
(D) zero – zero
(E) Answer not known

63. Determine the forward path gains from the signal flow graph shown below :



(A) $P_1 = K_1K_2K_3K_4$ and $P_2 = K_1K_2K_3K_6$

(B) $P_1 = K_1K_2K_3K_4$ and $P_2 = K_1K_2K_8$

(C) $P_1 = K_1K_2K_7$ and $P_2 = K_1K_2K_3K_5$

(D) $P_1 = K_1K_2K_3K_4K_5$ and $P_2 = K_1K_2K_3K_4K_8$

(E) Answer not known

64. In Routh stability criterion, the number of sign changes in the elements of the first column of the Routh array correspond to the number of roots of the characteristic equation in the

(A) Right half of the s-plane

(B) Left half of the s-plane

(C) Both left and right of the s-plane

(D) Only at origin of the s-plane

(E) Answer not known

65. The Laplace transform of the output of a linear system is equal to the transfer function when the input is

(A) An Sinusoidal

(B) An impulse function

(C) An Ramp

(D) An step

(E) Answer not known

66. _____ relays are used to protect the transformers against the external short circuits and the overloads.

(A) Buchholz relay
(B) Differential relay
(C) Distance relay
(D) IDMT relay
(E) Answer not known

67. Match the Boundary conditions with faults :

(a)	$V_a = 0;\ I_b = I_c = 0$	1.	Three phase fault
(b)	$I_a = 0; I_b + I_c = 0; V_b = V_c$	2.	LL fault
(c)	$I_a = 0; V_b = 0; V_c = 0$	3.	LG fault
(d)	$I_a + I_b + I_c = 0;\ V_a = V_b = V_c = 0$	4.	LLG fault

	(a)	(b)	(c)	(d)
(A)	3	2	4	1
(B)	1	2	3	4
(C)	4	3	2	1
(D)	2	1	4	3

(E) Answer not known

68. Ferranti effect on long overhead lines is experienced, when it is

(A) Lightly loaded
(B) On full load at upf
(C) On full load at 0.8 pf lag
(D) All the above
(E) Answer not known

69. The following sequence currents were recorded in a power system under a fault condition :

$I_{Positive}$ = j 1.653 PU

$I_{Negative}$ = –j 0.5 PU

I_{Zero} = –j 1.153 PU

The fault is

(A) Line to ground
(B) Three phase
(C) Line to line to ground
(D) Line to line
(E) Answer not known

70. In a power system, the maximum number of Buses are

(A) PV Buses
(B) Slack Buses
(C) PQ Buses
(D) Either PV or PQ buses
(E) Answer not known

71. A 50 Hz four-pole alternator rated 20 mVA, 13.2 kV has an inertia constant of H = 9.0 kW-sec/kVA. Determine the kinetic energy stored in the rotor at synchronous speed.

(A) 180 mega joules
(B) 170 mega joules
(C) 160 mega joules
(D) 150 mega joules
(E) Answer not known

72. The percentage bias of a generator protection lies between

(A) 15 % to 30 %
(B) 50 % to 60 %
(C) 80 % to 90 %
(D) 45 % to 75 %
(E) Answer not known

73. The minimum short circuit current according to Indian standard specifications in

(A) $\geq I_{Setting}$
(B) $\geq 1.5\, I_{Setting}$
(C) $\geq 1.3\, I_{Setting}$
(D) $\geq 2\, I_{Setting}$
(E) Answer not known

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

(A) Short circuit current limit
(B) Reactive power limit
(C) Steady state stability limit
(D) Transient stability limit
(E) Answer not known

75. _____ gives the continuous measurement and record of real power, apparent power, voltage, current and power factor.

(A) Synergy meter
(B) Multimeter
(C) Electrodynamic wattmeter
(D) Power analyser
(E) Answer not known

76. The inductance of a power transmission line increases with

(A) Increase in diameter of conductor
(B) Decrease in line length
(C) Increase in line length
(D) Increase in spacing between the phase conductors
(E) Answer not known

77. Identify the key characteristic of a deregulated power system from the following.

(A) Government control overall aspects of the electricity market
(B) Separation of generation, transmission and distribution functions
(C) Single, vertically integrated utility company
(D) Fixed electricity prices set by the Government
(E) Answer not known

78. In an overcurrent Relay, the time of operation is inversely proportional to _____.

(A) The square of the current
(B) The square of the voltage
(C) The frequency
(D) The voltage
(E) Answer not known

79. Steady-state stability refers to the ability of a power system to

(A) Withstand sudden, large disturbances

(B) Return to stable operating point after small disturbance

(C) Maintain synchronism during fault condition

(D) Maintain voltage and frequency within acceptable limits during normal operating condition

(E) Answer not known

80. For below 400 kV systems, the circuit breaker is designed to withstand _____ above the normal system voltage.

(A) 10%

(B) 15%

(C) 20%

(D) 40%

(E) Answer not known

81. A transmission line has 0.4 pu impedance on a base of 132 kV, 100 MVA. On a base of 220 kV, 50 MVA, it will have a per unit impedance of

