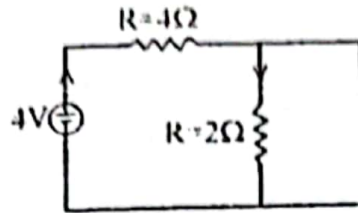1. What is the value of current passing through the resistor R = 2Ω in the figure shown below?

(a) 1 A
(b) 0.5 A
(c) 1.5 A
(d) Zero

2. By increasing transmission voltage by a factor of 2, power transfer increases by a factor of:

(a) ¼
(b) 2
(c) 4
(d) 8

3. The feeder is designed mainly from the point of view of:

(a) its current carrying capacity
(b) voltage drop in it
(c) operating voltage
(d) operating frequency

4. The current in a 3-phase unbalanced system are:

$$\vec{I_R} = (12 + j2)A \qquad \vec{I_y} = (12 - j12)A \qquad \vec{I_B} = (-15 + j10)A$$

The phase sequence is RYB. The zero phase sequence component in R-phase is:

(a) $(1.5 + j2.3)\,A$
(b) $(3 + j1.33)\,A$
(c) $(2.8 + j6.7)\,A$
(d) $(1.5 + j0.15)\,A$

5. The least expensive protection for low-voltage system is:

(a) isolator
(b) oil circuit breaker
(c) fuse
(d) air break circuit breaker

6. A two-pole alternator is running at 3000 R.P.M. Its angular velocity is:

(a) 120π rad/s
(b) 100π rad/s
(c) 150π rad/s
(d) 200π rad/s

7. A synchronous motor running with over excitation acts as a capacitor when it is:

(a) fully loaded
(b) half loaded
(c) quarter loaded
(d) not loaded

8. A thermal generating station has an installed capacity of 20 MW and supplies a daily load of 18 MW for 16 hours and 9 MW for remaining 8 hours. The plant capacity factor for this station is

(a) 1
(b) 0.75
(c) 0.67
(d) 0.50

9. Figure given below shows the daily load curve of a generating station. The units generated per day will be:

Time in Hours ⟶
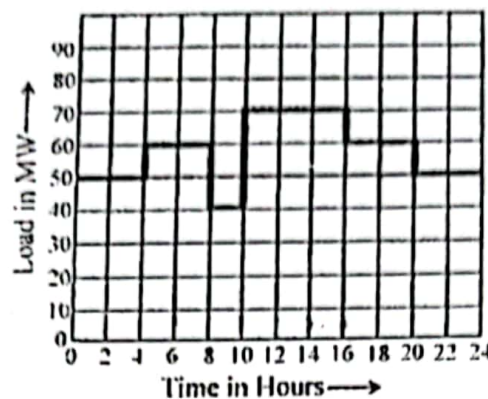
(a) 13.8×10^5 kWh (b) 10.6×10^5 kWh
(c) 15.2×10^5 kWh (d) 11.4×10^5 kWh

10. In a three phase system, the line losses are:
(a) directly proportional to $\cos\phi$ (b) inversely proportional to $\cos\phi$
(c) inversely proportional to $\cos^2\phi$ (d) directly proportional to $\cos^2\phi$

11. In the power system, the resonance rarely occurs at the supply frequency because:
(a) circuit capacitance is large (b) circuit capacitance is small
(c) circuit inductance is small (d) circuit capacitance is very small as compared to inductance

12. Which of the following is the correct expression for resonant frequency ω_r?
(a) $\omega_r = \omega_n\sqrt{1-\xi^2}$ (b) $\omega_r = \omega_n\sqrt{1+\xi^2}$
(c) $\omega_r = \omega_n\sqrt{1-2\xi^2}$ (d) $\omega_r = \omega_n\sqrt{1+2\xi^2}$

13. For which type of measurements, a piezo electric transducer is suitable?
(a) Static pressures (b) Dynamic pressures
(c) High temperatures (d) Low temperatures

14. A solar cell is a:
(a) photo voltaic transducer (b) photo emissive transducer
(c) photo conductive transducer (d) photo resistive transducer

15. The negative real axis in G(s) H(s) plane for Nyquist plot corresponds to:
(a) +180° phase (b) −180° phase
(c) +90° phase (d) −90° phase

16. The elements in the first column of Routh-Hurwitz table are:

$$2, -3, -5, 7.5, 8, -6, 4$$

   How many poles of the system have positive real part?

