1. A PLA can be used as

    (A) as a microprocessor

    (B) as a dynamic memory

    (C) to realize a sequential logic circuit

    ✓(D) to realize a combinational logic circuit

    (E) Answer not known

2. Which of the following statements are correct?

    (1) The noise margin of CMOS devices is much higher.

    (2) CMOS devices dissipate high static power than bipolar devices.

    (3) The output drive currents are much lower in CMOS than in bipolar devices.

    (4) CMOS devices have low input impedances.

    ✓(A) (1) and (3) correct   (B) (2) and (3) correct

    (C) (3) and (4) correct   (D) (1) and (4) correct

    (E) Answer not known

3. The size of the multiplexer required to implement three variable Boolean function is _____.

    (A) 2×1 ✓(B) 4×1

   (C) 8×1 (D) 16×1

    (E) Answer not known

4. A Schmitt trigger can be used as a

   (A) Comparator
   (B) Square wave generator
   (C) Flip flop
   ✓(D) Comparator, Square wave generator (or) flip flop
   (E) Answer not known

5. In a RC Phase Shift Oscillator if $R_1 = R_2 = R_3 = 200\,k\Omega$ and $C_1 = C_2 = C_3 = 100\,pF$. The frequency of oscillations will be

   ✓(A) 3.248 kHz   (B) 6.248 kHz

   (C) 1.624 kHz   (D) 2.248 kHz

   (E) Answer not known

6. Determine o/p voltage v_0 and i/p current i_1
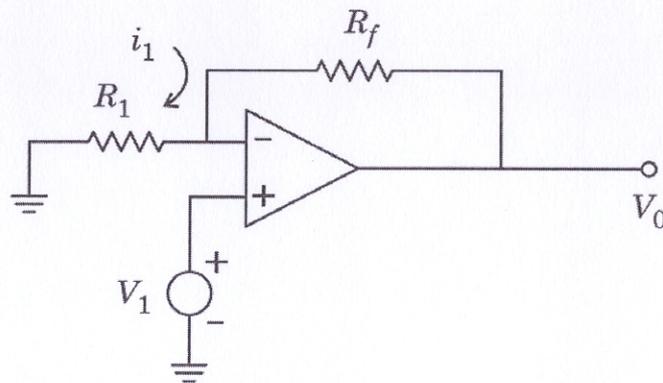
$R_1 = 5k\,\Omega,$
$R_f = 20\,k\Omega$
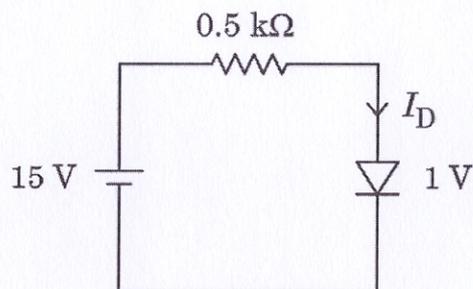$v_i = 1V$

   (A) 1 V, 1 mA   (B) 5 V, 1 mA

   ✓(C) 5 V, 0.2 mA   (D) 1 V, 0.2 mA

   (E) Answer not known

7. Simplify the logic function

$F(A, B, C) = \Sigma m(1, 2, 3, 5, 7)$

   (A) $A + \overline{A}B$ (B) ABC

   (C) $A + BC$ ✓(D) $C + \overline{A}B$

   (E)   Answer not known

8. Determine current through a diode in the circuit shown below.

   (A)   32 mA   ✓(B) 28 mA

   (C)   30 mA   (D) 7.5 mA

   (E)   Answer not known

9. Thermal runaway occurs in transistor when

   (A)   Collector is reverse biased

   ✓(B)   Transistor is not biased

   (C)   Emitter is forward biased

   (D)   Junction capacitance is high

   (E)   Answer not known

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10. Consider a bar of n type semi conductor on which light is incident such that in a steady state, there is a spatially uniform generation of electron hole pairs. If the generation rate is $5 \times 10^{21} cm^3 / s$ and if the hole lifetime is $2 \mu s$. The excess hole density in the semiconductor will be

✓(A) $10^{16} cm^3$ (B) $10^{27} cm^3$

(C) $10^{-16} cm^3$ (D) $10^{16} cm^{-3}$

(E)   Answer not known

11. For faithful amplification, a transistor amplifier must have,

(i)   Non-zero collector current.

(ii) Proper base-emitter voltage at any instant.

(iii) Proper collector-emitter voltage at any instant.

Which of the above statements are correct?

(A)   (i) and (iii) only   (B) (i) and (ii) only

(C)   (ii) and (iii) only   ✓(D) (i), (ii) and (iii) only

(E)   Answer not known

12. The dc current gain of a transistor in CE mode is 100. Determine its dc current gain in CB mode

(A)   0.91   ✓(B) 0.99

(C)   99.0   (D) 9.0

(E)   Answer not known

13. The voltage gain of an amplifier without feedback and with negative feedback values are 100 and 20. The percentage of negative feedback β will be

(A) 2% ✓(B) 4%

(C) 8% (D) 5%

(E) Answer not known

14. The Darlington pair has the possibility of two stages being

(A) CE & CC (B) Both CE

✓(C) Both CC (D) CE & CB

(E) Answer not known

15. If the collector current changes from 2 mA to 3 mA in a transistor when collector-emitter voltage is increased from 2 V to 10 V, what is the output resistance?

(A) 1 kΩ ✓(B) 8 kΩ

(C) 4 kΩ (D) 24 kΩ

(E) Answer not known

16. The ratio of peak power to average power required in an Electric Vehicle can be over

(A) 2 : 1 (B) 1 : 1

(C) 5 : 1 ✓(D) 10 : 1

(E) Answer not known

17. The pattern formed for vectors that represent wind velocities from different directions is

   ✓(A) Wind Rose   (B) Wind Vane

   (C)   Camber   (D) Nacelle

   (E)   Answer not known

18. EMF of fuel cell can be given as

   ✓(A) $E = \dfrac{W}{NF}$ (B) $E = \dfrac{W}{Q}$

   (C) $e = \dfrac{E}{Q}$ (D) $e = V + l_r$

   (E)   Answer not known

19. A wind turbines extracts maximum power from wind, when the downstream wind speed reduces to

   ✓(A) One third that of upstream wind

   (B)   Half that of a upstream wind

   (C)   Two third that of upstream wind

   (D)   Zero

   (E)   Answer not known

20. The wind turbine power in the wind energy system is proportional to _____.

   (A)   Square of air density   (B) Square of wind speed

   ✓(C) Cube of wind speed   (D) Cube of air density

   (E)   Answer not known

21. The suitable cell for hydrogen powered electric vehicles is

   ✓(A) Phosphoric acid fuel cell   (B) Alkaline fuel cell

   (C) Molten carbonate fuel cell   (D) Solid oxide fuel cell

   (E) Answer not known

22. Assertion [A] : Induction generators are more preferable than synchronous generator in order to convert mechanical energy into electrical energy in the case of wind energy conversion system.

   Reason [R] :   Wind and hence rotor speed is expected to varied.