(A) $0.4 \times \frac{50}{100} \times \left(\frac{220}{132}\right)^2$

(B) $0.4 \times \frac{50}{100} \times \left(\frac{132}{220}\right)^2$

(C) $0.4 \times \frac{100}{50} \times \left(\frac{220}{132}\right)^2$

(D) $0.4 \times \frac{100}{50} \times \left(\frac{132}{220}\right)^2$

(E) Answer not known

82. The voltage drop produced by an inductive lead can be reduced particularly when line has

(A) High X_C/X_L ratio

(B) High X/R ratio

(C) Low X_C/X_L ratio

(D) Low X/R ratio

(E) Answer not known

83. If "δ" is the dielectric loss angle of the cable, its power factor is _____.

(A) $\sin \delta$

(B) $\cos \delta$

(C) independent of δ

(D) $\tan \delta$

(E) Answer not known

84. The complete fission of 1 kg of Uranium (U^{235}) can produce as much energy as can be produced by burning of _____.

(A) 450 tons of High grade coal

(B) 950 tons of High grade coal

(C) 4500 tons of High grade coal

(D) 9000 tons of High grade coal

(E) Answer not known

85. In hydro power plants, the turbine that has specific speeds varying from 50 rpm to 300 rpm is _____.

(A) Single jet Pelton turbine
(B) Double jet Pelton turbine
(C) Francis turbine
(D) Kaplan turbine
(E) Answer not known

86. In a HVDC transmission, the bridge rectifier output voltage after taking into account grid control and overlap results in

$$V_d = V_o \cos\alpha - \frac{3 \times I_d}{\pi}$$

In this equation, the voltage drop $\frac{3 \times I_d}{\pi}$ represents a drop due to

(A) Ohmic resistance of the rectifier transformer
(B) Ohmic resistance of thyristors
(C) Leakage reactance of transformer
(D) Commutation of the rectifier
(E) Answer not known

87. In Gauss-Seidal method, the number of iterations may be reduced if the voltage correction at each bus is multiplied by

(A) Blocking factor
(B) Gauss constant
(C) Acceleration factor
(D) Deceleration factor
(E) Answer not known

88. A stringing chart is useful for _____.

(A) Finding the sag in the conductor
(B) The design of the tower
(C) The design of the Insulator string
(D) Finding the distance between the towers
(E) Answer not known

89. Match the passive compensators with purpose :

(a)	Series Inductor	1.	To improve voltage profile
(b)	Series Capacitor	2.	To reduce over voltage
(c)	Shunt Inductor	3.	To increase power transfer capability in a Transmission line
(d)	Shunt Capacitor	4.	To reduce fault current in a Transmission line

	(a)	(b)	(c)	(d)
(A)	1	2	3	4
(B)	4	3	2	1
(C)	1	3	2	4
(D)	1	4	2	3

(E) Answer not known

90. Calculate the thermal efficiency of the steam power station having maximum demand of 25 mW, Load factor of 0.4, Coal consumption = 0.88 kg/kWh, Boiler efficiency = 85%, Turbine efficiency = 90%, price of coal = Rs. 55/Tone

(A) 62.35%
(B) 76.5%
(C) 71.5%
(D) 70.2%
(E) Answer not known

91. Let R be the resistance of each conductor in a DC 2-wire with a midpoint earthed transmission system. Find the copper loss in the system to transmit the power P?

(A) $\left(\frac{P^2}{2V^2}\right)^R$

(B) $2\left(P/V\right)^2 R$

(C) $\left(P^2/V^2\right)R$

(D) $4\left(P/V\right)^2 R$

(E) Answer not known

92. In the following options, the most relevant information needed to specify the Real Power (P) at the PV buses in a load flow analysis is

(A) Rated power output of the Generator

(B) Rated voltage of the Generator

(C) Solution of Economic load dispatch

(D) Base power of the Generator

(E) Answer not known

93. Match the following :

Types of cables	Voltage level
(a) Low tension cables	1. 33 kV to 66 kV
(b) High tension cables	2. 22 kV to 33 kV
(c) Extra high tension cables	3. Upto 11,000 V
(d) Super tension cables	4. Upto 1000 V

	(a)	(b)	(c)	(d)
(A)	4	3	2	1
(B)	4	3	1	2
(C)	3	4	1	2
(D)	3	2	1	4

(E) Answer not known

94. Match List I with List II and select the correct answer :

List I	List II
(a) Graetz Bridge converter	1. EHV/UHV AC transmission
(b) Series compensation	2. HVDC transmission
(c) Sag templates	3. Insulators
(d) Grading ring	4. Tower location

	(a)	(b)	(c)	(d)
(A)	2	1	3	4
(B)	1	2	4	3
(C)	2	1	4	3
(D)	1	2	3	4

(E) Answer not known

95. The capacitance of a 3 core cable between any two conductors with sheath earthed is $2\,\mu F$. The capacitance per phase will be

(A) $1\ \mu F$
(B) $4\ \mu F$
(C) $0.667\ \mu F$
(D) $1.414\ \mu F$
(E) Answer not known

96. The relation between electric field vector E, displacement vector D and polarization vector P is

(A) $D = E + P$
(B) $D = P/E$
(C) $D = \varepsilon_0 E + P$
(D) $D = \varepsilon_0 (E + P)$
(E) Answer not known

