103/2025

Question Booklet Alpha Code	A	Question Booklet Serial Number

Total Number of Questions : 100 **Time : 1 Hour 30 Minutes**

Maximum Marks : 100

INSTRUCTIONS TO CANDIDATES

A

1. The question paper will be given in the form of a Question Booklet. There will be four versions of question booklets with question booklet Alpha Code viz. A, B, C & D.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the question booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a question booklet where the Alpha Code does not match to the allotted Alpha Code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your question booklet is unnumbered, please get it replaced by new question booklet with same Alpha Code.
6. The question booklet will be sealed at the middle of the right margin. Candidate should not open the question booklet until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the question booklet supplied to him/her contains all the 100 questions in serial order. The question booklet does not have unprinted or torn or missing pages and if so, he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same Alpha Code. This is most important.
8. A blank sheet of paper is attached to the question booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

1. Use Superposition principle to find current through R_1 in Fig.(1).

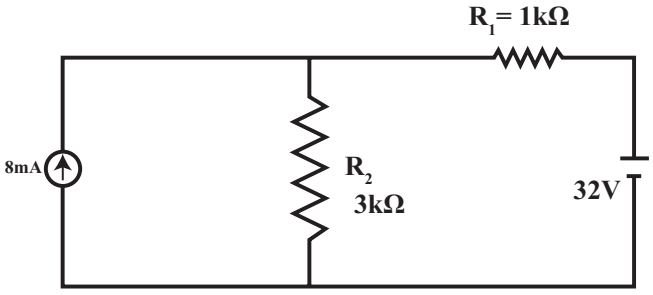


Fig.(1)

(A) 1 mA

(B) 2 mA

(C) 1.5 mA

(D) 2.5 mA

2. A coil has an inductive reactance of 220 Ω and a resistance of 220 Ω connected in series with the coil. If an AC voltage of 220V, 50Hz is applied to it; then the reactive current is _____.

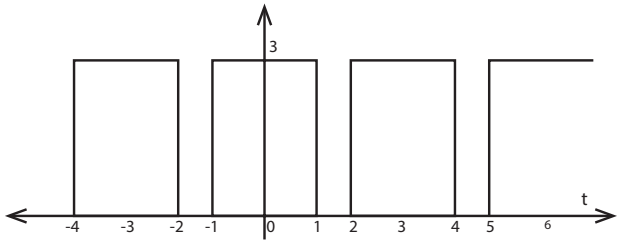
(A) 1.5 A

(B) 0.7 A

(C) 7 A

(D) 0.5 A

3. Find the R.M.S. value of the function shown below:



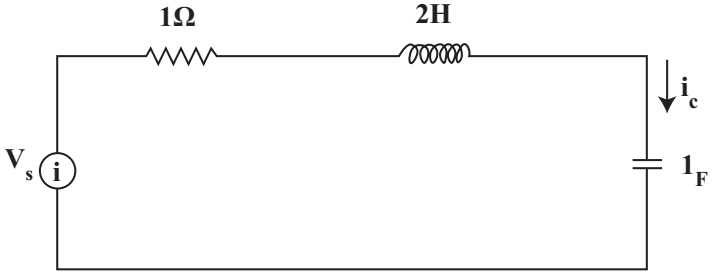
(A) $\sqrt{12}$

(B) $\sqrt{3}$

(C) $\sqrt{6}$

(D) 3

4. If the current through capacitor is $i_c = -2e^{-t}$ A, then find V_s ———



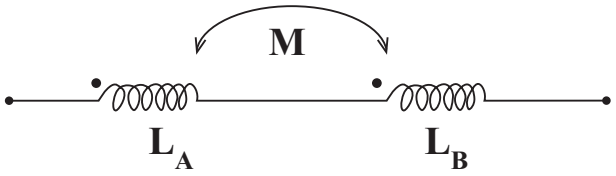
(A) $3\ e^{-t}$

(B) $-3\ e^{-t}$

(C) $1.5\ e^{-2t}$

(D) $1.5\ e^{2t}$

5. Two coupled coils are connected as shown below. If $L_A = 1$ H, $L_B = 2$ H, M = 0.5 H, then effective inductance of the coils is _____



(A) 4 H

(B) 2 H

(C) 3.5 H

(D) 1.5 H

6. An R-L-C series resonant circuit has R = 100 Ω, Q factor of 20 and resonant frequency $\omega_0 = 100$ rad/sec. Then the value of capacitance is _____

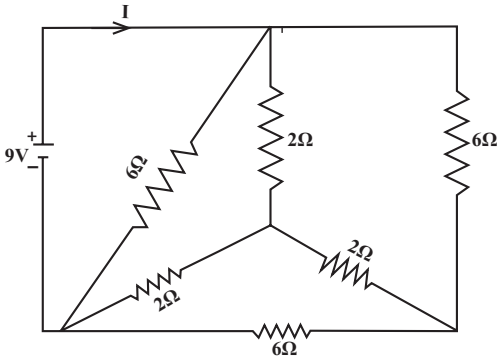
(A) 5 μF

(B) 50 μF

(C) 20 μF

(D) 2 μF

7. **Find the current I flowing through the below circuit.**



(A) 4 A **(B) 2 A**

(C) 4.5 A **(D) 1.5 A**

8. **A series circuit has an impedance of (6 – j8) Ω. It is connected across 200 V supply. The active power consumed by this circuit is _____.**

(A) 2400 W

(B) 4800 W

(C) 3200 W

(D) 1600 W

9. **An inductor of 3 H carries a current of i(t) = 0.5 t for $0 < t \leq 2$sec. What is the energy consumed by the inductor when time t = 2sec?**

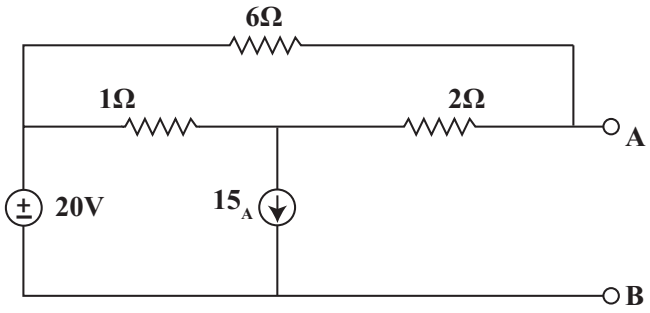
(A) 2.5 Joules (J)

(B) 1.5 Joules (J)

(C) 3 Joules (J)

(D) 6 Joules (J)

10. For the circuit shown below, what should be the value of the load resistance to be connected across points 'A' and 'B' so that the maximum power will be transferred?