   (a) 4   (b) 3

   (c) 2   (d) 1

17. An increase in the gain of critically damped system results in:

   (a) Over damped system   (b) Under damped system

   (c) Oscillatory system   (d) Critically stable system

18. For the under damped second order system the damping ratio is:

   (a) less than 1   (b) more than 1

   (c) equal to 1   (d) less than 2 but greater than 1

19. Repeatability of the instrument output with respect to a given ixed input is:

   (a) Accuracy   (b) Precision

   (c) Resolution   (d) Sensitivity

20. For maximum power transfer from an electrical transducer, the impedance of the external load should be:

   (a) very low   (b) very high

   (c) equal to the internal impedance of the transducer   (d) linearly increasing from very low values to very high values.

21. Which of the following is not an active transducer?

   (a) Thermocouple   (b) LVDT

   (c) Photovoltaic cell   (d) Bourdon tube of a pressure gauge

22. For the system having transfer function $\left(\frac{2}{s+1}\right)$ the approximate time taken for a step response to reach 98% of the final value is:

   (a) 1 s   (b) 2 s

   (c) 4 s   (d) 8 s

23. A function y(t) satisfies the following differential equation:

$$\frac{dy(t)}{dt} + y(t) = \delta(t)$$

   where δ(t) is the delta function. Assuming zero initial condition, and denoting the unit step function by u(t), y(t) can be of the form:

   (a) e^{t} (b) e^{-t}

   (c) $e^{t} u(t)$ (d) $e^{-t} u(t)$

24. An ammeter has a current range of 0 – 5A, and its internal resistance is 0.2 Ω. In order to change the range to 0 – 25A, we need to add a resistance of:

   (a) 0.8 Ω in series with the meter.   (b) 1.0 Ω in series with the meter.

   (c) 0.04 Ω in parallel with the meter.   (d) 0.05 Ω in parallel with the meter.

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4

25. A dc potentiometer is designed to measure up to about 2V with a slide wire of 800 mm. A standard cell of e.m.f. 1.18 V obtains balance at 600 mm. A test cell is seen to obtain balance at 680mm. The e.m.f. of the test cell is:

    (a)   1.00 V   (b)   1.34 V
    (c)   1.50 V   (d)   1.70 V

26. The minimum number of wattmeter(s) required to measure 3-phase, 3-wire balanced or unbalanced power is:

    (a)   1   (b)   2
    (c)   3   (d)   4

27. A system is said to be effectively grounded only if $\frac{R_0}{X_1}$ and $\frac{X_0}{X_1}$ are respectively:

    (a) $\leq 1\ and \leq 3$ (b) $\geq 1\ and \geq 3$
    (c) $\leq 2\ and \geq 2$ (d) $\geq 2\ and \leq 2$

28. For a d.c. series motor, the relationship between speed of motor at particular load(N), flux per pole (ϕ) and back e.m.f. (E_b) is:

    (a) $\dfrac{N_2}{N_1} = \dfrac{E_{b_2}}{E_{b_1}}\dfrac{\phi_1}{\phi_2}$ (b) $\dfrac{N_2}{N_1} = \dfrac{E_{b_1}}{E_{b_2}}\dfrac{\phi_2}{\phi_1}$

    (c) $\dfrac{N_1}{N_2} = \dfrac{E_{b_2}}{E_{b_1}}\dfrac{\phi_2}{\phi_1}$ (d) $\dfrac{N_1}{N_2} = \dfrac{E_{b_1}}{E_{b_2}}\dfrac{\phi_1}{\phi_2}$

29. Select the correct statement:

    (a)   In an Induction Motor, actual speed is equal to synchronous speed.
    (b)   In an Induction Motor, actual speed is always less than the synchronous speed.
    (c)   In an Induction Motor, actual speed is always greater than the synchronous speed.
    (d)   None of the above.

