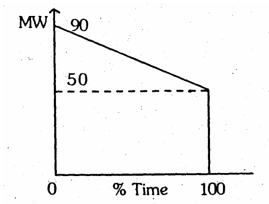
ELECTRONICAL ENGINEERING

PAPER-II

1.


The load duration curve for a power station is as shown in the above figure. The reserve capacity in the plant at 70% capacity factor is

a. Zero
b. 10 MW
c. 30 MW
d. 50 MW

2. In pump storage hydropower plant, the electrical machine is made to work alternately as generator and motor. The efficiency of the generator working at the same electrical power Level is

a. Greater than that as motor
b. Equal to that as motor
c. Less than that as motor
d. Greater or less than that as motor depending on the type of the machine

3. The ABCD constants of a 3-phase transmission line are

A = D = 0.8 $\angle 1°$

B = 170 $\angle 85°\Omega$

C = 0.002 $\angle 90.4°$mho

The sending end voltage is 400 kV. The receiving end voltage under no-load condition is

a. 400 kV
b. 500 kV
c. 320 kV
d. 417 kV

4. In a thermal nuclear reactor

1. The purpose of moderator is to slow dawn fast neutrons produced due to fission
2. The moderator material must have low molecular weight
3. Ordinary water can be used as moderator with natural uranium as fuel
4. The multiplication factor is kept slightly greater than unity during its normal functioning

Of these statements

a. 1 and 3 are correct
b. 3 and 4 are correct
c. 1, 2 and 3 are correct
d. 1, 2 and 4 are correct

5. If a 250 MVA, 11/400 kV three-phase power transformer has leakage reactance of 0.05 per unit on the base of 250 MVA and the primary voltage of 11 kV, then the actual leakage reactance of the transformer referred to the secondary side of 400 kV is

a. 0.8 Ω
b. 0.0032Ω
c. 0.03125Ω
d. 32.0Ω

6. In a short transmission line, voltage regulation is zero when the power factor angle of the load at the receiving end side is equal to

a. $\tan^{-1}(X/R)$
b. $\tan^{-1}(R/X)$
c. $\tan^{-1}(X/Z)$
d. $\tan^{-1}(R/Z)$

7. Consider the following statements:

Surge impedance loading of a transmission line can be increased by

1. Increasing its voltage level
2. Addition of lumped inductance in parallel
3. Addition of lumped capacitance in series
4. Reducing the length of the line

Of these statements

a. 1 and 3 are correct
b. 1 and 4 are correct
c. 2 and 4 are correct
d. 3 and 4 are correct

8. The load current in short circuit calculation are neglected because
   1. Short-circuit currents are much larger than load, currents
   2. Short circuit currents are greatly out of phase with load currents

   Which of these statement(s) is/are correct?
   a. Neither 1 nor 2
   b. 2 alone
   c. 1 alone
   d. 1 and 2

9. The surge impedance ‘of a 3-phase, 400 kV transmission line is 400Ω . The surge impedance loading (SIL) is
   a. 400MW
   b. 100MW
   c. 1600MW
   d. 200MW

10. Two 50 Hz generating units operate in parallel within the same power plant and have the following ratings

    Unit 1 : 500 MVA, 0.85 power factor, 20 kV, 3000 rpm,
    H_1=5MJ/MVA

    Unit 2 : 200 MVA, 0.9 power factor, 20 kV, 1500 rpm, H_2 = 5 MJ/MVA.

    The equivalent inertia constant H in MJ/MVA on 100 MVA base is
    a. 2.5
    b. 5.0
    c. 10.0
    d. 35.0

11. If a traveling-wave traveling along a loss-free overhead line does not result in any reflection after it has reached the far end, then the far end of the line is
    a. Open circuited
    b. Short circuited
    c. Terminated into a resistance equal to surge impedance of the line
    d. Terminated into a capacitor

12. The active and the reactive power delivered at the receiving end of a short transmission line of impedance $Z\angle\Psi$ are respectively given by

    $$P_R = \frac{V_S V_R}{Z}\cos(\Psi - \delta) - \frac{V_R^2}{Z}\cos\Psi \text{ , and}$$

    $$Q_R = \frac{V_S V_R}{Z}\sin(\Psi - \delta) - \frac{V_R^2}{Z}\sin\Psi \text{ , with}$$

    V_s and V_R being the magnitude of voltage at the sending and receiving ends, δ the power-angle. At the power-limit condition i.e. for maximum P_R
    a. Leading VARs (Q_R) goes to the load for any values of V_S and V_R
    b. Leading VARs (Q_R) goes to the load ONLY for V_S=V_R
    c. Lagging VARs (Q_R) goes to the load for any values of V_S and V_R
    d. Lagging VARs (Q_R) goes to the load ONLY for V_S = V_R

13. A traveling wave 400/1/50 means crest value of
    a. 400 V with rise time of 1/50 s
    b. 400 kV with rise time 1 s and fall time 50 S
    c. 400 kV with rise time 1 μs with fall time 50μs
    d. 400 MV with rise time 1μs and fall time 50μs