(A) 2.4 Ω

(B) 2.55 Ω

(C) 1.55 Ω

(D) 6.55 Ω

11. Hysteresis loss in magnetic materials are primarily due to

(A) rapid reversals of its magnetization

(B) flux density lagging behind magnetizing force

(C) retentivity

(D) magnetic friction

12. Air gaps are provided in magnetic circuits to

(A) increase permeability of the circuit

(B) increase the magnetic flux

(C) prevent saturation

(D) reduce magnetic flux leakage

13. In a parallel magnetic circuit with two branches, the net mmf required to create magnetic flux is

(A) mmf of the low reluctance path

(B) mmf of the high reluctance path

(C) sum of mmfs of both low and high reluctance paths

(D) difference between mmfs of high and low reluctance paths

14. A coil of 1000 turns carrying a current of '*I*' A produces a magnetic flux of 5 mWb. If the current in the coil is reversed in 0.1s, then the average value of emf induced in the coil will be

(A) 10 V

(B) 100 V

(C) 50 V

(D) 5 V

15. A coil of 500 turns carrying 5A current produces 5mWb flux in an adjacent coil of 1000 turns. The mutual inductance between the coils is

(A) 0.5 H

(B) 1 H

(C) 0.75 H

(D) 1.5 H

16. Two identical coils with 1000 turns and self inductance of 100 mH each are lying in parallel planes. If current changing at the rate of 100 A/s in the first coil induces an emf of 5 V in the second coil, then the coupling of coefficient between the coils will be

(A) 1

(B) 0.5

(C) 0.1

(D) 0.05

17. A coil of 1000 turns has a resistance of 100 ohms. When excited with a DC source of 200 V, the coil produces a magnetic flux of 10 mWb. The self inductance of the coil will be

(A) 5 H

(B) 0.2 H

(C) 10^{-5} H

(D) 10^{-6} H

18. The mutual inductance M between two coupled inductors L_1 and L_2 will be

(A) $M = (L_1^2 + L_2^2)^{1/2}$

(B) $M > (L_1 + L_2) / 2$

(C) $M > (L_1 L_2)^{1/2}$

(D) $M <= (L_1 L_2)^{1/2}$

19. The hysteresis loop of a magnetic material has an area of 10 cm^2 with the axis scales given as 1 cm = 5 AT and 1 cm = 50 mWb. If the supply frequency is 50 Hz, then the hysteresis loss in the material will be

(A) 2.5 W

(B) 25 W

(C) 125 W

(D) 12.5 W

20. Which of the following statements hold for the divergence of electric and magnetic flux densities?

(A) Both are zero

(B) These are zero for static flux densities and non-zero for time varying flux densities

(C) Divergence is zero for electric flux density

(D) Divergence is zero for magnetic flux density

21. A 4-pole lap wound DC generator has 720 conductors, a flux of 40 mWb per pole is driven at 400 rpm. Find the generated emf.

(A) 192 V

(B) 184 V

(C) 200 V

(D) 190 V

22. A shunt generator running at 1000 rpm has generated emf as 220 V. If the speed increases to 1200 rpm, then the generated emf will be

(A) 150 V

(B) 175 V

(C) 240 V

(D) 264 V

23. The condition for maximum power in case of DC motor is

(A) back emf = 2 × supply voltage

(B) back emf = half of the supply voltage

(C) supply voltage = half of the back emf

(D) supply voltage = back emf

24. A 20 kVA single phase transformer has 400 turns on the primary and 60 turns on the secondary. The primary is connected to 2000 V, 50 Hz supply. The secondary voltage on open circuit is

(A) 250 V

(B) 300 V

(C) 500 V

(D) 600 V

25. If R_2 is the secondary resistance and K is the transformation ratio, then the equivalent secondary resistance referred to primary will be

(A) $R_2 / \sqrt{K}$

(B) R_2 / K^2

(C) R_2 / K

(D) R_2K^2

26. A 3-phase 400 V, 50 Hz induction motor has 5% slip. The frequency of rotor emf will be

(A) 250 Hz

(B) 50 Hz

(C) 2.5 Hz

(D) 0.25 Hz

27. The power factor of a squirrel cage induction motor is

(A) low at light loads only

(B) low at heavy loads only

(C) low at both light and heavy loads

(D) low at rated load only

28. The effective resistance of 2200 V, 50 Hz, 440 kVA, 1-phase alternator is 0.5 ohms. On short circuit, a field current of 40 A gives the full load current of 200 A. The emf on open circuit with same field excitation is 1160 V. The synchronous impedance is

(A) 5.8 Ω

(B) 8.5 Ω

(C) 11 Ω

(D) 12 Ω

29. The frequency of voltage generated by an alternator having 6 poles and rotating at 1800 rpm is _____ Hz.

(A) 60 Hz

(B) 90 Hz

(C) 100 Hz

(D) 120 Hz

30. The V-curves of a synchronous motor show the relationship between

(A) excitation current and back emf

(B) field current and power factor

(C) D.C. field current and A.C. armature current

(D) armature current and supply voltage

31. What is the minimum number of NAND gates required to realize an X-OR gate?

(A) 3

(B) 4

(C) 5

(D) 6

32. Number of select lines m, required to select one out of n input lines is

(A) $m = \log_2 n$

(B) $m = \log n$

(C) $m = \ln n$

(D) $m = 2^n$

33. 2421 code is

(A) weighted self-complementing code

(B) non weighted self-complementing code

(C) weighted non-self-complementing code

(D) non-weighted and non-self-complementing code

34. When an inverter is placed between the input of an S-R flip-flop, then the resulting flip-flop is a

(A) J-K flip-flop

(B) Master slave flip-flop

(C) T flip-flop

(D) D flip-flop

35. The number of flip-flops required for a mod-12 Johnson counter is

(A) 4

(B) 6

(C) 12

(D) 24

36. A certain 4-bit DAC uses binary weighted resistors. If the MSB resistor is 100 kΩ, then the LSB resistor will be

(A) 400 kΩ

(B) 25 kΩ

(C) 800 kΩ

(D) 12.5 kΩ

37. The total memory capacity of 8085 processor is

(A) 64 KB

(B) 1 MB

(C) 64 MB

(D) 10 MB

38. The _____ instruction is used to store the accumulator content into memory pointed by register pair DE in 8085 processors.