30. Equivalent–Pi model is quite suitable for analyzing the performance of transmission line of:

    (a)   50 km of length   (b)   150 km of length
    (c)   30 km of length   (d)   250 km of length

31. The d.c. motor, which can provide zero speed regulation at full load without any controller is a:

    (a)   series motor   (b)   shunt motor
    (c)   cumulatively compounded motor   (d)   differentially compounded motor

32. Under no load condition, if the applied voltage to an induction motor is reduced from the rated voltage to half the rated value:

    (a)   the speed decreases and the stator current increases.
    (b)   both the speed and the stator current decreases.
    (c)   the speed and the stator current remains practically constant.
    (d)   there is negligible change in speed but the stator current decreases.

33. A 50 kVA, 3300 / 230 V single–phase transformer is connected as an auto transformer with input voltage of 3300 V. The nominal rating of the autotransformer will be:

    (a)   50.0 kVA   (b)   53.5 kVA
   (c)   717.4 kVA   (d)   767.4 kVA

34. The no-load current in a transformer lags the applied voltage by:

(a) 90°

(b) about 75°

(c) 0°

(d) about 110°

35. In power transformers, core is made up of:

(a) Cast iron

(b) Silicon steel

(c) Ferrite

(d) Powdered alloy

36. The voltage applied to a transformer primary is increased keeping V/f constant. With this, the core loss will:

(a) decrease and magnetizing current I_m will increase.

(b) increase and I_m will also increase.

(c) remain constant and I_m will also remain constant.

(d) increase and I_m will remain constant.

37. When the supply voltage to a 3-phase squirrel cage induction motor is reduced by 20%, the maximum torque will decrease by:

(a) 10%

(b) 20%

(c) 36%

(d) 40%

38. The dummy coil in a d.c. machine is used to:

(a) eliminate reactance voltage.

(b) reduce armature reaction.

(c) provide mechanical balance to the armature.

(d) reduce harmonics generated in armature.

39. A star-delta starter is equivalent to an auto-transformer starter with a tapping of:

(a) 86.6%

(b) 57.73%

(c) 57%

(d) 58%

40. The m.m.f. produced by the rotor currents of a 3-phase induction motor:

(a) rotates at the speed of rotor in the air gap.

(b) is at stand still with respect to stator m.m.f.

(c) rotates at slip speed with respect to stator m.m.f.

(d) rotates at synchronous speed with respect to rotor.

41. Three identical bulbs are connected in series and supplied with a 300 V battery. The current through the second bulb, if the battery is supplying one ampere current, is:

(a) 1.5 A

(b) 2.0 A

(c) 1.20 A

(d) 1.0 A

42. A 3-phase squirrel cage induction motor has its stator rewound for 6-poles without any alteration in the rotor. The motor would now run at a speed

(a) < 1000 rpm

(b) < 1500 rpm

(c) < 1200 rpm

(d) zero rpm

43. A 3-phase induction motor takes 60 kW out of which 1 kW is wasted as stator losses. What will be the mechanical power developed by this motor at a slip of 3%?

(a) 60.55 kW

(b) 57.23 kW

(c) 55.20 kW

(d) 50.25 kW

44. Stator and rotor leakage reactance of a three-phase induction motor:

    (a) improve its operating power factor.   (b) decrease its operating power factor.

    (c) improve its starting torque.   (d) have no effect on motor performance.

45. If the iron and copper losses of a transformer on full load are given as P_1 and P_2 respectively, then the maximum efficiency occurs at 50% full load when:

    (a) $P_1 : P_2 = 1 : 6$ (b) $P_1 : P_2 = 1 : 2$

    (c) $P_1 : P_2 = 1 : 4$ (d) $P_1 : P_2 = 1 : 5$

46. Damper winding is provided in synchronous motor to:

    (a) provide maximum torque   (b) prevent hunting

    (c) increase speed   (d) reduce speed

47. If the field resistance of a dc shunt generator is increased beyond its critical value, the generator:

    (a) output voltage will exceed its name-plate rating   (b) will not build-up any voltage

    (c) may burn out if loaded up-to its rating   (d) power output may exceed its name-plate rating

48. Superposition Theorem is not applicable for:

    (a) Voltage calculation   (b) Bilateral elements

    (c) Power calculations   (d) Passive elements

49. The force experienced by a conductor of length L, carrying a current I, placed in a magnetic field B is given by (conductor is perpendicular to B):