   (A) [A] is true but [R] is false

   ✓(B) Both [A] and [R] are true and [R] is the correct explanation of [A]

   (C) [A] is false but [R] is true

   (D) Both [A] and [R] are true but [R] is not the correct explanation of [A] is correct

   (E) Answer not known

23. The maximum power of per unit battery weight that the battery can produce in a short period is

   (A) Specific Energy   ✓(B) Specific Power

   (C) Cycle Life   (D) Self Discharge

   (E) Answer not known

24. What is the typical cut-out speed for Wind Turbines in India?

  ✓(A) 25 m/s   (B) 3 m/s

  (C) 10 m/s   (D) 12 m/s

  (E) Answer not known

25. BLDC motor is most promising candidate for EV and HEV application because of its

  (a) High efficiency

  (b) Safety

  (c) Low noise emission

  (d) Cost

  (A) (a) & (b)   ✓(B) (a) & (c)

  (C) (b) & (c)   (D) (a) & (d)

  (E) Answer not known

26. Yawing System in a wind energy conversion system is used to

  (A) Control wind speed

  (B) Stop the wind rotor

  (C) Control the electricity generation

  ✓(D) Keep the rotor in wind direction

  (E) Answer not known

27. The range of wind speed suitable for wind power generator is

  (A) 0 to 5 m/s   ✓(B) 5 to 25 m/s

  (C) 25 to 50 m/s   (D) 50 to 75 m/s

  (E) Answer not known

28. Which of the following is not the type of Sunshine Recorder?

 ✓(A) Strip Chart Belfort Recorder

  (B) Campbell – Stokes Recorder

  (C) Rotating Mirror Sunshine Recorder

  (D) Blake – Larsen Recorder

  (E) Answer not known

29. The energy conversion efficiency of a fuel cell is,

 ✓(A) $\eta = \dfrac{\Delta W}{-\Delta H}$

  (B) $\eta = \dfrac{W_{out}}{W_{in}}$

  (C) $\eta = \dfrac{W_T - W_P}{Q_G}$

  (D) $\eta = \dfrac{E_{out}}{E_{in}}$

  (E) Answer not known

30. In connection with solar PV types which of the following is incorrectly paired?

  (1) DSSC — Dye-Sensitized Solar Cell

  (2) C-Si — Carbon Solar Cell

  (3) a-Si — Amorphous Silicon Solar Cell

  (4) Mono-Si — Micromorph Solar Cell

  (A) (1) and (2)   (B) (1) and (3)

  (C) (3) and (4)   ✓(D) (2) and (4)

  (E) Answer not known

31. The thermodynamic quantity equivalent to total heat content of a system is termed as

    (A) Oxidation   (B) Entropy

    (C) Hydration   ✓(D) Enthalpy

    (E) Answer not known

32. A microhydel power plant has a capacity of

    ✓(A) Upto 5 kW to 100 kW   (B) 100 kW to 1000 kW

    (C) 1000 kW to 10,000 kW   (D) 10,000 kW to 1 MW

    (E) Answer not known

33. Solar power is expressed in terms of

    ✓(A) W/m^2 (B) W

    (C) J/m^2 (D) J

    (E) Answer not known

34. Which states of India have peak value of solar insolation _____ and _____?

    ✓(A) Rajasthan and Gujarat

    (B) New Delhi and Haryana

    (C) Goa and Madhya Pradesh

    (D) Tamil Nadu and Andhra Pradesh

    (E) Answer not known

35. Which state receives highest annual solar radiation energy in India?

    ✓(A)   Rajasthan   (B) Gujarat

    (C)   Goa   (D) Tamil Nadu

    (E)   Answer not known

36. A 7 watt CFL light to run for 6 hours a day. Find out the battery capacity in solar lanterns

    ✓(A)   7 Ah/day   (B) 42 Ah/day

    (C)   6 Ah/day   (D) 14 Ah/day

    (E)   Answer not known

37. Structures covered with glass or plastic sheets suitable to grow plants under adverse climatic conditions is called _____.

    (A)   Solar Green Houses   (B) Solar Power Plants

    (C)   Power Houses   ✓(D) Green Houses

    (E)   Answer not known

38. The rate of incident solar energy per unit area of a surface is termed _____.

    ✓(A)   Irradiance   (B) Diffuse radiation

    (C)   Reflected radiation   (D) Air mass

    (E)   Answer not known

39. The extraterrestrial radiation refers to the amount of radiation falling on earth, outside its atmosphere is given in terms of solar constant which is

✓(A) 1367 W/m^2 (B) 1367 kW/m^2

(C) 1467 W/m^2 (D) 1467 kW/m^2

(E) Answer not known

40. Among the following, which one is not the green energy _____?

(A) Solar   (B) Wind

(C) Fuel cell   ✓(D) Atomic power

(E) Answer not known

41. The transfer function for the state variable representation $\dot{X} = AX + BU \ \ Y = CX + DU$ is given by

(A) $C(SI - A)^{-1}D + B$ ✓(B) $D + C(SI - A)^{-1}B$

(C) $B + C(SI - A)^{-1}D$ (D) $D(SI - A)^{-1}B + C$

(E) Answer not known

42. The state transition matrix of the following state space model is

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -2 & -1 \\ 2 & -5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

(A) $\begin{bmatrix} 2e^{-3t} - e^{-4t} & -e^{-3t} + e^{-4t} \\ 2e^{-3t} - 2e^{-4t} & -e^{-3t} + 2e^{-4t} \end{bmatrix}$

✓(B) $\begin{bmatrix} -e^{-4t} + 2e^{-3t} & e^{-4t} - e^{-3t} \\ -2e^{-4t} + 2e^{-3t} & 2e^{-4t} - e^{-3t} \end{bmatrix}$

(C) $\begin{bmatrix} e^{-t} + e^{t} & e^{2t} + e^{-2t} \\ e^{-2t} - e^{-3t} & e^{-4t} - e^{-3t} \end{bmatrix}$

(D) $\begin{bmatrix} e^{-t} - e^{-2t} & e^{-t} - e^{-2t} \\ e^{-t} - e^{-3t} & e^{-t} - e^{-4t} \end{bmatrix}$

(E) Answer not known

43. Consider following state space equation $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -2 & -1 \\ 2 & -5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$.

Find Eigen values of system.

✓(A) $\lambda_1 = -3$, $\lambda_2 = -4$ (B) $\lambda_1 = +3$, $\lambda_2 = -4$

(C) $\lambda_1 = -3$, $\lambda_2 = +4$ (D) $\lambda_1 = 1$, $\lambda_2 = 2$

(E) Answer not known

44. The open loop transfer function of a unity feedback control system is $\dfrac{10}{(S+5)^3}$. The gain margin of the system is

(A) 20 dB ✓(B) 40 dB

(C) 60 dB (D) 80 dB

(E) Answer not known

45. The characteristic equation of a feedback control system is $S^3 + 5S^2 + (K+6)s + K = 0$. The coordinates for asymptotes of root loci for large K meet at a point in S plane at

(A) (2, 0) (B) (–1, 0)

✓(C) (–2, 0) (D) (–3, 0)

(E) Answer not known

46. Physically, the addition of a zero in the feed forward transfer function is equivalent to the addition of _____ to the system.