(A) STA D

(B) STA E

(C) STAX D

(D) STAX E

39. The order of 8085 machine cycle executed in executing the instruction STA 1200H are

(A) opcode fetch, memory read, memory write

(B) opcode fetch, memory write, memory read

(C) opcode fetch, memory read, memory read, memory read

(D) opcode fetch, memory read, memory read, memory write

40. During which T-state of opcode fetch cycle, the higher order address/data lines are de-multiplexed in 8085 processors?

(A) T_1

(B) T_2

(C) T_3

(D) T_4

41. Calculate the inductance of each conductor of a 3-phase 3-wire transmission system, when the conductors are arranged in a horizontal plane with spacing such that D_{31} = 4 mt, $D_{12} = D_{23}$ = 2 mt. The conductors are transposed and have a diameter of 3 cm.

(A) 1.11 mH

(B) 1.11 H

(C) 1.11 μH

(D) 0.9 mH

42. A three-unit insulator string is fitted with a guard ring. The capacitance of the link pins to metal work and guard ring can be assumed to be 15% and 5% of the capacitance of each unit. Determine the string deficiency.

(A) 30.2 %

(B) 86.5 %

(C) 38.54 %

(D) 13.5 %

43. In Newton-Raphson method of load flow analysis, what happens if the Q limit is violated for a PV bus?

(A) PV bus is changed to PQ bus and Q value is assigned to limit violated

(B) PV bus is changed to Slack bus and Q value is assigned to limit violated

(C) PV bus is changed to PQ bus and Q is allowed to vary within limits

(D) PV bus is not changed and Q value is assigned to limit violated

44. At fault point V_{a2} = _____ and Z_0 = _____

(A) $Z_2 I_{a2}$ and $3Z_n + Z_{go}$

(B) $-Z_2 I_{a2}$ and $3Z_n - Z_{go}$

(C) $-Z_2 I_{a2}$ and $3Z_n + Z_{go}$

(D) $Z_2 I_{a2}$ and $3Z_n - Z_{go}$

45. A power transmission network is shown in figure 1. The following data represents the parameters of the system.

$X_s = 0.85$ p.u., $X_{T1} = X_{T2} = 0.157$ p.u., $X_{l1} = X_{l2} = 0.35$ p.u., E = 1.5 p.u., V_L =1.00 p.u.

Calculate the maximum power limit and steady state stability margin with indicated values of E and V_L with the generator delivering 1.00 p.u. power output stably.

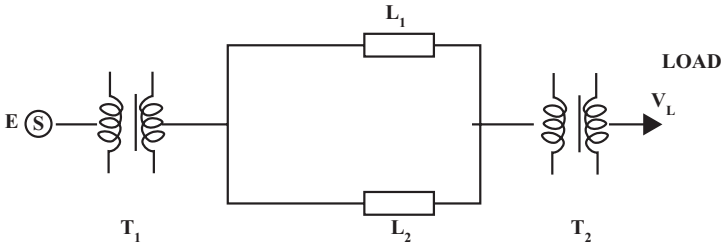


Figure 1

(A) 1.12 p.u. and 7.1 %

(B) 1.00 p.u. and 10.7 %

(C) 1.12 p.u. and 10.7 %

(D) 1.00 p.u. and 7.1 %

46. A 100 MVA, 50 Hz alternator operates at its rated speed. The H constant of the machine is 5 kW sec per kVA. The load suddenly increases by 50 MW. Due to delay in governor action, there is a delay of 0.6 sec in opening of steam valves. Find the frequency deviation.

(A) – 3.046 %

(B) – 96.95 %

(C) 3.046 %

(D) 96.95 %

47. A generator transformer unit feeds an infinite bus bar as shown in the figure 2 through a transmission line. At the midpoint of the transmission line, a three-phase inductor of 0.5 p.u. is connected. The generator emf behind synchronous reactance is 1.1 p.u. and the voltage at infinite bus bar is 1 p.u. Find the steady state power limit when the inductor is open and closed respectively

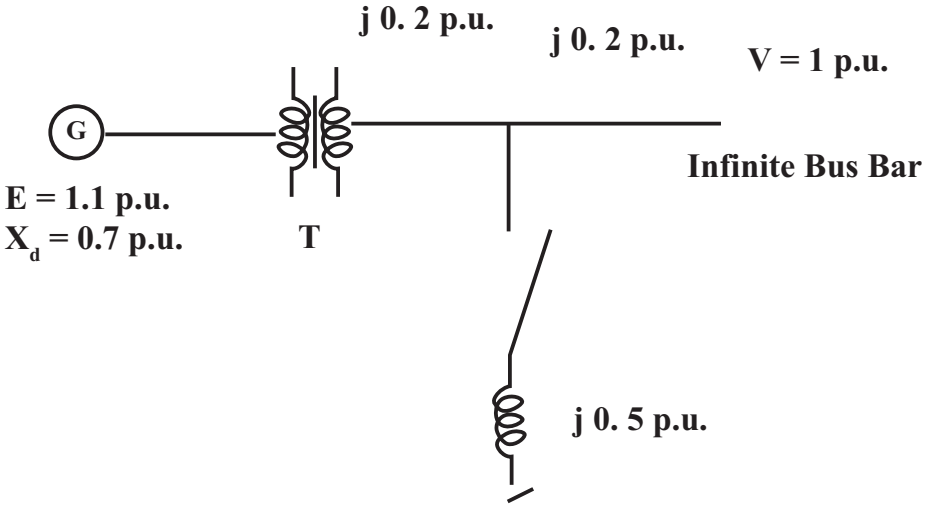


Figure 2

(A) 0.9617 p.u. and 0.6785 p.u.