14. If a 500 MVA, 11 kV three-phase generator at 50 Hz feeds, through a transfer impedance of (0.0 + J 0.605)Ω per phase, an infinite bus also at 11 kV; then the maximum steady state power transfer on the base of 500 MVA and 11 kV is
    a. 1.0 Pu
    b. 0.8 Pu
    c. 0.5 Pu
    d. 0.4 Pu

15. Installation of capacitors at suitable locations and of optimum size in a distribution system results in
    1. Improved voltage regulation.
    2. Reduction in distribution power losses.
    3. Reduction of kVA rating of distribution transformers

    Select the correct answer using the codes given below:
    a. 1 alone
    b. 1 and 2
    c. 1,2 and 3
    d. 3 alone

16. In a three unit insulator string, voltage across the lowest unit is 17.5 kV and string efficiency is 8428%. The total voltage across the string will be equal to
    a. 8.825 kV
    b. 44.25 kV
    c. 88.25 kV
    d. 442.5 kV

17. Bundled conductors are used for EHV transmission lines primarily for reducing the
   a. Corona loss
   b. Surge impedance of the line
   c. Voltage drop across the line
   d. I^2R losses

18. The good effect of corona on overhead lines is to
   a. Increase the line carrying capacity due to conducting ionized air envelop around the conductor
   b. Increase the power factor due to corona loss
   c. Reduce the radio interference from the conductor
   d. Reduce the steepness of surge fronts

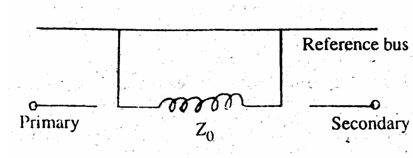
19. The principal information obtained from load flow studies in a power system are.
   1. Magnitude and phase angle of the voltage at each bus
   2. Reactive and real power flows in each of the lines
   3. Total power loss in the network
   4. Transient stability limit of the system

   Select the correct answer using the codes given below:
   a. 1 and 2
   b. 3 and 4
   c. 1, 2 and 3
   d. 2 and 4

20. Three generators rated 100 MVA, 11 kV have an impedance of 0.15 Pu each. If in the same plant, these generators are being replaced by a single equivalent generator, the effective impedance of equivalent generator will be
   a. 0.05 pu
   b. 0.15 pu
   c. 0.25 Pu
   d. 0.45 Pu

21. If all the sequence voltages at the fault point in a power system are equal, then the fault is a
   a. Three-phase fault
   b. Line to ground fault
   c. Line to line fault
   d. Double line to ground fault

22.



A three-phase transformer having zero-sequence impedance of Z_0 has the zero-sequence network as shown in the above figure. The connections of its windings are
   a. star — star
   b. delta — delta
   c. star – delta
   d. delta — star with neutral grounded

23. Which one of the following relays has the capability of anticipating the possible major fault in a transformer?
   a. Over current relay
   b. Differential relay
   c. Buchholz relay
   d. Over fluxing relay

24. In a 220 kV system, the inductance and capacitance up to the circuit breaker location are 25mH and 0.025μF respectively. The value of resistor required to be. connected across the breaker contacts which will give no transient oscillations, is
   a. 25 Ω
   b. 250Ω
   c. 500Ω
   d. 1000Ω

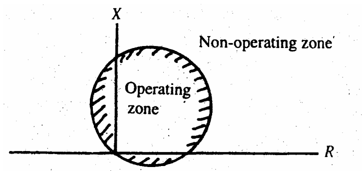
25. Match List I with List II and select the correct answer:

   List I (Equipments)
   A. Metal oxide arrester
   B. Isolator.
   C. Auto-reclosing C.B
   D. Differential relay

   List II (Applications)
   1. Protects generator against short circuit faults
   2. Improves transient stability
   3. Allows C.B. maintenance
   4. Provides protection against surges

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

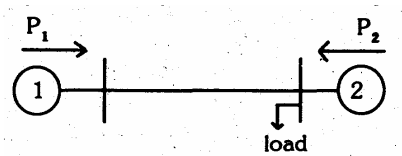
26.



The operating characteristic of a distance relay in the R-X plane is shown in the above figure. It represents operating characteristic of a

a. Reactance relay
b. Directional impedance relay
c. Impedance relay
d. Mho relay

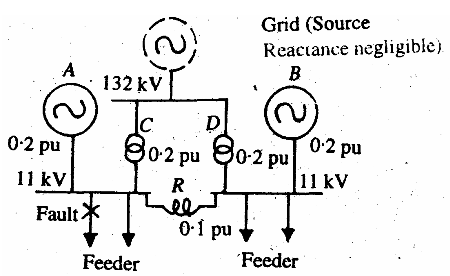
27.



Two power plants interconnected by a tie-line as shown in the above figure have loss formula coefficient $B_{11} = 10^{-3}\ MW^{-1}$. Power is being dispatched economically with plant '1' as 100 MW and plant '2' as 125 MW The penalty factors for plants 1 and 2 are respectively

a. 1 and 1.25
b. 1.25 and 1
c. 1 and zero
d. Zero and 1

28.