97. Complete the Lorentz force equation F =

(A) $q\,E$
(B) $q(V \times B)$
(C) $qE + q(V \times B)$
(D) $q\,BV\cos\phi$
(E) Answer not known

98. The total force on any closed circuit carrying current in a uniform magnetic field is

(A) One
(B) Zero
(C) Magnetic flux density
(D) Magnetic field intensity
(E) Answer not known

99. The Unit of Self-Inductance is

(A) Weber/ampere
(B) Henry
(C) Volt-Second/ampere
(D) All the above
(E) Answer not known

100. A circular coil has a radius of 0.1m and a number of turns of 50. The magnetic induction at a point at the centre of the coil, when a current of 0.1A flows in it will be

(A) $3.14\times10^{-4}T$
(B) $3.14\times10^{-5}T$
(C) $2.81\times10^{-6}T$
(D) $1.57\times10^{-3}T$
(E) Answer not known

101. A solenoid having an air core and 10 cm long has 100 turns and its area of cross section is 5 cm^2. Find the self inductance of the solenoid.

(A) 42.8 μH
(B) 62.8 μH
(C) 32.8 μH
(D) 52.8 μH
(E) Answer not known

102. An air-core toroid with 500 turns, a cross sectional area of 6 cm^2, and mean radius of 15 cm has the reluctance of the circuit as

(A) $1.6\times10^{-6}\,A.t/Wb$
(B) $1.25\times10^{9}\,A.t/Wb$
(C) $2.67\times10^{3}\,A.t/Wb$
(D) $1.59\times10^{4}\,A.t/Wb$
(E) Answer not known

103. In Biot-Savart's law, the magnetic field intensity is proportional to _____, where R is the distance.

(A) R^2 (B) $1/R^2$

(C) R (D) $1/R$

(E) Answer not known

104. The air-core transformers are _____ coupled.

(A) Perfectly (B) Loosely

(C) Tightly (D) Weightless

(E) Answer not known

105. The magnetic field intensity for an infinite sheet of current density $\vec{k}$ is

(A) $-\frac{1}{2}\vec{k}\times\vec{a}_n$ (B) $\frac{1}{2}\vec{k}\times\vec{a}_n$

(C) zero (D) $\vec{k}\times\vec{a}_n$

(E) Answer not known

106. A particle of charge $4\times10^{-9}C$ is acted upon a downward force $9.6\times10^{-9}N$ in an electric field. The strength of electric field is

(A) 2.4 N (B) 2.4 N/C

(C) 3.2 N (D) 3.2 N/C

(E) Answer not known

107. If k is the dielectric constant, $\in$ is the permittivity of a medium and $\in_0$ is permittivity for vacuum, then

(A) $\in_0 = k \in$

(B) $\in_0 = \frac{\in}{k}$

(C) $\in \in_0 k = 1$

(D) $\in = k \in_0^2$

(E) Answer not known

108. The capacitance of parallel plate capacitor with d = 1m and area 0.8 m^2 is

(A) $0.8\varepsilon_0$

(B) $0.4\varepsilon_0$

(C) $0.8/\varepsilon_0$

(D) $0.4/\varepsilon_0$

(E) Answer not known

109. Six charges each + Q, are placed at the corners of a regular hexagon of side 'a'. The electric field at the centre of hexagon is

(A) $\frac{1}{4\pi\varepsilon_0}\frac{6Q}{a^2}$

(B) $\frac{1}{4\pi\varepsilon_0}\frac{Q}{a^2}$

(C) $\frac{1}{4\pi\varepsilon_0}\frac{6Q^2}{a}$

(D) zero

(E) Answer not known

110. The materials are classified as dielectrics if the conductivity, σ and relative permittivity, ε_r are

(A) $(\sigma >> 1, \varepsilon_r = 1)$

(B) $(\sigma << 1, \varepsilon_r \geq 1)$

(C) $(\sigma >> 1, \varepsilon_r \leq 1)$

(D) $(\sigma >> 1, \varepsilon_r > 1)$

(E) Answer not known

111. The potential difference between X(2,1,1) and Y(1,2,3) if the electric field intensity is $E = (x.u_x + y.u_y + z.u_z)\ v/m$ will be

(A) + 1 V
(B) – 4 V
(C) +4 V
(D) – 5 V
(E) Answer not known

112. A spherical capacitor formed of two concentric spherical conducting shells of inner radius a and outer radius b. The capacitance of an isolated spherical conductor while allowing the outer sphere radius to become infinitely large will be

(A) $4\pi\varepsilon a$
(B) $2\pi\varepsilon a$
(C) $\pi\varepsilon a$
(D) $\frac{\pi}{2}\varepsilon a$
(E) Answer not known

113. The Gauss's law is a result of proper application of

(A) Divergence theorem to Coulomb's law
(B) Divergence theorem to Maxwell's law
(C) Stokes theorem to Coulomb's law
(D) Stokes theorem to Maxwell's law
(E) Answer not known

114. The normal component of D is _____ across the interface with no free charges at the dielectric-dielectric boundary.

(A) infinite
(B) continuous
(C) discontinuous
(D) zero
(E) Answer not known

115. Consider a parallel plate capacitor separated by a distance 'd'. The capacitance can be increased by placing the two plates

(A) Far away from each other

(B) Closer together

(C) in series

(D) in parallel

(E) Answer not known

116. In an digital IC family, propagation delay is 10 ns with an average power dissipation of 2mW. Then its speed power product is _____.