(B) 0.9167 p.u. and 0.6875 p.u.

(C) 0.9671 p.u. and 0.6578 p.u.

(D) 0.9167 p.u. and 0.6578 p.u.

48. In a short circuit test on a 3-pole, 132 kV circuit breaker, the following observations are noted: p.f. of the fault is 0.4, the recovery voltage is 0.9 times the full line value, the breaking current is symmetrical and the frequency of oscillations of re-striking voltage is 16 kHz. Assume that the neutral is grounded and the fault does not involve ground. Determine the average rate of rise of re-striking voltage.

(A) 5.866 kV/μ sec

(B) 6.8566 kV/μ sec

(C) 8.566 kV/μ sec

(D) 5.686 kV/μ sec

49. Referring to the system shown in Figure 3, fault current is 2000 A and Relay 1 is set on 100% and Relay 2 is set on 125%. CT Ratio is 200/1. For discrimination, the tie grading margin between the relays is 0.5 sec. Determine the time of operation of two relays assuming that both the relays have the characteristic as shown in Figure 4 and the relay number 1 has a time multiplier setting = 0.2.

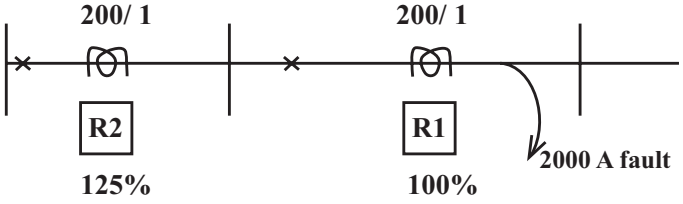


Figure 3

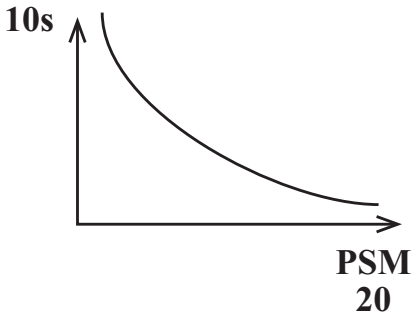


Figure 4

(A) 0.56 sec, 1.06 sec

(B) 1.06 sec, 0.56 sec

(C) 0.06 sec, 1.56 sec

(D) 1.56 sec, 0.06 sec

50. A short circuit to earth occurs near the terminals of phase A of a three-phase alternator, star connected with neutral point earthed. The current to earth is 1000 Amps. If the alternator does not supply any normal current, then calculate the positive, negative and zero sequence components of the currents of phase A.

(A) 333.3 $\angle 0°$ Amps, 333.3 $\angle 0°$ Amps and 333.3 $\angle 0°$ Amps

(B) 333.3 $\angle 0°$ Amps, 333.3 $\angle 120°$ Amps and 333.3 $\angle 30°$ Amps

(C) 333.3 $\angle 30°$ Amps, 333.3 $\angle 120°$ Amps and 333.3 $\angle 0°$ Amps

(D) 333.3 $\angle 60°$ Amps, 333.3 $\angle 0°$ Amps and 333.3 $\angle 30°$ Amps

51. The open loop transfer function of a unity feedback control system is $G(s) = \frac{1}{(s+2)^2}$. The closed loop transfer function will have poles at

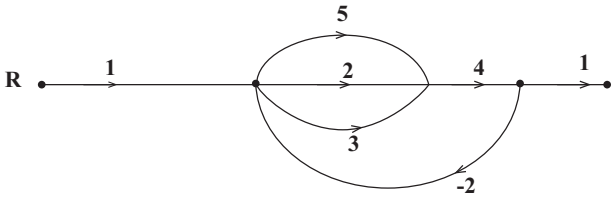
(A) –2, +2

(B) –2, –1

(C) –2, –2

(D) $-2 \pm j1$

52. For the signal flow graph shown below, which of the statement given are correct?



1. The number of loops are 2.

2. The number of loops are 3.

3. The number of forward paths are 3.

4. $\frac{C}{R}$ ratio is $\frac{40}{81}$.

5. $\frac{C}{R}$ ratio is $\frac{28}{81}$.

(A) 1, 3 and 4

(B) 2, 3 and 4

(C) 3 and 4

(D) 1, 2, 3 and 4

53. The impulse response of a system is e^{-3t} sin 2t. The transfer function of the system is

(A) $\frac{1}{s^2+6s+13}$

(B) $\frac{2}{s^2+6s+13}$

(C) $\frac{5}{s^2+6s+13}$

(D) $\frac{13}{s^2+6s+13}$

54. The open loop transfer function of a unity feedback system is $\frac{K}{s(s+4)}$. The value of gain K for a damping ratio of $\frac{1}{2}$ is

(A) 1

(B) 2

(C) 4

(D) 16

55. Steady state error in response to a unit step input for a unity feedback system with forward path transfer function $\frac{15}{s^2+12s+20}$ is

(A) 14%

(B) 28%

(C) 37%

(D) 57%

56. Which of the following statements are correct?

1. Routh – Hurwitz criterion is a necessary and sufficient condition for stability.

2. Relative stability is dictated by the location of roots of the characteristic equation.

3. A stable system is a dynamic system with a bounded input to a bounded output.

(A) 1 and 2

(B) 1 and 3

(C) 2 and 3

(D) 1, 2 and 3

57. What will be the gain margin in dB of a system having open loop transfer function, $G(s)\,H(s) = \frac{2}{s(s+1)}$

(A) 0

(B) $\frac{1}{2}$

(C) 2

(D) ∞

58. The transfer function of a linear control system is $G(s)\,H(s) = \frac{100\,(s+15)}{s(s+4)(s+10)}$. The value of gain in dB in its Bode plot corresponding to $\omega = 0.1$ rad/sec is