    (a) $\dfrac{B}{IL}$ (b) $\dfrac{IL}{B}$

    (c) BIL (d) $\dfrac{I}{BL}$

50. In the circuit shown the frequency of voltage source is variable. At $f = 0$ and $f = \infty$, the magnitude of current will be:


    (a) 0 A, 8 A   (b) 0 A, 0A
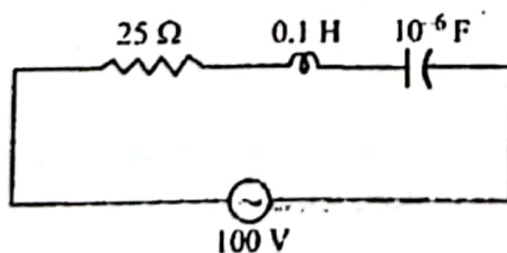
    (c) 8 A, 8 A   (d) 8 A, 0A

51. For a coil having N number of turns and flux linkage ϕ, the induced e.m.f. in the coil is given by:

    (a) $emf = \phi \dfrac{dN}{dt}$ (b) $emf = t \dfrac{dN}{d\phi}$

    (c) $emf = N \dfrac{dt}{d\phi}$ (d) $emf = N \dfrac{d\phi}{dt}$

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52. Mutual inductance between two coils as shown in circuit is:

$L_1 = 12$ mH $L_2 = 3$ mH $K = 0.8$
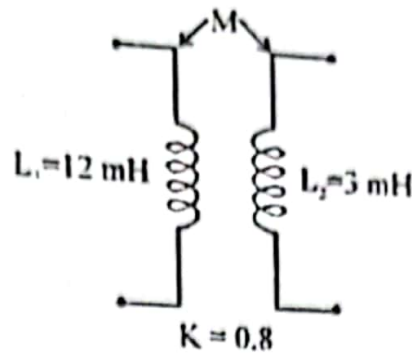
(a) 4.8 mH
(c) 4 mH
(b) 15 mH
(d) 24 mH

53. Figure shows a part of a closed circuit. What is the potential difference between points A and B?

A • 3A → 3V —||— 1Ω ⌇⌇⌇— 6Ω ⌇⌇⌇— • B

(a) 6 V
(c) 24 V
(b) 18 V
(d) 12 V
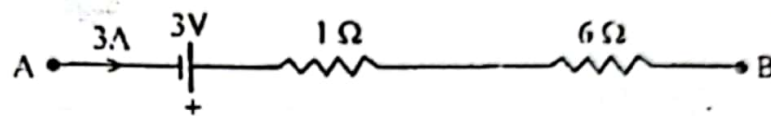
٠. The quantity of charge that will be transferred by a current flow of 10 A over 1-hour period is:

(a) 10 C
(c) 3.6×10^4 C
(b) 2.4×10^3 C
(d) 1.6×10^2 C

$\theta = c \frac{d!}{dt} =$ $= \frac{1 \varnothing}{36 \varnothing \varnothing}$

. A wire having resistance R is drawn through a dye so that its length is increased $\frac{2}{3}$ times. The new value of the resistance will be:

(a) 3 R
(c) $\dfrac{R}{3\sqrt{3}}$
(b) $\frac{3}{2}$ R
(d) $\frac{2}{3}$ R

56. A flux of 0.5 mWb links a coil of 400 turns. If the flux is reversed in 0.2s, then the average value of the induced voltage in the coil will be:

(a) 10 V
(c) 2 V
(b) 21 V
(d) 4 V

57. Power transmission lines are transposed to reduce:

(a) Skin effect
(c) Transmission loss
(b) Ferranti effect
(d) Interference with neighbouring communication lines

58. The voltage across R and L in a series RL circuit are found to be 200 V and 150 V respectively. The r.m.s. value of the voltage across the series combination is:

(a) 250 V
(c) 450 V
(b) 360 V
(d) 400 V

P.T.O.