(A) Integral controller (B) Proportional controller

✓(C) Derivative controller (D) Feedback controller

(E) Answer not known

47. The state Transition Matrix for the system

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u \text{ is}$$

(A) $\begin{bmatrix} e^t & 0 \\ e^t & e^t \end{bmatrix}$

(B) $\begin{bmatrix} e^t & 0 \\ t^2 e^t & e^t \end{bmatrix}$

✓(C) $\begin{bmatrix} e^t & 0 \\ t e^t & e^t \end{bmatrix}$

(D) $\begin{bmatrix} e^t & t e^t \\ 0 & e^t \end{bmatrix}$

(E) Answer not known

48. Closed loop transfer function of a unity feedback system is given by
$\dfrac{Y(s)}{R(s)} = \dfrac{w_n^2}{s^2 + 2\zeta w_n s + w_n^2}$. Steady state error to unit ramp input is

(A) ∞

✓(B) $2\zeta / w_n$

(C) 1

(D) $4 / \zeta w_n$

(E) Answer not known

49. The transfer function of a simple RC filter is $\dfrac{1}{1 + jwT}$.

What is the phase angle?

✓(A) $-\tan^{-1} wT$

(B) $\tan^{-1} wT$

(C) $-\tan^{-1}\left(\dfrac{wT}{2}\right)$

(D) $+\tan^{-1}\left(\dfrac{wT}{2}\right)$

(E) Answer not known

50. Which of the following statement is incorrect for BIBO stability to be stable?

    (a)   If all the roots of the characteristic equation lie in the left half of the S-plane.

    (b)   If all the roots of the characteristic equation lie in the right half of the S-Plane.

    (c)   One or more non repeated roots on the jw axis of the S-plane.

    (A) (a)   (B) (b)

    (C) (c)   ✓(D) Both (b) and (c)

    (E) Answer not known

51. In Force-Current Analogy, the mechanical element that corresponds to a capacitor C is

    ✓(A) Mass M   (B) Spring with stiffness K

    (C) Damper with coefficient B   (D) Voltage Source V(s)

    (E) Answer not known

52. In second order close loop transfer function, with natural frequency kept constant and increase the damping ratio, the poles are moving

    (A) towards the imaginary axis

    ✓(B) away from the imaginary axis

    (C) towards the origin

    (D) away from the origin

    (E) Answer not known

53. A discrete time system difference equation

$y(k+2)+3y(k+1)+5y(k)=u(k)$, then the transfer function of the system is

(A) $\dfrac{1}{(z+1)(z+3)}$

✓(B) $\dfrac{1}{z^2+3z+5}$

(C) $\dfrac{1}{(z+2)(z+3)}$

(D) None of the above

(E) Answer not known

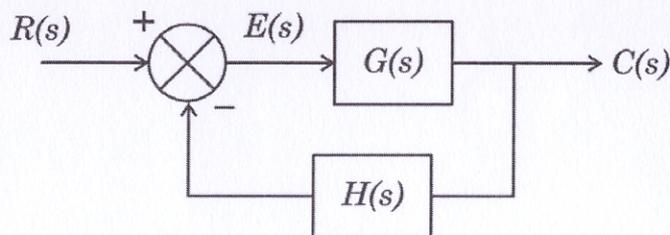54. The final value of function $F(S)=\dfrac{5}{S(S^2+S+2)}$ will be

(A) 0

(B) 2/5

✓(C) 5/2

(D) 5

(E) Answer not known

55. The block diagram of a control system is shown in Fig.

The Steady State Error is given as

✓(A) $\displaystyle\lim_{S\to 0}\dfrac{SR(s)}{1+G(s)H(s)}$

(B) $\displaystyle\lim_{S\to 0}\dfrac{R(s)}{1-G(s)H(s)}$

(C) $\displaystyle\lim_{S\to 0}\dfrac{R(s)}{1+G(s)H(s)}$

(D) $\displaystyle\lim_{S\to 0}\dfrac{R(s)}{S[1-G(s)H(s)]}$

(E) Answer not known

56. A voltage having symmetrical square waveshape is applied to an average reading voltmeter with scale calibrated interms of rms value of a sinusoidal wave has an error of

(A) −3.9%

(B) +3.9%

(C) −11%

(D) +11% ✓

(E) Answer not known

57. _____ record data in such a way that they can be retrieved (or) reproduced in electrical form again.

(A) XY Recorders

(B) Ultraviolet Recorders

(C) Digital tape Recorders

(D) Magnetic tape Recorders ✓

(E) Answer not known

58. In a digital storage oscilloscope, the input signals are

(A) directly applied to the oscilloscope

(B) applied to amplifier, stored as analog signals, multiplexed, converted to digital form, stored in digital form converted to analog form and applied to CRO through amplifier ✓

(C) multiplexed, converted to digital form and stored and applied to oscilloscope

(D) multiplexed, converted to digital form stored, converted to analog form and applied to oscilloscope

(E) Answer not known

59. If the bandwidth of an oscilloscope is given as direct current to 10 MHz. What is the fastest rise time a sinewave can have to be accurately reproduced by the instrument?

(A) 35 μ S   ✓(B) 35 nS

(C) 35 mS   (D) 39 nS

(E) Answer not known

60. In a 20 $k\Omega/V$ sensitivity multimeter for measuring dc voltage in 10 V fsd (full scale deflection) is

✓(A) 200 $k\Omega$ (B) 20 $k\Omega$

(C) 10 $k\Omega$ (D) 2 $k\Omega$

(E) Answer not known

61. A spectrum analyser provides a calibrated graphical display on its CRT, with

✓(A) frequency on the horizontal axis and amplitude on the vertical axis

(B) time on the horizontal axis and amplitude on the vertical axis

(C) time on the horizontal axis and frequency on the vertical axis

(D) amplitude on the horizontal axis and frequency on the vertical axis

(E) Answer not known

62. An analog transducer with a 0-10 V input is able to distinguish a change of 10 mV in its input signal. Calculate its resolution.

(A) $\dfrac{1}{10}$ ✓(B) $\dfrac{1}{1000}$

(C) $\dfrac{1}{100}$ (D) $\dfrac{1}{10000}$

(E) Answer not known

63. The following codes are used in digital tape recorders

(A) NZ-L and JNZ-L   ✓(B) NRZ-L and Bi-phase-L

(C) JNZ-L and NRZ-L   (D) Bi-phase-L and JNZ-L

(E) Answer not known

64. The Geiger Muller tube are frequently used for detection and measurement of

(A) alpha rays

(B) alpha and beta rays

✓(C) alpha, beta and gamma rays

(D) none of the above

(E) Answer not known

65. A true RMS voltmeter measures

(A) Average value   (B) Instantaneous value

✓(C) RMS value   (D) Peak value

(E) Answer not known

66. Maxwell's bridge is used to measure Q factor in the range of

   (A) 1 – 10   (B) 30 – 50

   (C) 50 – 75   (D) 75 – 100

   (E) Answer not known

67. A moving coil voltmeter has a uniform scale with 100 divisions, the full scale reading is 300 V and $\frac{1}{10}$ of a scale division can be estimated with a fair degree of certainity. The resolution of the instrument is

   (A) 0.2 V   (B) 3 V

   (C) 30 V   (D) 0.3 V

   (E) Answer not known

68. The current in the primary winding of a current transformer (CT) depends upon

   (A) load connected to the system in which the C.T. is installed

   (B) burden of the secondary winding of transformer

   (C) both burden of the transformer secondary winding and load connected to the system

   (D) voltage in the primary of the C.T.