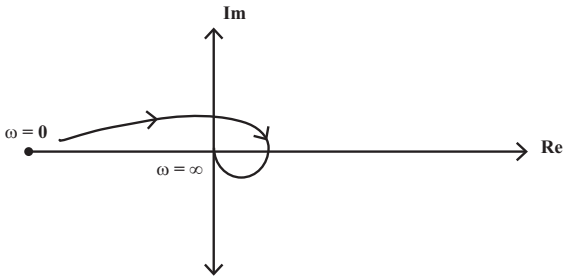
(A) 20 dB

(B) 40 dB

(C) 60 dB

(D) 80 dB

59. The Nyquist plot of a system is shown below



The open loop transfer function of this system will be

(A) $\frac{K}{(1+sT_1)(1+sT_2)(1+sT_3)}$

(B) $\frac{K}{s(1+sT_1)(1+sT_2)(1+sT_3)}$

(C) $\frac{K}{s^2(1+sT_1)(1+sT_2)}$

(D) $\frac{K}{s^2(1+sT_1)(1+sT_2)(1+sT_3)}$

60. A second order control system has $M(j\omega) = \frac{100}{100 - \omega^2 + 10\sqrt{2}\, j\omega}$. Its peak magnitude is

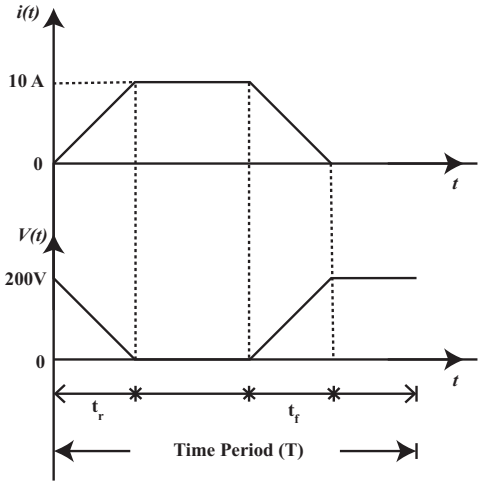
(A) 0.5

(B) 1

(C) $\sqrt{2}$

(D) 2

61. The voltage and current in a power electronics switch are given in the figure below. Determine the power loss in the switch during the rise time period of the switch. The switching frequency is 50 kHz, $t_r = 3\mu s$, and $t_f = 5\mu s$. (t_r = rise time, and t_f = fall time)



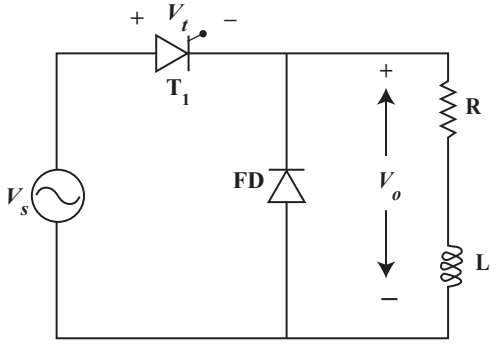
(A) 10 W

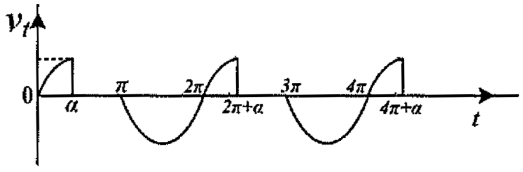
(B) 50 W

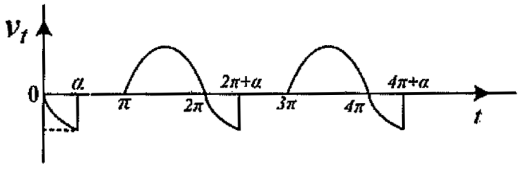
(C) 20 W

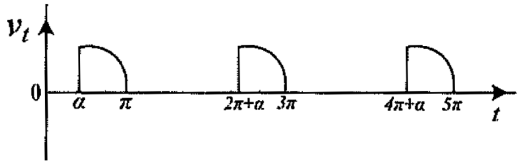
(D) 32 W

62. **Consider a single-phase half-wave rectifier with a free-wheeling diode feeding RL load shown in the figure. Identify the waveform of voltage across the thyristor.**



(A)


(B)


(C)


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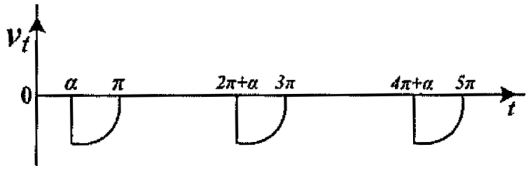
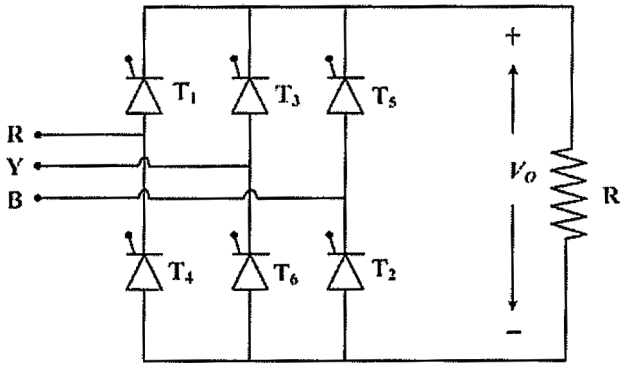


63. **A three-phase full wave bridge rectifier feeds a resistive load as shown in the figure. The input line voltage is 300 V, 50 Hz, AC supply. Calculate the average output voltage for a firing angle (α) of 90°.**



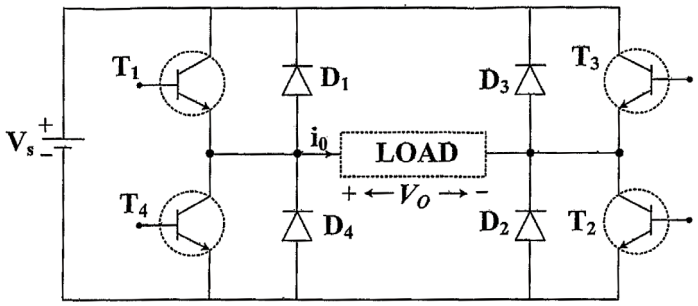
(A) $\frac{300\sqrt{2}}{\pi}(1+\frac{\sqrt{3}}{2})$V

(B) $\frac{600\sqrt{2}}{\pi}(1-\frac{\sqrt{3}}{2})$V

(C) $\frac{900\sqrt{2}}{\pi}(1-\frac{\sqrt{3}}{2})$V

(D) $\frac{600\sqrt{6}}{\pi}(1+\frac{\sqrt{3}}{2})$V

64. A single-phase square wave inverter shown in the figure below feeds an RL load. Identify the correct statement during the period when switches T_3 and T_4 are on, while T_1 and T_2 are off. The given polarity of load voltage and direction of load current in the figure shown below is considered as positive.