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59. Time constant for RL series circuit is given by:

   (a) $\dfrac{R}{L}$ (b) $\dfrac{1}{RL}$

   (c) RL .   (d) $\dfrac{L}{R}$

60. What will be r.m.s. value of a rectangular wave with amplitude 10V (min. 0V, max. 10V)?

   (a) $5\sqrt{2}$ V   (b) 5 V $\cong \underline{10}$

   (c) 7.7 V   (d) 10 V

61. Noise generated in a resistor is also known as:

   (a) Partition noise   (b) White noise

   (c) Thermal noise   (d) Shot noise

62. A notch filter is sometimes used in communication receivers to:

   (a) reduce receiver gain at some specific frequency.   (b) increase receiver gain at some specific frequency.

   (c) make selectivity more precise.   (d) none of these.

63. Number of binary bits required to represent hexadecimal digit is:

   (a) 3   (b) 4

   (c) 8   (d) 16

64. The circuit given below is functionally equivalent to:
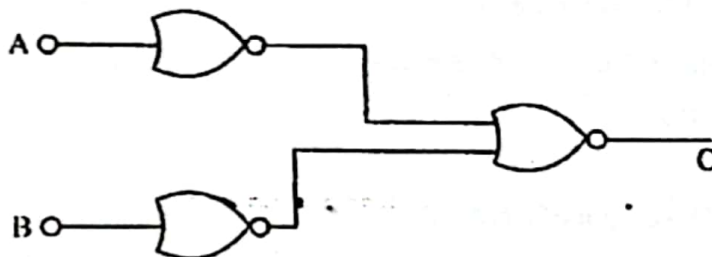
   (a) OR gate   (b) NOR gate

   (c) AND gate   (d) EX-OR gate

65. De Multiplexer is also known as:

   (a) Data selection   (b) Data distributor

   (c) Flip flop   (d) Encoder

66. A BJT is said to be operating in the saturation region if:

   (a) both junctions are reverse biased.   (b) Base emitter junction is reverse biased and base collector junction is forward biased.

   (c) Base emitter junction is forward biased and base collector junction is reverse biased.   (d) both the junctions are forward biased.
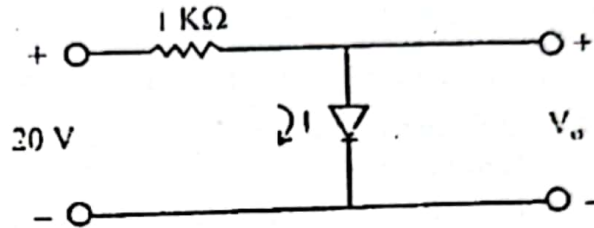
67. What is the value of current I flowing through the ideal diode?
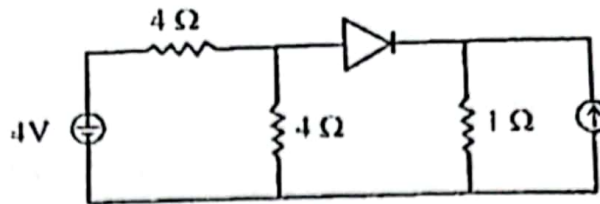
(a) $\frac{8}{3}$ A

(b) $\frac{2}{3}$ A

(c) $\frac{3}{8}$ A

(d) $\frac{3}{2}$ A

68. For the given circuit. find I & V_o for ideal diode condition:

(a) 20 mA, 20 V

(b) 20 mA, 20 mV

(c) 0 mA, 20 mV

(d) 20 mA, 0 V

69. The output of a particular Op-Amp increases 8V in 12 µs, the slew rate is:

(a) 90 V/µs

(b) 0.67 V/µs

(c) 1.5 V/µs

(d) 20 V/µs

70. In an Op-Amp if $A_d = 3500$ and $A_{cm} = 0.35$, then the CMRR is:

(a) 1225

(b) 10000

(c) 80 dB

(d) Both (a) and (c)