   (E) Answer not known

69. Instrumental, environmental and observational errors can be grouped under

   (A) Gross errors   (B) Systematic errors

   (C) Random errors   (D) Dynamic errors

   (E) Answer not known

70. A megger is used for measurement of

   (A) Low valued resistance   (B) Medium valued resistance

   ✓(C) Insulation resistance   (D) Order of 100 ohms

   (E) Answer not known

71. The units whose sizes cannot be choosen independently are called

   ✓(A) Derived Units   (B) Fundamental Units

   (C) Absolute Units   (D) Auxiliary Units

   (E) Answer not known

72. The burden of current transformers is expressed in terms of :

   (A) Primary winding current   (B) Secondary winding current

   ✓(C) VA rating of transformer   (D) Number of turns

   (E) Answer not known

73. A 1 mA ammeter has a resistance of 100 Ω. If it is converted to a 1 A ammeter what value of shunt resistance is needed?

   (A) 100 Ω (B) 10 Ω

   (C) 1 Ω ✓(D) 0.1001 Ω

   (E) Answer not known

74. Calculate the limiting error in the measurement of resistance, when the limiting errors in the measurement of power and current are respectively ±1.5% and ±1.0% is

   ✓(A) ±3.5%   (B) ±2.5%

   (C) ±1.5%   (D) ±4.5%

   (E) Answer not known

75. Johnson noise is

  ✓(A) caused by thermal agitation of free electrons carrying current thereby modulating the current

  (B) shot noise which results from random emission of electrons across p-n junction

  (C) noise carried into a circuit through conductors

  (D) noise of an electromagnetic origin that is radiated into a circuit

  (E) Answer not known

76. The readings of 2 wattmeter used for 3 phase power measurement are 5.2 kw and –1.6 kw. Determine real power, power factor of load?

  (A) 6.8 kw ; 0.2923

  ✓(B) 3.6 kw, 0.2923

  (C)   5.2 kw ; 0.2923

  (D) 3.6 kw ; UPF

  (E) Answer not known

77. A delta connected load has $30 - j40\,\Omega$ impedance per phase. Determine the magnitude of line current if it is connected to 400 V, 3ϕ, 50 Hz supply

   ✓(A)   13.856 A   (B) 8 A

   (C)   50 A   (D) 11.312 A

   (E)   Answer not known

78. The relationship between I_L and I_{Ph} in a balanced star connected network is

   (A) $I_L = \sqrt{3}I_{Ph}$ (B) $I_L = \sqrt{2}I_{Ph}$

   (C) $I_L = 3I_{Ph}$ ✓(D) $I_L = I_{Ph}$

   (E)   Answer not known

79. In star connection, the relation between phase voltage (V_P) and line voltage (V_L) is _____.

   (A) $V_P = \sqrt{3}V_L$ (B) $V_P = {V_L}/{\sqrt{2}}$

   (C) $V_P = \sqrt{2}V_L$ ✓(D) $V_P = {V_L}/{\sqrt{3}}$

   (E)   Answer not known

80. What will be total active power consumed by a 3-phase delta connected system which is supplied with a line voltage of 230 V, the value of the phase current is 10 A and the current lags the voltage by 30°

    ✓(A) 5975.4 W   (B) 3450 W

    (C) 1991.9 W   (D) 10350 W

    (E) Answer not known

81. Compute bandwidth and Quality factor of an RLC series circuit with $R = 20\,\Omega$, $L = 50\,mH$ and $C = 1\,\mu F$

    ✓(A) 400 rad/sec, 11.2   (B) 4472 rad/sec; 7.2

    (C) 4276.6 rad/sec; 11.2   (D) 4676.6 rad/sec; 11.2

    (E) Answer not known

82. The set of three phase voltages in a three phase ac circuit are

$$v_{an} = 220\cos(wt + 10°)$$

$$v_{bn} = 220\cos(wt - 230°)$$

$$v_{cn} = 220\cos(wt - 110°).$$

The phase sequence will be

    (A) $a\ b\ c$ ✓(B) $a\ c\ b$

    (C) $b\ c\ a$ (D) none of the above

    (E) Answer not known

83. If a two port network is terminated with an open circuit at port 2. What is the value of 12?

(A)   1

(B) V_2/Z_{22}

✓(C)   0

(D) I_2/Z_{22}

(E)   Answer not known

84. At very high frequencies, an inductor in an RL circuit behaves as

(A)   A short circuit

✓(B)   An open circuit

(C)   A resistor with low resistance

(D)   A resistor with high resistance

(E)   Answer not known

85. Three equal resistances of 5Ω are connected in delta. What is the resistance in one of the arms of the equivalent star circuit?

(A) 5Ω

(B) 10Ω

(C) 15Ω

✓(D) 1.66Ω

(E)   Answer not known

86. The time constant of the RL series circuit with $R = 10\Omega$ and $L = 0.2H$

(A)   0.05 m sec

✓(B)   20 m sec

(C)   0.5 m sec

(D)   2 m sec

(E)   Answer not known

87. Choose the right equation of power factor for capacitive load

   (A) Zero Lag $[\cos\phi = \cos(-90) = 0]$

   ✓(B) Zero Lead $[\cos\phi = \cos(+90°) = 0]$

   (C) Unity $[\cos\phi = 1]$

   (D) Lagging $[\cos\phi]$

   (E) Answer not known

88. Find the right choice from the following :
    Proved that power transfer from a DC source network to a resistive
    network is maximum

   ✓(A) Internal resistance of the DC source network is equal to the
         load resistance

   (B) Internal resistance of the DC source network is less than the
        load resistance

   (C) Internal resistance of the DC source network is negligible when
        compare to load resistance

   (D) Internal resistance of the DC source network is greater than
        the load resistance

   (E) Answer not known

89. In a two terminal network load resistance is equal to Norton's
    Resistance of the network. What will be the load current if Norton
    Current is I_n?