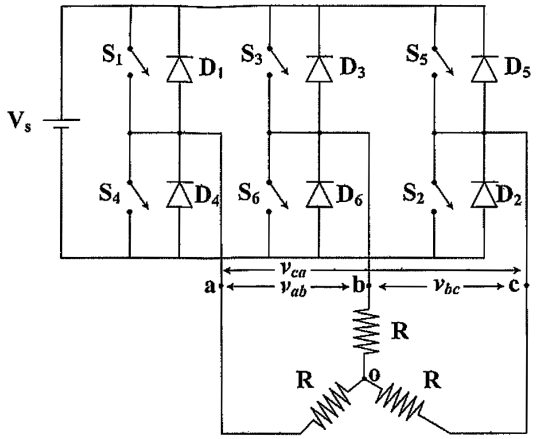
(A) The output voltage is equal to zero, the output current is positive, and the power flows through a freewheeling diode.

(B) The output voltage is equal to V_s, the output current is negative, and the power flows from load to source.

(C) The output voltage is equal to $-V_s$, the output current is negative, and the power flows from source to load.

(D) The output voltage is equal to zero, the output current is negative, and the power flows through a freewheeling diode.

65. Consider a three-phase inverter feeding a star-connected resistive load shown in the figure below operated in 180° conduction mode. The magnitude of phase voltages ν_{ao}, ν_{bo} and ν_{co}, when the switches S_1, S_2 and S_6 are in conduction while other switches are in off state.



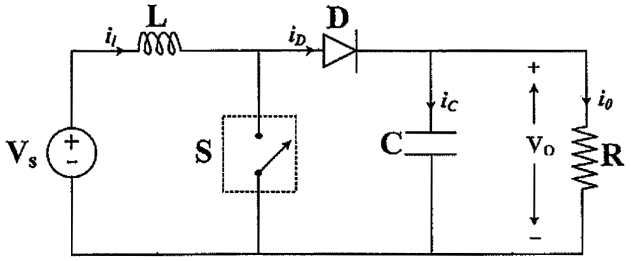
(A) $\nu_{ao} = \nu_{co} = V_s/3$, $\nu_{bo} = -2V_s/3$

(B) $\nu_{ao} = \nu_{bo} = V_s/3$, $\nu_{co} = -2V_s/3$

(C) $\nu_{ao} = \nu_{co} = -V_s/3$, $\nu_{bo} = V_s/3$

(D) $\nu_{ao} = 2V_s/3$, $\nu_{bo} = \nu_{co} = -V_s/3$

66. A boost converter connected to a resistive load (R = 10Ω) operates in continuous conduction mode. The duty ratio and switching frequency are 0.6 and 10 kHz respectively. Determine the value of the inductor under the condition $i_{l\,max} = 1.5\,(i_{l\,avg})$, where $i_{l\,max}$ is the maximum value of the inductor current and $i_{l\,avg}$ is the average value of inductor current.



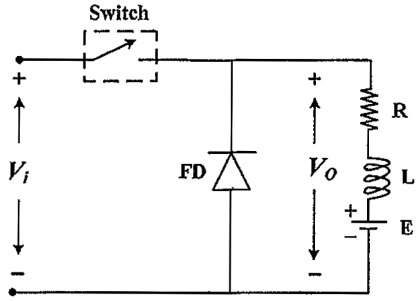
(A) 96 μH

(B) 32 μH

(C) 64 μH

(D) 72 μH

67. Consider class 'A' chopper (V_s = 100 V) feeding an RLE (R = 10 Ω, L = 10 μH, and E = 120 V) load. The load current is continuous throughout the operation. Find the duty cycle (α) of the chopper for which the average current through the controlled switch is maximum.



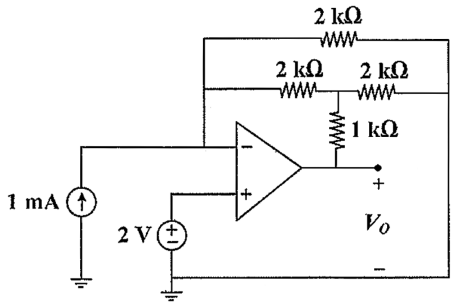
(A) 0.4

(B) 0.6

(C) 0.8

(D) 1.0

68. Calculate the value of V_0 for the operational amplifier shown below.



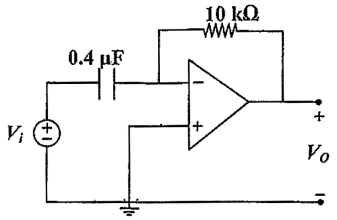
(A) 3 V

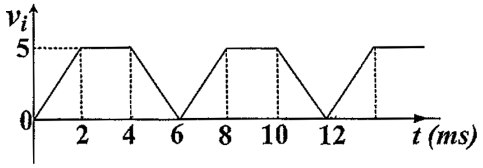
(B) 8 V

(C) 15 V

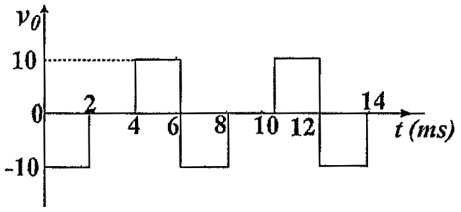
(D) 6 V

69. The input V_i to an operational amplifier shown below is given in the graph. Identify its output voltage.

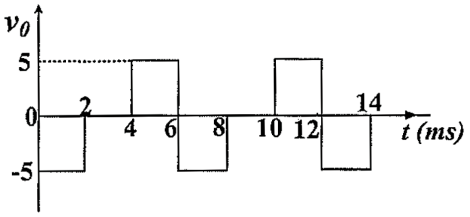




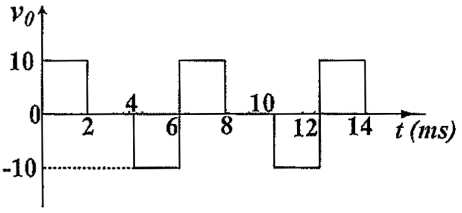
(A)