(A) 20 pJ

(B) 1/20 pJ

(C) $5\mu J$

(D) $1/5\mu J$

(E) Answer not known

117. Schottky TTL Gate is faster than TTL Gate because _____.

(A) Schottky diode resistance is small

(B) Schottky diode between base and collector avoids the transistor to enter into saturation

(C) Schottky diode between base and emitter supports to enter into saturation

(D) Schottky transistor has low power dissipation

(E) Answer not known

118. Which among the following statements are true with respect to ECL gates

(i) Wired logic is possible

(ii) Current-mode logic

(iii) Lower power dissipation than CMOS

(A) (ii) only

(B) (i) and (ii)

(C) (i) only

(D) (i) (ii) and (iii)

(E) Answer not known

119. The minimum number of Flip-flops required to design a MOD-10 counter is

(A) 3

(B) 10

(C) 4

(D) 5

(E) Answer not known

120. Identify the correct option that is not a sequential circuit.

(A) J-K flip flop

(B) Counter

(C) Full adder

(D) Shift register

(E) Answer not known

121. In a voltage controlled oscillator, if input signal frequency $f_s = 20kHz$; free running frequency $f_0 = 21$ kHz/V, voltage to frequency conversion factor kV is 4 kHz/V, find the change in the dc control voltage Vc during lock.

(A) 0.4v
(B) 0.25v
(C) 0.1v
(D) 0v
(E) Answer not known

122. A programmable logic array (PLA) consists of two level _____ circuits on a single chip.

(A) AND-NAND
(B) OR-NOR
(C) AND-OR
(D) NAND-NOR
(E) Answer not known

123. In Boolean algebra the Boolean Junction $x(\bar{x} + y)$ is equal to

(A) xy
(B) $x + y$
(C) $\bar{x}y$
(D) y
(E) Answer not known

124. Crossover Distortion occurs only in _____ amplifier

(A) Class A
(B) Class B
(C) Class AB
(D) Push-Pull
(E) Answer not known

125. A complementary symmetry push pull amplifier is operated using $V_{cc} = \pm 10V$ and deliver power to a load $R_L = 5\Omega$. The maximum power output will be

(A) 50 W
(B) 10 W
(C) 2 W
(D) 25 W
(E) Answer not known

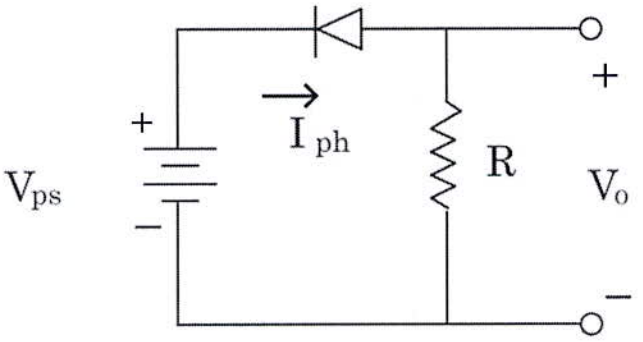
126. For a single phase Diode rectifiers, the TUF of a Bridge rectifier is

(A) 0.812
(B) 0.482
(C) 0.286
(D) 1.11
(E) Answer not known

127. Determine the dynamic resistance with a forward current of 70mA and forward voltage of 0.025V.

(A) 0.357Ω
(B) 0.37Ω
(C) 0.38Ω
(D) 0.24Ω
(E) Answer not known

128. For the photodiode shown in below fig. assume the quantum efficiency is 1. The junction area is $10^{-2}cm^2$, and the incident photon flux is $5\times10^{+17}cm^{-2}$/sec. Calculate the photo current. (Assume charge of electron is $1.6\times10^{-19}C$)



(A) 1.25 mA
(B) 0.5 mA
(C) 0.16 mA
(D) 0.8 mA
(E) Answer not known

129. In a diode under forward bias, the minority carrier densities at the edges of the space charge has _____ relation with the applied bias.

(A) linearly
(B) quadratically
(C) logarithmically
(D) exponentially
(E) Answer not known

130. The maximum overall efficiency of a transformer – coupled class-A amplifier is _____ percent.

(A) 78.5
(B) 25
(C) 85
(D) 50
(E) Answer not known

131. Three loads with impedance z_1, z_2 and z_3 are connected in parallel to ac source of 120V. Then, the false statement is _____.