   ✓(A) $I_n/2$ (B) $2I_n/3$

   (C) I_n (D) $2I_n$

   (E) Answer not known

90. For the application of superposition theorem, the circuit needs _____ sources.

   (A) Zero

   (B) One

   (C) Infinite

   ✓(D) Two (or) more

   (E) Answer not known

91. The algebraic sum of the voltages around any close path in a circuit is _____.

   (A) Infinity

   ✓(B) Zero

   (C) Maximum

   (D) Minimum

   (E) Answer not known

92. The line voltage _____ phase voltage by _____ in a balanced star-connected system.

   ✓(A) leads, 30°

   (B) leads, 60°

   (C) lags, 30°

   (D) lags, 60°

   (E) Answer not known

93. Find maximum power which can be transferred to R.

(A)   18.2 W   ✓(B) 19.217 W

(C)   1.7647 W   (D) 10.2 W

(E)   Answer not known

94. Determine the loop current I_1 in the circuit shown in circuit diagram.

(A)   −4.125 A   ✓(B) 0.25 A

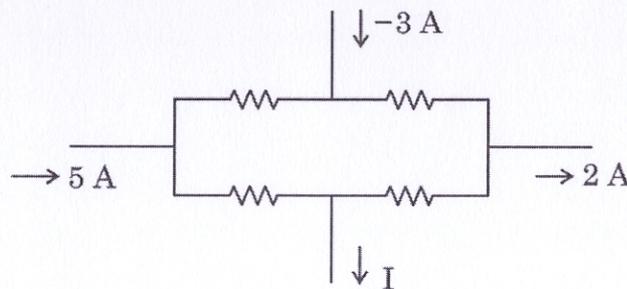(C)   −3.23 A   (D) −1.123 A

(E)   Answer not known

95. An electric heating element consumes 500 W power when connected to a 100 V line. If the line voltage becomes 150 V. The power consumption will be _____.

   (A)   500 W   (B) 750 W

   (C)   150 W   ✓(D) 1125 W

   (E)   Answer not known

96. For AC networks, as per the maximum power transfer theorem, maximum power will be transferred to load under load impedance should be equal to _____.

   ✓(A)   Complex conjugate of the source impedance

   (B)   Twice the source impedance

   (C)   Twice the complex conjugate of the source impedance

   (D)   Half of the source impedance

   (E)   Answer not known

97. Find the current I for the circuit shown.

   (A)   6 A   (B) −3 A

   ✓(C)   0 A   (D) 4 A

   (E)   Answer not known

98. In the network shown in Fig. solve all currents using Nodal analysis, what is total power absorbed?

(A) $\Sigma p = 10\,w$ (B) $\Sigma p = 15\,w$

✓(C) $\Sigma p = 0\,w$ (D) $\Sigma p = 20\,w$

(E) Answer not known

99. In circuits excited by DC source at steady state the _____ behave as an open circuit and _____ behave as a short circuit.

✓(A) Capacitance, Inductance   (B) Inductance, Resistance

(C) Inductance, Capacitance   (D) Resistance, Capacitance

(E) Answer not known

100. Express the total capacitance of three capacitors in Figure.
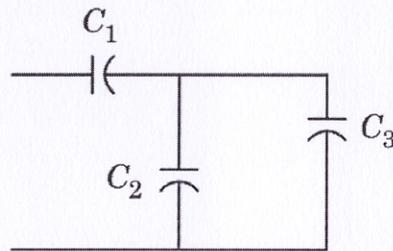
(A) $C_T = C_1 + \dfrac{C_2 C_3}{(C_2 + C_3)}$

(B) $C_T = \dfrac{(C_1 + C_2) \times C_3}{C_1 + C_2 + C_3}$

(C) $C_T = C_1 + \left(\dfrac{C_2 + C_3}{C_2 C_3} \right)$

✓ (D) $C_T = \dfrac{C_1 (C_2 + C_3)}{C_1 + C_2 + C_3}$

(E) Answer not known

101. A 3ϕ ac voltage controller feeds a 3ϕ induction motor for its speed control. The speed control will be more pronounced if

(A) Load torque T_L is constant

(B) T_L is proportional to speed

✓ (C) T_L is proportional to speed squared

(D) T_L is inversely proportional to speed

(E) Answer not known

102. For fans & pumps, the preferred speed control method is

(A) Vector control

(B) Resistance control

✓ (C) Stator voltage control

(D) V/f control

(E) Answer not known

103. Setting the lower value of commutation lead angle (β_l) for load side converter of synchronous motor drive leads to

   ✓(A)   Higher the motor p.f. and lower inverter rating

   (B)   Lower the motor p.f. and higher inverter rating

   (C)   Lower the motor p.f. and lower inverter rating

   (D)   Higher the motor p.f. and higher inverter rating

   (E)   Answer not known

104. A DC chopper is used for regenerative braking of a separately excited DC motor. The supply voltage is 400 V. The average armature current during regenerative braking is kept constant at 300 A. For a duty cycle of 60% for a chopper, the power returned to the supply is

   (A)   24 kW   (B) 12 kW

   ✓(C)   48 kW   (D) 6 kW

   (E)   Answer not known

105. In Single Phase Dual converter fed DC drives, firing angle of converter-1 is greater than $90°$ and when field current is reversed, the motor operates at

   (A)   Forward motoring mode

   ✓(B)   Forward regenerative braking mode

   (C)   Reverse motoring mode

   (D)   Reverse regenerative braking mode

   (E)   Answer not known

106. A 220 V, 1500 rpm, 50 A separately excited motor with armature resistance of 0.6 Ω is fed from a 3ϕ fully controlled rectifier. Available AC source has a line voltage of 440 V, 50 Hz. A Y-Δ transformer is used to feed the armature so that motor terminal voltage equals rated voltage when converter firing angle is zero. The transformer turns ratio is

(A) 1.102   (B) 2.701

(C) 1.414   ✓(D) 1.559

(E) Answer not known

107. A motor driving a passive load is said to be steady-state stable if

(A) $\dfrac{dT_l}{dw_m} = \dfrac{dT}{dw_m}$ ✓(B) $\dfrac{dT_l}{dw_m} > \dfrac{dT}{dw_m}$

(C) $\dfrac{dT_l}{dw_m} < \dfrac{dT}{dw_m}$ (D) $\dfrac{dJ}{dt} = 0$

(E) Answer not known

108. For a $120°$ mode 3ϕ bridge inverter, RMS value of output line voltage is

✓(A) 70.7% of input DC voltage   (B) 40.8% of input DC voltage

(C) 38.9% of input DC voltage   (D) 100% of input DC voltage

(E) Answer not known

109. In single pulse modulation of PWM inverter third harmonic can be eliminated if pulse width is equal to

(A)   60°   ✓(B) 120°

(C)   180°   (D) 270°

(E)   Answer not known

110. Identify the switching device which has high input impedance and low on state conduction losses.

(A)   BJT   ✓(B) IGBT

(C)   MOSFET   (D) JFET

(E)   Answer not known

111. Thyristor is a _____ semiconductor device.

(A)   four layer, two terminal   ✓(B) four layer, three terminal

(C)   three layer, two terminal   (D) three layer, three terminal

(E)   Answer not known

112. In a switching mode regulators, if a transistor has a switching time of 0.5 micro second, the oscillator period would be

(A)   0.5 microsecond   (B) 5 microsecond

✓(C)   50 microsecond   (D) 500 microsecond

(E)   Answer not known

113. The capacitance of reverse biased junction J_2 in a thyristor is $C_j = 20\,pF$ and the charging current to turn on the thyristor is 16 mA. Then the value of $\dfrac{dV_a}{dt}$ is

   ✓(A)   800 $V/\mu s$ (B) 80 $V/\mu s$

   (C)   8 $V/\mu s$ (D) 8000 $V/\mu s$

   (E)   Answer not known

114. The reverse recovery time of a diode is $t_{rr} = 2\mu s$ and the rate of fall of a diode current is $\dfrac{di}{dt} = 10\,A\big/\mu s$. The storage charge Q_R is