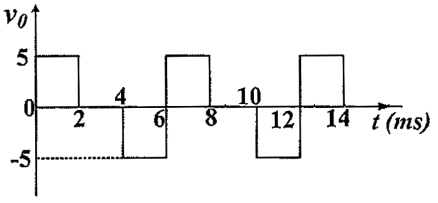
(B)



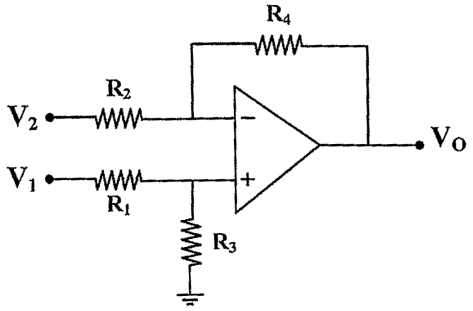
(C)



(D)



70. A differential amplifier has $V_1 = 0.85$ V, $V_2 = 0.55$ V and $V_0 = 300.7$ V. The common mode voltage gain of the amplifier is 1. What is the differential voltage gain (A_d) and common mode rejection ratio (CMRR) of the amplifier?



(A) $A_d = 100$ and CMRR = 20 dB

(B) $A_d = 10$ and CMRR = 20 dB

(C) $A_d = 1000$ and CMRR = 60 dB

(D) $A_d = 200$ and CMRR = 40 dB

71. The unknown resistance is R_x is measured using a Wheatstone bridge using the formula given below

$$R_x = \frac{R_2 R_3}{R_1}$$

The magnitude of resistance and the error in ohm is given as $R_1 = 10 \pm 0.5\ \Omega$, $R_2 = 20 \pm 0.2\ \Omega$ and $R_3 = 30 \pm 0.6\ \Omega$. The resulting error in R_x is

(A) $60 \pm 1.3\%$

(B) $60 \pm 8\%$

(C) $60 \pm 2\%$

(D) $60 \pm 2.17\%$

72. A PMMC voltmeter is connected across a series combination of a DC voltage source $V_1 = 5V$ and an AC voltage source $V_2(t) = 2 \sin (314t)V$. The meter reads

(A) $(5 + \sqrt{2})V$

(B) $\left(5 + \frac{4}{\pi}\right)V$

(C) 7V

(D) 5V

73. The deflection angle of the pointer of an ideal moving iron ammeter is 10° for 1.0 ampere DC current. If a current of 3 sin (314 t) amperes is passed through the ammeter, then the deflection angle is

(A) 0°

(B) 30°

(C) 45°

(D) 90°

74. Two voltmeters have the same range of 0 – 400 V and have sensitivity of 100 Ω/V and 150 Ω/V respectively. If they are connected in series and 600 V is applied across the series circuit, then voltmeter readings are

(A) 200 V and 400 V

(B) 240 V and 360 V

(C) 400 and 200 V

(D) Each meter shows zero volts

75. A moving iron ammeter produces a full-scale torque of 250 μN-m with a deflection of 125° at a current of 20 A. The rate of change of self-inductance (μH/rad) of the instrument at full scale is

(A) 2.0 μH/rad

(B) 1.25 μH/rad

(C) 2.50 μH/rad

(D) 14.6 μH/rad

76. The voltage expression $v(t) = E_1\sin(\omega t) + E_3\sin(3\omega t)V$ is applied to the pressure coil of a wattmeter and current expression of $i(t) = I_1\sin(\omega t - \varphi_1) + I_3\sin(3\omega t - \varphi_3) + I_5\sin(5\omega t - \varphi_5)$ is passed through current coil. The average power measured by the wattmeter is

(A) $0.5\ E_1I_1\cos(\varphi_1)$

(B) $0.5\ [E_1I_1\cos(\varphi_1) + E_1I_3\cos(\varphi_3)]$

(C) $0.5\ [E_1I_1\cos(\varphi_1) + E_3I_3\cos(\varphi_3)]$

(D) $0.5\ [E_1I_1\cos(\varphi_1) + E_1I_3\cos(\varphi_3) + E_1I_5\cos(\varphi_5)]$

77. Two wattmeter method is used for the measurement of power in a symmetrical three phase system and load. One of the wattmeters reads half of the other. What will be the power factor of the load if both are having positive readings?

(A) 0.532

(B) 0.632

(C) 0.707

(D) 0.866

78. A single phase energy meter disc makes 2208 revolutions for a constant load of 230 V, 4 A at unity power factor for 6 hours. What will be the energy consumption by the load if the meter disc completes 1240 revolutions?

(A) 2.5 kWh

(B) 2.8 kWh

(C) 3.5 kWh

(D) 3.1 kWh

79. A sinusoidal waveform has peak - peak amplitude of 5 cm viewed on a CRO screen. The vertical sensitivity is set to 4V/ cm. The RMS value of the signal is

(A) 7.07V

(B) 10.2V

(C) 14.14V

(D) 20V

80. The deflection sensitivity of a Cathode Ray Tube is

(A) Directly proportional to the deflection voltage

(B) Directly proportional to the square of the deflection voltage

(C) Inversely proportional to the deflection voltage

(D) Independent of the deflection voltage

81. The fundamental period of the signal 10 sin9t + 20 cos5t is

(A) 2π

(B) $\frac{2\pi}{45}$

(C) $\frac{2\pi}{3}$

(D) 3π

82. Which one of the following is unbounded signal?

(A) $\left(\frac{1}{2}\right)^t u(t)$

(B) $10e^{-5t}\,u(t)$

(C) $\frac{1}{t}u(t)$

(D) $5e^{-2t}\sin 2\pi t\, u(t)$

83. Input output relationship of a system is given by y(t) = cos x(t). The system is

(A) Linear, time invariant, unstable

(B) Nonlinear, time variant, stable

(C) Linear, time invariant, unstable

(D) Nonlinear, time invariant, stable

84. Which one of the following is non causal system?

(A) y (t) = x (sin t)