(A) $P_{total} = P_1 + P_2 + P_3$

(B) $Q_{total} = Q_1 + Q_2 + Q_3$

(C) $S_{total} = S_1 + S_2 + S_3$

(D) $Z_{total} = Z_1 + Z_2 + Z_3$

(E) Answer not known

132. The current in the neutral wire of a balanced three phase, four wire star connected load is given by

(A) $\sqrt{3}$ times the current in each phase

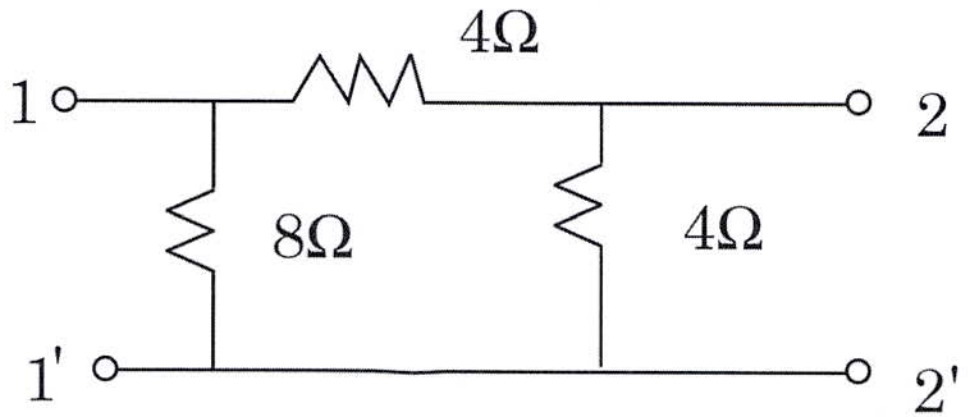
(B) 3 times the current in each phase

(C) zero

(D) $\sqrt{2}$ times the current in each phase

(E) Answer not known

133. The input and output impedance of the 2 port network shown are



(A) 4Ω, 3Ω

(B) 4Ω, 2Ω

(C) 3Ω, 2Ω

(D) 2 Ω, 1Ω

(E) Answer not known

134. In a certain series RC circuit, the true power is 2W and the reactive power is 3.5 VAR. What is the apparent power?

(A) 3.5 VA
(B) 3 VA
(C) 9 VA
(D) 4.03 VA
(E) Answer not known

135. From the given below conditions, choose the condition for a two port network is said to be reciprocal

(A) $Z_{12} = Z_{22}$
(B) $Z_{11} = Z_{22}$
(C) $Z_{12} = Z_{21}$
(D) $Z_{11} = Z_{12}$
(E) Answer not known

136. An impedance Z, when connected to 100 V, 25 Hz supply, produces 1 A while the same circuit produces 0.5 A when the applied voltage is 100 V but the frequency is 50 Hz. What will be frequency at which the circuit impedance will be half to that when 25 Hz voltage was applied to it _____.

(A) 12.5 Hz
(B) 25 Hz
(C) 50 Hz
(D) 37.5 Hz
(E) Answer not known

137. In a balanced star connected system, the phase angle difference between line voltage and phase voltage is _____.

(A) 120°
(B) 90°
(C) 60°
(D) 30°
(E) Answer not known

138. The input current to a 3 phase step down transformer connected to an 11 kV supply system is 14 A. Calculate the secondary line voltage for star - star connection if the phase turns ratio is 44.

(A) 195 V
(B) 200 V
(C) 228 V
(D) 250 V
(E) Answer not known

139. If the two port network is symmetrical which of the following is true for 2-parameters

(A) $Z_{11} = Z_{22}$
(B) $Z_{12} = Z_{21}$
(C) $Z_{11} = Z_{12}$
(D) $Z_{21} = Z_{22}$
(E) Answer not known

140. Find P delivered from a sinusoidal voltage source with $V_{\text{Ref}} = 110V$ to an impedance of $Z = 10 + j8$. Find the power factor.

(A) 0.65
(B) 0.91
(C) 0.7
(D) 0.78
(E) Answer not known

141. In a three-phase unbalanced star-connected system, the vector sum of the current in the three line is _____.

(A) Zero
(B) Three times the current in the each phase
(C) $\sqrt{3}$ times the current in the each phase
(D) Not zero
(E) Answer not known

142. At certain current, the energy stored in the iron cored coil is 2000 J and its copper loss is 2000 W. The time constant is

(A) 1.0
(B) 2.0
(C) 0.25
(D) 0.50
(E) Answer not known

143. In Electric signals, a signal that exhibits a distinct pattern and repeat at regular intervals is referred to as

(A) Periodic signal
(B) Non periodic signal
(C) Dependent signal
(D) Independent signal
(E) Answer not known

144. If $R_1 = 1\ \Omega$, $R_2 = 2\ \Omega$, $R_3 = 3\ \Omega$: R_2 and R_3 are connected in parallel and the combination is in series with R_1, then the total resistance will be _____.

(A) $5\ \Omega$
(B) $2\ \Omega$
(C) $3\ \Omega$
(D) $2.2\ \Omega$
(E) Answer not known

145. Norton's equivalent circuit consists of

(A) Voltage source in parallel with resistance
(B) Voltage source in series with resistance
(C) Current source in series with resistance
(D) Current source in parallel with resistance
(E) Answer not known

146. In Thevenin's theorem, the Thevenin voltage is called as _____.

(A) Short circuit voltage

(B) Open circuit voltage

(C) Both short circuit and open circuit voltages

(D) Neither open circuit nor short circuit voltage

(E) Answer not known

147. A voltage of 100 V D.C. is applied across two capacitors in series having capacitances 100 μF and 25 μF. Calculate the voltage drop across each capacitor.