   ✓(A) $20\mu C$ (B) $10\mu C$

   (C) $40\mu C$ (D) $60\mu C$

   (E)   Answer not known

115. Load commutation is possible in current source inverter only when the load power factor is _____.

   (A)   Either lagging or leading   (B) Unity

   (C)   Lagging   ✓(D) Leading

   (E)   Answer not known

116. The dielectric strength of SF_6 Gas used in circuit breaker is about _____ times that of air.

   (A)   same as   ✓(B) 2 to 3 times

   (C)   10 times   (D) 5 to 6 times

   (E)   Answer not known

117. The peak value of current during the first cycle of current wave after the closure of circuit breaker is known as

    ✓(A)   Making capacity   (B) Breaking capacity

    (C)   Normal current rating   (D) Short time rating

    (E)   Answer not known

118. Load frequency control is achieved by properly matching the individual machines

    (A)   Reactive powers

    (B)   Generated voltages

    ✓(C)   Turbine inputs

    (D)   Turbine and generator ratings

    (E)   Answer not known

119. Formula for load factor is

    ✓(A)   Average load / Maximum demand

    (B)   Average demand / Installed capacity

    (C)   Installed capacity – Maximum demand

    (D)   Maximum demand / Average demand

    (E)   Answer not known

120. The Y_{Bus} matrix of a 100 Bus interconnected system is 90% sparse. Hence the number of transmission lines in the system must be

    (A) 450   (B) 500

    (C) 900   ✓(D) 1000

    (E) Answer not known

121. The generator emf is $1\,\text{pu}$, $x_d = j0.4$, $x'_d = j0.25$ and $x''_d = j0.2$ in per units. Find the relationship between subtransient (I'') transient (I') and short circuit currents (I).

   (A) $I'' > I' > I$ ✓

   (B) $I > I' > I''$

   (C) $I' > I'' > I$

   (D) $I'' > I > I'$

   (E) Answer not known

122. Load factor of a power station is generally

   (A) equal to unity

   (B) less than unity ✓

   (C) more than unity

   (D) either less than or more than unity

   (E) Answer not known

123. Vacuum circuit breakers are being employed for outdoor applications ranging from

   (A) 115 kV to 230 kV

   (B) 11 kV to 33 kV

   (C) 22 kV to 66 kV ✓

   (D) Upto 765 kV

   (E) Answer not known

124. The most common and most severe causes of excessive voltages and currents are

   (A) Lightning and Short Circuit

   (B) Lightning and Resonance

   (C) Lightning and Switching ✓

   (D) Switching and Short Circuit

   (E) Answer not known

125. The most common stator fault of an alternator is

    (A)   Phase-to-phase fault   ✓(B) Phase-to-ground fault

    (C)   Inter-turn fault   (D) Short circuit fault

    (E)   Answer not known

126. Back up protection is generally of which type?

    (A)   Unit   ✓(B) Non unit

    (C)   Both (A) and (B)   (D) Over current

    (E)   Answer not known

127. The main purpose of smart grid in terms of Energy Conservation

    (A)   To increase electricity consumption

    ✓(B)   To distribute electricity more efficiently and allow for demand response

    (C)   To generate more electricity from Fossil Fuels

    (D)   To increase reliance on centralized power plants

    (E)   Answer not known

128. Identify the type of Relay is used to protect against overload conditions in motors.

    (A)   Differential Relay   (B) Over voltage Relay

    ✓(C)   Thermal Relay   (D) Distance Relay

    (E)   Answer not known

129. Two generating stations having short-circuit capacities of 1200 MVA and 800 MVA respectively and operating at 11 kV and linked by an interconnected cable having a reactance of 0.5 Ω phase. Determine the % Reactance of the cable.

   ✓(A) 496%

   (B) 500%

   (C) 250%

   (D) 200%

   (E) Answer not known

130. Choose the option that represents a key feature of an effective voltage control system.

   (A) Slow response time

   (B) Large voltage deviation

   ✓(C) Minimal voltage deviation

   (D) Excessive reactive power consumption

   (E) Answer not known

131. The method that is not used for elimination of void formation in the cables is

   ✓(A) use of high viscosity mineral oil

   (B) use of high pressure inert gas

   (C) use of low viscosity mineral oil

   (D) use of necessary oil channels

   (E) Answer not known

132. Location of surge tank in a hydel power plant is near to the

   (A) reservoir

   (B) tail race

   ✓(C) turbine

   (D) river

   (E) Answer not known

133. The insulator is designed in such a way that it should fail only by
_____.

✓(A) Flash over (B) Puncture

(C) Disconnection (D) Surface discharge

(E) Answer not known

134. During Fault Current Calculations, single line diagram will be modified by omitting

(i) all static loads

(ii) all resistances

(iii) shunt admittance of each transformer

(iv) capacitance of transmission line

(A) (i) only (B) (i) and (ii) only

(C) (i), (ii) and (iii) only ✓(D) (i), (ii), (iii) and (iv)

(E) Answer not known

135. The annual energy production of a central power station having a load factor of 60% and a maximum demand of 15,000 kW is

(A) 79.24×10^6 kWh ✓(B) 78.84×10^6 kWh

(C) 77.84×10^6 kWh (D) 76.84×10^6 kWh

(E) Answer not known

136. Economiser in a thermal power plant is used to heat

✓(A) feed water (B) cold air

(C) flue gases (D) hot air

(E) Answer not known

137. The main advantage of Fast Breeder Reactors in nuclear power plant is

    (A)   Low breeding gain

✓(B)   No moderator is required

    (C)   Neutron flux is high

    (D)   High absorption of high energy neutrons

    (E)   Answer not known

138. Diversity factor is always

    (A)   Equal to Unity   (B) Less than Unity

✓(C)   More than Unity   (D) Between 1 and 2

    (E)   Answer not known

139. The diagonal elements of a nodal admittance matrix are strengthened by adding

✓(A)   Shunt inductances   (B) Shunt capacitors

    (C)   Loads   (D) Generators

    (E)   Answer not known

140. A hydroelectric reservoir can supply water continuously at a rate of 1000 m^3/s. The head is 100 m. The theoretical power that can be developed is in MW

    (A)   1000 MW   (B) 9.81 MW

✓(C)   981 MW   (D) 100 MW

    (E)   Answer not known

141. In a bipolar HVDC transmission system _____ six pulse converters are connected in series on the DC side.

    (A) 3   (B) 1

    (C) 4   ✓(D) 2

    (E) Answer not known

142. In a load flow studies of a power system the quantities specified at a voltage controlled bus are

    ✓(A) P and V   (B) Q and δ

    (C) V and δ (D) P and Q

    (E) Answer not known

143. The process of achieving uniform electrostatic stress in the dielectric of cables is known as

    (A) Grounding   ✓(B) Grading

    (C) Spacing   (D) Distributing

    (E) Answer not known

144. The surge impedance of a 3ϕ, 410 kV transmission line is 410 Ω. The surge impedance loading (SIL) is

    ✓(A) 410 MW   (B) 100 MW

    (C) 1600 MW   (D) 200 MW

    (E) Answer not known

145. The thumb rule for getting the number of insulator discs with a suspension insulator for a specific voltage is to have

(A) one disc for every 33 kV ✓(B) one disc for every 11 kV

(C) one disc for every 330 kV (D) one disc for every 110 kV

(E) Answer not known

146. The method commonly used in designing of FIR filter is _____.

(A) Butter worth design ✓(B) Windowing

(C) State space representation (D) Biquod section

(E) Answer not known

147. Source to destination delivery of a packet across multiple network links is responsible of

(A) physical layer (B) data link layer

✓(C) network layer (D) transport layer

(E) Answer not known

148. The Discrete Fourier Transform (DFT) of a discrete-time delta function $\delta(nT)$ is a vector of all _____.

(A) 0 ✓(B) 1

(C) undefined (D) 2

(E) Answer not known

149. To carry sensitive information, a system must able to assure privacy. For this case, which layer responsibility to ensure data privacy?