(B) y (t) = 10 x(t) + 20

(C) $y(t) = 5\frac{d\,x(t)}{dt}$

(D) y (t) = sin (t + 1) x(t)

85. The energy and average power of sequence $x(n) = \left(\frac{1}{3}\right)^n u(n)$ are _____ respectively

(A) $\frac{9}{8}, 0$ (B) $\frac{9}{8}, \infty$

(C) $\infty, \frac{3}{2}$ (D) ∞, ∞

86. A signal $x(t) = 10 \sin (150\pi t - 30)$ is sampled at 200 Hz. The fundamental period of the sampled sequence x(n) is

(A) 4 (B) $\frac{1}{200}$

(C) 8 (D) $\frac{1}{100}$

87. A discrete system is given as $y(n) = [x(n) + 5]^n$, then the system is

(A) Memoryless, Causal system

(B) Memoryless, Stable, Time invariant system

(C) Stable, Linear, Time invariant system

(D) Linear, Time invariant Causal system

88. The impulse response h[n] of a linear time-invariant system is given by

$h[n] = u[n+2]+u[n-3]-2u[n-8]$, where u[n] is the unit step response.

The given system is

(A) Stable but not causal

(B) Stable and causal

(C) Causal but unstable

(D) Unstable and not causal

89. The fundamental period of the sequence $x(n) = 8 \cos (0.1 \pi n) + 5 \sin (0.9 \pi n) - \cos (0.8 \pi n)$ is

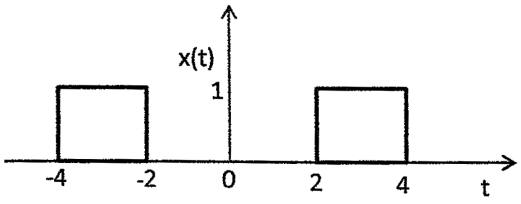
(A) 80

(B) 10

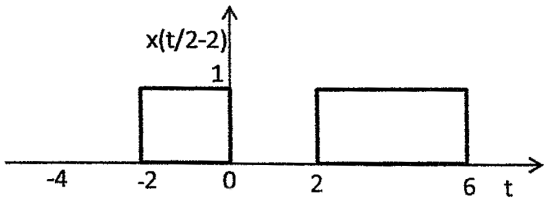
(C) 40

(D) 20

90. Signal x(t) is shown below. Find $x\left(\frac{t}{2}-2\right)$.



(A)



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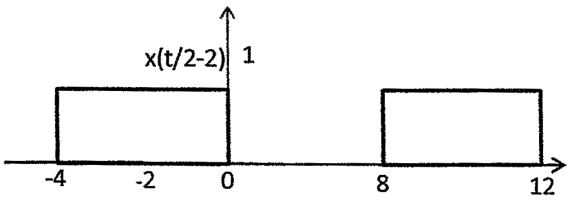
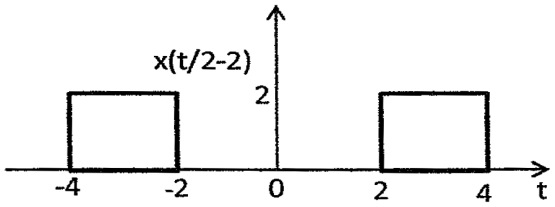
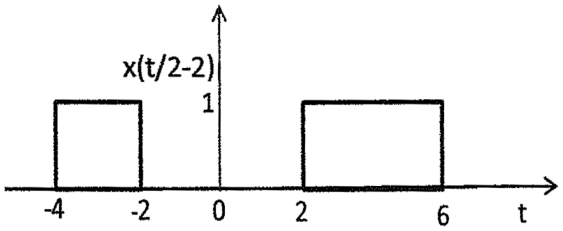


(C)



(D)



91. The LVDT has

(A) Movable primary winding

(B) Movable secondary winding

(C) Fixed core

(D) Movable core

92. The sensitivity of an LVDT is 10V/μm. What is the RMS value of output voltage for displacement of 0.5 μm?

(A) 5.0V

(B) 20V

(C) 2.5V

(D) 5.0V

93. Which instrument is used to measure the specific gravity of battery electrolyte?

(A) Hygrometer

(B) Hydrometer

(C) Barometer

(D) Anemometer

94. The maximum continuous discharge current of a 20Ah, LFP battery with a C rating of 2C is

(A) 40A for 1 hour

(B) 40A for 2 hours

(C) 40A for 0.5 hours

(D) 40A for 2 hours

95. Four 2.5V cell each having internal resistance 5Ω are connected in series. A 20 Ω resistance is connected to this battery. The current through the resistance is

(A) 0.75A

(B) 0.5A

(C) 1A

(D) 0.25A

96. As per the recommendation of ISI, the maximum load that can be connected in one subcircuit is

(A) 800 watts

(B) 1000 watts

(C) 1600 watts

(D) 500 watts

97. What is the minimum required length of pipe in a pipe electrode earthing system?

(A) 5.0m

(B) 1.5m

(C) 2.0m

(D) 2.5.0m

98. What is the average intensity of illumination on a surface located 8 m from a 500 – candela power lamp when the surface is inclined at an angle of 30 degrees to the rays?

(A) 2.9 lux

(B) 7.8 lux

(C) 3.9 lux

(D) 4.0 lux

99. What is the mean spherical candlepower of a lamp that emits 20000 lumens?

(A) 5000π

(B) 5000/π

(C) 10000/π

(D) 10000π

100. Which of the following is a discharge lamp?

(A) Sodium vapour lamp

(B) Incandescent lamps

(C) LED lamps

(D) Halogen lamps

A

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

A

SPACE FOR ROUGH WORK