(A) $VC_1 = 30\,V$ and $VC_2 = 70\,V$

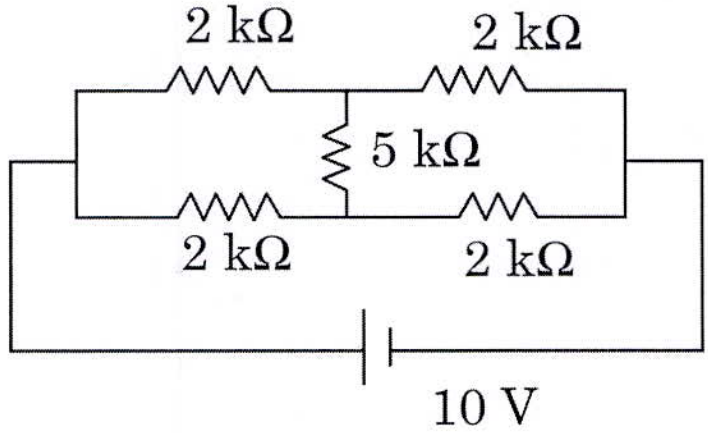
(B) $VC_1 = 20\,V$ and $VC_2 = 80\,V$

(C) $VC_1 = 40\,V$ and $VC_2 = 60\,V$

(D) $VC_1 = 80\,V$ and $VC_2 = 20\,V$

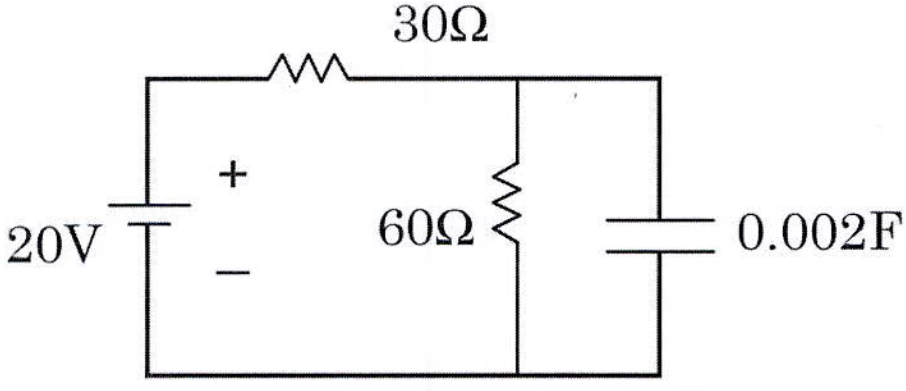
(E) Answer not known

148. The current through the 5 kΩ resistance in the circuit shown is



(A) 0 mA
(B) 2 mA
(C) 5 mA
(D) 3 mA
(E) Answer not known

149. The time constant of the RC circuit shown is



(A) 4 ms
(B) 40 ms
(C) 0.25 ms
(D) 25 ms
(E) Answer not known

150. Superposition theorem is valid only for

(i) Non-linear circuits

(ii) Linear circuits

(iii) Bilateral circuits

(iv) Integrated circuits

(A) (i) and (iii) only
(B) (ii) only
(C) (i) and (ii) only
(D) (iii) and (iv) only
(E) Answer not known

151. A 100 Ω resistance is directly switched on across a 10 V battery. What is the current through the resistor? How much is the power loss?

(A) I = 1A, Power Loss = 5 W
(B) I = 0.1 A, Power Loss = 1 W
(C) I = 1.1 A, Power Loss = 0.1 W
(D) I = 0.5 A, Power Loss = 2 W
(E) Answer not known

152. The Network's behaviour is different for the different direction of the current flowing through network components, which are referred to as _____.

(A) Multilateral network
(B) Bilateral network
(C) Passive network
(D) Unilateral network
(E) Answer not known

153. The unfavourable condition for a balanced three phase star connected system is ————————.

(A) $|\overline{V}_{an}| = |\overline{V}_{bn}| = |\overline{V}_{cn}|$

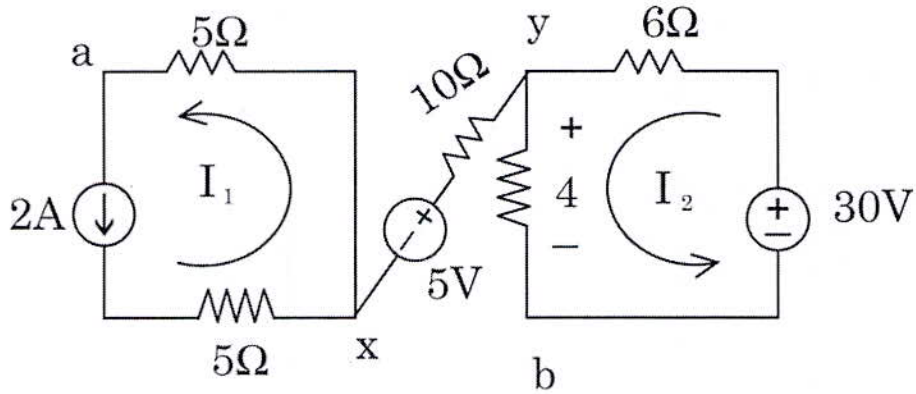
(B) $\bar{I}_{an} + \bar{I}_{bn} + \bar{I}_{cn} = 0$

(C) $\overline{V}_{an} + \overline{V}_{bn} + \overline{V}_{cn} = 0$

(D) Load impedances are different in each phase

(E) Answer not known

154. Find the voltage V_{ab} in the below shown network



(A) –3 V

(B) –5 V

(C) + 5 V

(D) + 3 V

(E) Answer not known

155. In Inductive circuit current _____ and in capacitive circuit current _____ the supply voltage.

(A) leads, lags

(B) lags, lags

(C) lags, leads

(D) leads, leads

(E) Answer not known

156. In an amplifier modulated system, the total power radiated is 400 W. The power of the carrier is 600 W. Calculate the modulation index

(A) 1
(B) 0.5
(C) 0.66
(D) 0.9
(E) Answer not known

157. _____ code atleast one logic level transition per bit period and often has two transitions.