71. The output of a NAND gate will be low if two inputs are:

(a) 11

(b) 01

(c) 10

(d) 00

72. If the ac input to half-wave rectifier is an r.m.s. value of $\frac{400}{\sqrt{2}}$ volts, the diode PIV rating is

(a) $400 \times \sqrt{2}$ V

(b) $\frac{400}{\sqrt{2}}$ V

(c) 400 V

(d) 200 V

73. When bipolar junction transistor (BJTs) are used in digital circuits they usually operate in:

(a) breakdown region

(b) active region

(c) linear region

(d) saturation and cut off regions

74. If a transistor has a β of 250 and a base-current of 20 µA, then emitter current equals:

(a) 5 mA

(b) 5.02 mA

(c) 50 mA

(d) 0.5 mA

75. The binary equivalent of the decimal number 368 is:

    (a) 110110000   (b) 101110000

    (c) 111100000   (d) 111010000

76. The resistance of a wire is 5Ω at $50°C$ and 6Ω at $100°C$. The resistance of the wire at $0°C$ will be:

    (a) 2Ω (b) 1Ω

    (c) 4Ω (d) 3Ω

77. The greatest length of a copper wire that can hang without breaking would be [Breaking stress = $7.2×10^7$ N/m^2; Density of copper = 7.2 g/cc; g = 10 m/s^2]:

    (a) 10 m   (b) 100 m

    (c) 1000 m   (d) 10,000 m

78. A ship of mass $3×10^7$kg which is initially at rest can be pulled through a distance of 3 m by means of a force of $5×10^3$ N. If there is no water resistance, then the speed attained by the ship will be:

    (a) 0.1 r 's   (b) 1 m/s

    (c) 10 r.'s   (d) 0.01 m/s

79. Two masses, one 'n' times heavier than the other, have equal kinetic energy. The ratio of their momenta (p_2/p_1) would be:

    (a) $\sqrt{n}$ (b) n

    (c) $n^{3/2}$ (d) n^2

80. Find the value of i_{rms} for the variation of current as given below:
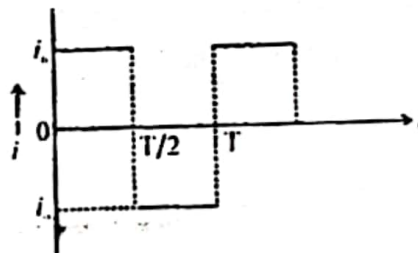
    (a) $i_{rms} = i_0 / 4$ (b) $i_{rms} = i_0 / 2$

    (c) $i_{rms} = 4i_0 / 3$ (d) $i_{rms} = i_0$

81. An inductance coil of 0.50 H and resistance 100 Ω is connected to a 220V, 50 Hz a.c. supply. What is the time lag between the voltage maximum and current maximum?

    (a) 3.2 ms   (b) 3.0 ms

    (c) 1.57 ms   (d) 2.57 ms

82. A nucleus with z =92 emits the following in a sequence:

$$\alpha, \alpha, \beta^-, \beta^-, \alpha, \alpha, \alpha, \alpha, \beta^-, \beta^-, \alpha, \beta^+, \beta^+, \alpha.$$

The z of the resulting nucleus is:

    (a) 76   (b) 78

    (c) 82   (d) 74

83. A potentiometer wire has a length of 5m and resistance of $2\ \Omega/m$. A cell of e.m.f. 5V and a resistance box are connected in series with it. The value of resistance to be introduced in the box so as to get a potential gradient of 0.1 V/m will be

(a) $55\ \Omega$

(b) $90\ \Omega$

(c) $115\ \Omega$

(d) $172\ \Omega$

84. Bomb calorimeter is used to estimate:

(a) calorific value of solid and liquid fuels.

(b) calorific value of gaseous fuels.

(c) composition of solid and liquid fuels.

(d) composition of gaseous fuels.

85. The luster of a metal is due to:

(a) presence of free electrons

(b) its chemical inertness

(c) its hydraulic washing

(d) its high density

86. What chemicals can be used to make a buffer of pH = 10?

(a) $CH_3COOH + CH_3COONa$

(b) $NH_4OH + NH_4Cl$

(c) $H_3PO_4 + CH_3COONa$

(d) $CH_3COOH + NH_4Cl$

87. Which of the following is not a greenhouse gas?

(a) CO_2

(b) CO

(c) CH_4

(d) Water

88. Which of the following is not a disinfectant?

(a) $CaOCl_2$

(b) $ClNH_2$

(c) O_3

(d) Na_2CO_3

89. Which of the following metal forms a volatile oxide film?

(a) Al

(b) Pb

(c) Au

(d) Mo

90. Nylon-6 is prepared by the self-polymerization of:

(a) Caprolactam

(b) ω-Amino undecanoic acid

(c) Hexa-methylene diamine

(d) Adipic acid

91. Which of the following functional groups is of an aldehyde?

(a) — OH

(b) $-\overset{\displaystyle H}{\underset{}{C}} = O$

(c) $-\overset{\displaystyle O}{\underset{}{C}}-$

(d) $-\overset{\displaystyle O}{\underset{}{C}}-OH$

92. Electrolysis of water produces

(a) OH^- and O^{2-}

(b) H_2 and H_3O^+

(c) H_3O^+ and OH^-

(d) H_2 and O_2

P.T.O.