(A) Application ✓(B) Presentation

(C) Data link (D) Physical

(E) Answer not known

150. Which of the following is not the property of DFT?

(A) Linearity (B) Symmetry

(C) Convolution ✓(D) Non linearity

(E) Answer not known

151. Find the content of "A" register and "B" register, after executing the given set of instructions

MVI A, 07

RLC

MOV B, A

ADD B

HLT

(A) A → 0E and B → 0E (B) A → 15 and B → 07

(C) A → 0E and B → 00 ✓(D) A → 1C and B → 0E

(E) Answer not known

152. Which of the following statements are true about the features of 8279?

(1) Simultaneous keyboard and display operations

(2) Scanned sensor mode

(3) 8 character keyboard FILO

(A) (1) only

(B) (2) and (3) only

(C) (1) and (2) only ✓

(D) (1) and (3) only

(E) Answer not known

153. In 8155, when both ports A and B are configured in the hand shake mode, by using pins of _____ as control signals.

(A) Port A

(B) Port B

(C) Port C ✓

(D) Port A and B

(E) Answer not known

154. The second byte of in the instructions IN and OUT of 8085 microprocessor denotes

(A) Memory address

(B) Instruction set

(C) Opcode

(D) I/O port addresses ✓

(E) Answer not known

155. The CBW instruction in 8086 microprocessor converts

    ✓(A)   a byte in AL to word value in AX

    (B)   a word in AX to byte value in AL

    (C)   a byte in BL to word value in BX

    (D)   a word in BX to byte value in BL

    (E)   Answer not known

156. In which motor do both rotor and stator flux run at same speed?

    (A)   DC motor   (B) AC motor

    ✓(C)   Synchronous motor   (D) Universal motor

    (E)   Answer not known

157. The switch used to start the single phase Induction Motor is called

    (A)   TPDT switch   (B) SPST switch

    ✓(C)   Centrifugal switch   (D) DPST switch

    (E)   Answer not known

158. A 6 pole alternator running at 1000 rpm supplies an 8 pole induction motor if the slip is 2.5%. The actual speed of the motor will be

    (A)   800 rpm   ✓(B) 731.25 rpm

    (C)   850.14 rpm   (D) 900.15 rpm

    (E)   Answer not known

159. The mechanical load of an induction motor can be represented by R_2 – Rotor resistance referred to stator

✓(A) $\dfrac{R_2}{s}$ (B) $s.R_2$

(C) $\dfrac{R_2^2}{s}$ (D) $s.R_2^2$

(E)   Answer not known

160. A switched reluctance motor differs from a VR stepper motor in the sense that it

(A)   has rotor poles of ferromagnetic material

✓(B)   rotates continuously

(C)   is designed for open-loop operation only

(D)   has lower efficiency

(E)   Answer not known

161. In a synchronous motor, under normal working conditions, the slip rings are

✓(A)   Short circuited

(B)   Open circuited

(C)   Connected to a capacitor

(D)   Used to supply AC to the rotor

(E)   Answer not known

162. Condition for maximum torque under running condition of a 3ϕ Induction Motor is

[where $R_2 \rightarrow$ rotor resistance

$X_2 \rightarrow$ rotor resistance

s $\rightarrow$ slip]

(A) $R_2 = X_2$

(B)   Core loss = Copper loss

✓(C) $R_2 = SX_2$

(D)   Load current = source current

(E)   Answer not known

163. When load on a normally – excited synchronous motor is increased, its power factor tends to

(A)   approach unity

✓(B)   become increasingly lagging

(C)   become increasingly leading

(D)   remain unchanged

(E)   Answer not known

164. The rotational speed of a given stepper motor is determined solely by the

✓(A)   step pulse frequency

(B) polarity of stator current

(C)   shaft load

(D) magnitude of stator current

(E)   Answer not known

165. The Linear Induction Motor Works with the concept of

    (A)   Attraction   ✓(B) Magnetic levitation

    (C)   Electro Magnetic Induction   (D) Self Induction

    (E)   Answer not known

166. The motor that is used for driving household electric clocks is

    ✓(A)   Hysteresis motor   (B) Reluctance motor

    (C)   Stepper motor   (D) Shaded-Pole Motor

    (E)   Answer not known

167. In Squirrel Cage Induction Motor, the rotor is

    ✓(A)   Permanently short-circuited   (B) Temporary short circuited

    (C)   Open circuited   (D) Wound with slip rings

    (E)   Answer not known

168. Choose the statement about parallel operation of transformer that is not correct

    (A)   Transformers must have equal voltage rating

    (B)   Transformers must have same ratio of transformation

    (C)   Transformers must be operated at same frequency

    ✓(D)   Transformers must have equal KVA Rating

    (E)   Answer not known

169. When a DC machine is loaded, the function of the interpoles is to minimize _____ between the brushes and the commutator.

   (A) Friction   ✓(B) Sparking

   (C) Current   (D) Wear and Tear

   (E) Answer not known

170. A DC motor runs at 1725 r.p.m. at full load and 1775 r.p.m. at no load. The speed regulation is

   (A) 4.7%   ✓(B) 2.9%

   (C) 7.6%   (D) 1.5%

   (E) Answer not known

171. The main purpose of using core in a transformer is to

   (A) Decrease iron losses

   (B) Prevent eddy current loss

   (C) Eliminate magnetic hysteresis

   ✓(D) Decrease reluctance of the common magnetic circuit

   (E) Answer not known

172. The heat run test on a transformer without loading is performed by means of

   (A) Short circuit test

   (B) Open circuit test

   (C) Both short circuit and open circuit test

   ✓(D) Sumpner's test

   (E) Answer not known

173. Single phase transformer, 200/400 V has a leakage impedance $z = r + jx$. The voltage regulation tends to become zero at the power factor of

(A) x / r lagging ✓(B) x / r leading

(C) r / x leading (D) r / x lagging

(E) Answer not known

174. When load is removed, _____ motor will run at the highest speed.

(A) Shunt (B) Cumulative – Compound

(C) Differential – Compound ✓(D) Series

(E) Answer not known

175. Efficiency of a power transformer is of the order of

(A) 80 to 85% (B) 90 to 95%

✓(C) 96 to 99% (D) 100%

(E) Answer not known

176. In a DC Generator, the effect of armature reaction on the main pole flux is to

(A) Reduce it (B) Distort it

(C) Reverse it ✓(D) Both (A) and (B)