(A) Bi-phase-L
(B) NRZ-L
(C) RZ-L
(D) JNZ-L
(E) Answer not known

158. Programmable logic controller operates on the following signals

(A) Analog
(B) Digital
(C) Impulse
(D) Frequency
(E) Answer not known

159. A pitot tube is used for measurement of velocity of flow of water having a density of 1000 kg/m^3. Determine the velocity of flow at the head of the pitot tube if the differential pressure of 10 kN/m^2 between the outlets

(A) 2.25 m/s
(B) 4.47 m/s
(C) 10 m/s
(D) 6.5 m/s
(E) Answer not known

160. The internal resistance of an ohmmeter can be estimated from

(A) Zero deflection
(B) Full scale deflection
(C) Half scale deflection
(D) Quarter deflection
(E) Answer not known

161. A pulse generator generating a square wave has a duty cycle of

(A) 25%
(B) 50%
(C) 75%
(D) 40%
(E) Answer not known

162. The liquid used in LCDs are

(A) Nematic
(B) Tantalum
(C) Oil
(D) Electrolytic
(E) Answer not known

163. The turn off time of a LCD is of the order of

(A) 1 s
(B) 1 ms
(C) 10 ms
(D) 10 ns
(E) Answer not known

164. Sphere gaps are used for measurement of

(A) Instantaneous value of voltage
(B) r.m.s value of voltage
(C) Peak value of voltage
(D) Average value of voltage
(E) Answer not known

165. A spectrum analyzer is used to display

(A) Frequency band spectrum
(B) Amplitude
(C) Time
(D) Phase
(E) Answer not known

166. A D'Arsonal movement is

(A) Taut band
(B) Permanent Magnet Moving Coil (PMMC)
(C) Electrodynamometer
(D) Moving iron type
(E) Answer not known

167. The relation between the angular deflection of the pointer from the plane of reference (θ) and the phase angle of the circuit to which the power factor meter is connected (ϕ) is

(A) $\theta = \phi$
(B) $\theta = 30^\circ - \phi$
(C) $\theta = 30^\circ + \phi$
(D) $\theta = \phi / 2$
(E) Answer not known

168. The difference between the expected value of the variable and the measured variable is termed

(A) absolute error
(B) random error
(C) instrumental error
(D) gross error
(E) Answer not known

169. The ratio of desired signal to the unwanted noise is called

(A) Relative error
(B) Percentage error
(C) Noise to signal ratio
(D) Signal to noise ratio
(E) Answer not known

170. The ratio of transformation in the case of potential transformers.

(A) remains constant irrespective of the power factor of secondary burden
(B) increases with increase in power factor of secondary burden
(C) decreases with increase in power factor of secondary burden
(D) increases with decrease in power factor of secondary burden
(E) Answer not known

171. Identify the bridge used to measure the frequency

(A) Maxwell's bridge
(B) Schering bridge
(C) Anderson bridge
(D) Wien's bridge
(E) Answer not known

172. A wheatstone bridge requires a change of 8Ω in the unknown arm of the bridge to produce a change in deflection of 4 mm of the galvanometer. Determine its sensitivity.

(A) 32 mm/Ω
(B) 0.5 mm/Ω
(C) 2 mm/Ω
(D) 0.6 mm/Ω
(E) Answer not known

173. The difference between the best measured value and the true value of the quantity is known as

(A) Dynamic error
(B) Absolute error
(C) Relative error
(D) Static error
(E) Answer not known

174. _____ is the closeness with which an instrument reading approaches the true value of the quantity being measured.

(A) Precision
(B) Accuracy
(C) Sensitivity
(D) Resolution
(E) Answer not known

175. In a second order system, the peak overshoot is 100%. The value of damping factor is

(A) 0.707
(B) 1.32
(C) 0.132
(D) 0
(E) Answer not known

176. The condition for maximum starting torque in 3ϕ induction motor is :

[Where : $R_2 \rightarrow$ Rotor resistance

$X_2 \rightarrow$ Rotor reactance

$E_2 \rightarrow$ Rotor emf

$V \rightarrow$ Supply voltage]

(A) $R_2 = X_2$

(B) Cone loss = Copper loss

(C) $E_2 = V$

(D) $R_2 = \frac{1}{2} X_2$

(E) Answer not known

177. In blocked rotar test of a induction motor the relation between short-circuit current and voltage is

(A) Sinusoidal

(B) Straight line

(C) Irregular shape

(D) Trapezoidal

(E) Answer not known

178. The V-curves of a synchronous motor show relation between

(A) excitation current and back e.m.f.

(B) field current and p.f.