93. The value of $4\cos 12^\circ \cos 48^\circ \cos 72^\circ$ is:

   (a) $\cos 36^\circ$ (b) $\cos 72^\circ$

   (c) $\sin 36^\circ$ (d) $\sin 72^\circ$

94. The value of k for which the points $(k, 2-2k)$, $(-k+1, 2k)$ and $(-4-k, 6-2k)$ are collinear is:

   (a) any value of k   (b) $k = -1$ or $k = \frac{1}{2}$

   (c) $k = 1$ or $k = -\frac{1}{2}$ (d) $k = 1$ or $k = \frac{1}{2}$

95. If $\cos 40^\circ - \sin 40^\circ = x$, $(x < 2)$, then value of $\cos 80^\circ$ is

   (a) $x\sqrt{2-x^2}$ (b) $2r$

   (c) $-x\sqrt{2-x^2}$ (d) $x+\sqrt{2-x^2}$

96. The maximum value of $\frac{\log_e x}{x}$ for $x > 0$ is

   (a) e (b) $\frac{1}{e}$

   (c) e^2 (d) $\frac{1}{e^2}$

97. Value of $\int_{-3}^{3} \frac{x^2 \sin x}{1+x^6} dx$ is

   (a) 0   (b) 1

   (c) 2   (d) 4

98. Let $\vec{a} = 2\hat{\imath} + 3\hat{\jmath} - \hat{k}$ and $\vec{b} = \hat{\imath} - 2\hat{\jmath} + 3\hat{k}$, then the value of λ for which the vector $\vec{c} = \lambda\hat{\imath} + \hat{\jmath} + (2\lambda - 1)\hat{k}$ is parallel to the plane containing $\vec{a}$ and $\vec{b}$ is:

   (a) 1   (b) 0

   (c) -1 (d) 2

99. The equation of tangent to the circle $x^2 + y^2 + 4x - 4y + 4 = 0$ which makes equal intercepts on positive quadrant is given by:

   (a) $x + y = 1$ (b) $x + y = \sqrt{2}$

   (c) $x + y = \frac{1}{\sqrt{2}}$ (d) $x + y = 2\sqrt{2}$

100. If the percentage error in the edge of a cube is I, then the error in its volume is:

   (a) 1%   (b) 2%

   (c) 3%   (d) 4%

———

ALIGARH MUSLIM UNIVERSITY, ALIGARH
Answer Key B.E.(ELECTRICAL) Admission Test 2019-20
SERIES: B

Q.No.	Answer	Q.No.	Answer	Q.No.	Answer
1	D	41	D	81	A
2	C	42	A	82	B
3	A	43	B	83	B
4	B	44	B	84	A
5	C	45	C	85	A
6	B	46	B	86	B
7	D	47	B	87	B
8	B	48	C	88	D
9	A	49	C	89	D
10	C	50	B	90	A
11	D	51	D	91	B
12	C	52	A	92	D
13	B	53	B	93	A
14	A	54	B	94	B
15	B	55	D	95	A
16	A	56	C	96	B
17	B	57	D	97	A
18	A	58	A	98	A
19	B	59	D	99	D
20	C	60	A	100	C
21	B	61	C		
22	C	62	A		
23	D	63	B		
24	D	64	C		
25	B	65	B		
26	B	66	D		
27	A	67	B		
28	A	68	D		
29	B	69	B		
30	D	70	D		
31	D	71	A		
32	D	72	C		
33	D	73	D		
34	B	74	B		
35	B	75	B		
36	D	76	C		
37	C	77	C		
38	C	78	A		
39	B	79	A		
40	B	80	D		

COORDINATOR
DATED: 13.06.2019