(E) Answer not known

177. The friction loss that is proportional to the cube of the speed is

    (A) Bearing-friction loss   ✓(B) Windage-friction loss

    (C) Brush-friction loss   (D) Core-friction loss

    (E) Answer not known

178. In the methods of starting of a dc machine, the maximum allowable starting current is

    ✓(A) less than 1.5 to 2.0 times the rated value

    (B) less than 2.5 to 3.5 times the rated value

    (C) more than 1.5 to 2.0 times the rated value

    (D) more than 2.5 to 3.5 times the rated value

    (E) Answer not known

179. A three phase transformer 300 KVA, 1100/230 V, 50 Hz transformers are connected in delta-delta formation. It is supplying a 900 KVA load at 0.8 power factor lagging. If one of these transformers is made open-delta connection due to emergency repair, the percentage increase in load on each transformer will be

    (A) 70 percent   (B) 71.5 percent

    ✓(C) 73 percent   (D) 74.4 percent

    (E) Answer not known

180. In the starter step calculation for dc shunt motor, the step resistance of various sections can be found using

   ✓(A) $r_n = r_{n-1} / \gamma$ (B) $r_n = (r_{n-1}) \times \gamma$

   (C) $r_n = r_n / \gamma$ (D) $r_n = r_n \times \gamma$

   (E) Answer not known

181. A uniform line charge of 8 nC/m lying along the z axis, will result with total flux leaving a 6 m length as

   (A) 2 nC   (B) 4 nC

   (C) 24 nC   ✓(D) 48 nC

   (E) Answer not known

182. The correct statement of Biot-Savart law in integral form is

   (A) $\overline{H} = \oint \dfrac{I\,d\overline{L} \times \hat{a}_R}{4\,\pi\,R^2}$ (B) $\overline{H} = \oint \dfrac{\overline{k}\,ds \times \hat{a}_R}{4\pi R^2}$

   (C) $\overline{H} = \oint \dfrac{\overline{J}\,dv \times \hat{a}_R}{4\pi R^2}$ ✓(D) All the above

   (E) Answer not known

183. The reciprocal of reluctance is called as

   (A) Resistance   (B) Polarization

   ✓(C) Permeance   (D) Susceptibility

   (E) Answer not known

184. The magnetic dipole moment per unit volume is defined as

(A) Polarization ✓(B) Magnetization

(C) Susceptibility (D) Permeability

(E) Answer not known

185. The unit of magnetic dipole moment is

(A) A/m² ✓(B) A.m²

(C) A.m (D) A/m

(E) Answer not known

186. The coefficient of coupling for two coils having $L_1 = 2H$, $L_2 = 8H$ and $M = 3H$ is

(A) 5.333 (B) 1.333

(C) 0.875 ✓(D) 0.75

(E) Answer not known

187. The mutual inductance of two coils is maximum when the coils are

(A) Inclined at an angle of 45° (B) At right angles to each other

(C) Facing each other ✓(D) Touching each other

(E) Answer not known

188. The integral form of Ampere's law is

(A) $\oint \overline{H} \, d\overline{L} = 0$ (B) $\oint \overline{J} \, d\overline{S} = 0$

✓(C) $\oint \overline{H} \, d\overline{L} = I$ (D) Both (A) and (B)

(E) Answer not known

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[Turn over

189. A multilayer coil of 2000 turns of fine wire is 20 mm long and has a thickness 5 mm of winding. If the coil carries a current of 5 mA, the mmf generated is

✓(A)   10 A.t   (B)   2000 A.t

(C)   200 A.t   (D)   500 A.t

(E)   Answer not known

190. The thumb in Fleming's left hand rule indicates

✓(A)   Deflecting force   (B)   Current

(C)   Magnetic field   (D)   emf

(E)   Answer not known

191. The work done on a unit positive charge in bringing it from infinity to any point in an electric field is called as

(A)   Intensity at that point

✓(B)   Electric potential at that point

(C)   Electric potential at infinity

(D)   Electric intensity at infinity

(E)   Answer not known

192. The magnetic field intensity for inside the N-turn toroid is

(A) $\dfrac{NI}{\pi p}\vec{a}_\phi$ ✓(B) $\dfrac{NI}{2\pi p}\vec{a}_\phi$

(C)   0   (D) $\dfrac{\mu NI}{2\pi p}\vec{a}_\phi$

(E)   Answer not known

193. Unit of Electric Field Strength is

    (A) V/m

    (B) N/C

    (C) $J/{C-m}$

    ✓(D) All

    (E) Answer not known

194. The electric flux density for an infinite sheet of charge is

    ✓(A) $\dfrac{P_S}{2} a_n$

    (B) $\dfrac{P_S}{2\varepsilon_0} a_n$

    (C) $\dfrac{P_S}{\pi\varepsilon_0} a_n$

    (D) $\dfrac{P_S}{\varepsilon_0} a_n$

    (E) Answer not known

195. An electric field from a medium where relative permittivity is 6 passes into a medium of relative permittivity of 2. If $\vec{E}$ makes an angle of $45°$ with the boundary normal, the angle of the field in second dielectric make with normal is

    ✓(A) $\tan^{-1}\left(\dfrac{1}{3}\right)$

    (B) $\tan^{-1}\left(\dfrac{1}{2}\right)$

    (C) $\tan^{-1}\left(\dfrac{1}{4}\right)$

    (D) $\tan^{-1}(3)$

    (E) Answer not known

196. The force between two small charged spheres having charges of 3×10^{-7} C and 4×10^{-7} C placed 30 cm apart in the air will be

(A) 6×10^{-3} N ✓(B) 12×10^{-3} N

(C) 16×10^{-2} N (D) 18×10^{-2} N

(E) Answer not known

197. The boundary condition for a dielectric-dielectric interface along tangential components (E_T, D_T) is

(A) $D_{T_1} = D_{T_2}$ (B) $\dfrac{E_{T_1}}{\varepsilon_1} = \dfrac{E_{T_2}}{\varepsilon_2}$

✓(C) $\dfrac{D_{T_1}}{D_{T_2}} = \dfrac{\varepsilon_1}{\varepsilon_2}$ (D) $\varepsilon_1 D = \varepsilon_2 D$

(E) Answer not known

198. The velocity of air in an inner tube when punctured by a nail, results in expansion of air as the pressure drops, during its outflow. The divergence of this velocity is

(A) equal to zero (B) constant

✓(C) greater than zero (D) infinite

(E) Answer not known

199. The force acting on a point charge depend on _____ of charge.

(A) only position (B) only velocity

✓(C) both position and velocity (D) gravitational force

(E) Answer not known

200. The Gauss law is not applicable to determine E or D when the

✓(A) Charge distribution is not symmetric
 (B) Charge distribution is symmetric
 (C) Charge distribution is spherical symmetry
 (D) Charge distribution is cylindrical symmetry
 (E) Answer not known

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