(C) d.c. field current and a.c. armature current

(D) armature current and supply voltage

(E) Answer not known

179. An induction motor having 8 poles runs at 727.5 r.p.m. If the supply frequency is 50 Hz, the e.m.f. in the rotor will have a frequency of

(A) 1.5 Hz
(B) 48.5 Hz
(C) 2.5 Hz
(D) 51.5 Hz
(E) Answer not known

180. Properties of linear induction motor depends on

(A) Synchronous speed
(B) Rotor input
(C) Number of poles
(D) Synchronous speed and rotor input
(E) Answer not known

181. The purpose of damper winding in synchronous motor is to _____.

(A) Provide magnetic locking
(B) Suppress rotor oscillations
(C) Develop necessary starting torque
(D) Both (B) and (C)
(E) Answer not known

182. The best suited connection for 3-phase, 4-wire service for generators and motors is

(A) $\Delta - \Delta$
(B) $Y - Y$
(C) $\Delta - Y$
(D) $Y - \Delta$
(E) Answer not known

183. In Induction motor, stroboscopic method is used for measurement of

(A) Speed
(B) Slip
(C) Frequency
(D) Power
(E) Answer not known

184. Two alternators working in parallel, supply the following loads :

(1) Lighting load of 500 kW,

(2) 1000 kW at p.f. 0.9 lag

(3) 800 kW at p.f. 0.8 lag

(4) 500 kW at p.f. 0.9 lead

One alternator supply 1500 kW at 0.95 lag

The kW output of other machine will be

(A) 1300
(B) 1000
(C) 2000
(D) 1800
(E) Answer not known

185. An electric train, driven by a linear motor, moves with 200 km/h, when stator frequency is 100 Hz assuming negligible slip, the pole-pitch of the linear motor will be

(A) 277.8 mm
(B) 240 mm
(C) 190 mm
(D) 360 mm
(E) Answer not known

186. A 12 pole, 3 phase alternator driven at a speed of 500 r.p.m supplies power to a 8-pole, 3-phase induction motor. If the slip of the motor, at full load is 3%, the full load speed of the motor will be

(A) 500 rpm
(B) 1500 rpm
(C) 1440 rpm
(D) 727.5 rpm
(E) Answer not known

187. It is never advisable to connect a stationary alternator to live bus-bars because it

(A) is likely to run as synchronous motor
(B) will get short-circuited
(C) will decrease bus-bar voltage through momentarily
(D) will disturb generated e.m.fs of other alternators connected in parallel
(E) Answer not known

188. A synchronous machine is called a doubly excited machine because

(A) It can be over excited
(B) Its rotor and stator are excited
(C) It has two sets of rotor poles
(D) It needs twice the normal exciting current
(E) Answer not known

189. In a DC shunt generator, the generated EMF is directly proportional to

(A) Load resistance

(B) Pole flux

(C) Number of armature parallel path

(D) Armature current

(E) Answer not known

190. The back emf in a D.C. motor

(A) Opposes the applied voltage

(B) Aids the applied voltage

(C) Aids the armature current

(D) Reduce eddy current

(E) Answer not known

191. Short-circuit test of a transformer helps us to find its

(A) Iron loss

(B) Full load Cu loss

(C) Cu loss at no load

(D) Cu loss at any desired load

(E) Answer not known

192. The full load copper-loss and iron loss of a transformer are 6400 W and 5000 W respectively. The copper loss and iron-loss at half load will be, respectively

(A) 3200 W and 2500 W

(B) 3200 W and 5200 W

(C) 1600 W and 1250 W

(D) 1600 W and 5000 W

(E) Answer not known

193. The undesirable condition for parallel operation of dc generators is

(A) Same voltage rating
(B) Same regulator resistance
(C) Same percentage voltage regulation
(D) Same percentage speed regulation
(E) Answer not known

194. The condition for maximum power output of a DC motor is :

(A) $E_b = \frac{V}{2}$
(B) $E_b = V$
(C) $R_a = X_a$
(D) $E_b = 0$
(E) Answer not known

195. Sumpner's test is conducted on transformer to determine

(A) Temperature rise
(B) Stray loss
(C) Transformation ratio
(D) Copper loss
(E) Answer not known

196. The all day efficiency of a transformer depends on

(A) Copper loss
(B) The amount of load
(C) Duration of load
(D) Both (B) and (C)
(E) Answer not known

197. The terminal voltage at half full-load in a level compound generator will be

(A) the same as no load voltage
(B) the same as full load voltage
(C) more than no-load voltage
(D) less than no-load voltage
(E) Answer not known

198. A single phase, 50 Hz transformer has 100 turns on primary and 500 turns on secondary winding. If 230 V supply is connected, the emf induced in secondary winding at no load is

(A) 920 V
(B) 1000 V
(C) 1150 V
(D) 1200 V
(E) Answer not known

199. The main advantage of auto transformer compared to two-winding transformer is

(A) Higher efficiency and low kVA
(B) Lower efficiency and high kVA
(C) Higher efficiency and kVA
(D) Lower efficiency and kVA
(E) Answer not known

200. In a dc machine, if the thickness of cone lamination is halved, then the eddy current loss will

(A) remain same

(B) become half the value

(C) become double the value

(D) become one-fourth the value

(E) Answer not known