The above diagram shows the layout of a power station having two generators A and B, connected to the 11 kV buses which are also fed through two transformers C and D from a 132 kV grid. The 11 kV buses are interconnected through a reactor R.

The reactance's of A, B, C, D and R are, in p.u. on a common MVA- and kV-base. All the generated voltages in A, B and grid are each 1.0 p.u. and assumed as in phase at the time of fault.

The steady state symmetrical fault-current for a 3-phase fault on the 11 kV feeders is

a. 10 p.u.
b. 15 p.u.
c. 20 p.u.
d. 25 p.u.

29. The speed regulation parameter R of a control area is 0.025 Hz/MW and load frequency constant D is 2 MW/Hz. The area frequency response characteristic (AFRC) is,

a. 42.0 MW/Hz
b. 40.0 MW/Hz
c. 20 M/Hz
d. 2 MW/Hz

30. In the HVDC system, the ac harmonics which gets effectively eliminated with 12 pulse bridge converters, are

a. Triplen harmonics
b. Triplen and 5^{th} harmonics
c. Triplen, 5^{th} and 7^{th} harmonics
d. 5^{th} and 7^{th} harmonics

31. In an electromechanical energy conversion device, the developed torque depends upon

a. Stator field strength and torque angle
b. Stator field and rotor field strengths
c. Stator field and rotor field strengths and the torque angle
d. Stator field strength only

32. Consider the following statements:

The use o. inter poles in dc machines is to counteract the

1. Reactance voltage
2. Demagnetizing effect of armature mmf in the commutating zone
3. Cross-magnetizing effect of armature mmf in the commutating zone

Which of these statement (s) is/are correct?

a. 1 and 2
b. 2 and 3
c. 1 and 3
d. 3 alone

33. In an alternator, if m is the number of slots per pole per phase and γ is the slot pitch angle, then the breadth or the distribution factor for the armature winding is

a. $\dfrac{\sin\frac{\gamma}{2}}{m\sin\frac{m\gamma}{2}}$

b. $\sin\left(\dfrac{m\gamma}{2}\right)$

c. $\dfrac{m\sin\dfrac{\gamma}{2}}{\sin\dfrac{m\gamma}{2}}$

d. $\dfrac{\sin\left(\dfrac{m\gamma}{2}\right)}{\sin\left(\dfrac{\gamma}{2}\right)}$

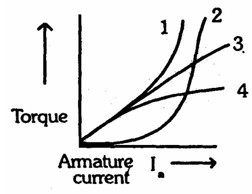
34. The current drawn by a 220V dc motor of armature resistance 0.5Ω and back emf 200V is
a. 40A
b. 44A
c. 400A
d. 440A

35. Match List I (Type of machine) with List II (Characteristic/application) and select the correct answer:
List I
A. dc shunt generator
B. dc series motor
C. Level compounded dc generator
D. dc series generator
List II
1. Electric tr4action
2. Has good voltage regulation
3. Must have residual flux
4. Used as boosters

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

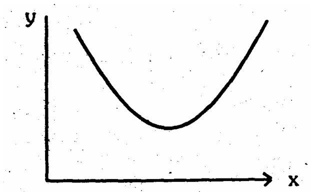
36. A dc shunt generator when driven without connecting field winding shows an open circuit terminal voltage of 12V.
When field winding is connected and excited the terminal voltage drops to zero because
a. Field resistance is higher than critical resistance
b. There is no residual magnetism in the field. Circuit
c. Field winding has got wrongly connected
d. There is a fault in armature circuit

37. Match List I (dc motors) with List II (Characteristics labeled 1, 2, 3 and 4) and select the correct answer:
List I
A. Shunt motor
B. Series motor
C. Cumulative compound motor
D. Differential compound motor
List II



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

38.



In the 'V' curve shown in the above figure for a synchronous motor, the parameter of x and y coordinates are, respectively
a. Armature current and field current
b. Power factor and field current
c. Armature current and torque
d. Torque and field current

39. The advantage of the double squirrel-cage induction motor over single cage rotor is that its
a. Efficiency is higher
b. Power factor is higher
c. Slip is larger
d. Starting current is lower

40. An induction motor when started on load does not accelerate up to full speed but runs at 1/7t) of the rated speed. The motor is said to be
a. Locking
b. Pluming
c. Crawling
d. Cogging

41. Match List I (Equivalent circuit parameter) with List II (Values) for a 50 MVA three phase alternator arid select the correct answer:
List I
A. Armature resistance
B. Synchronous reactance
C. Leakage reactance
List II

1. 1 Pu
2. 0.1 Pu
3. 0.01 pu

	A	B	C
a.	1	2	3
b.	3	1	2
c.	3	2	1
d.	1	3	2

42. Synchronous condenser means
a. A synchronous motor with capacitor connected across stator terminals to improve pf
b. A synchronous motor operating at full load with leading pf
c. An over-excited synchronous motor partially supplying mechanical load, and also improving. Pf of the system to which it is connected
d. An over-excited synchronous motor operating at no-load with leading pf used in large power stations for improvement of pf

43. Match List I with List II aid select the correct answer:

List I (Tests)
A. No-load and blocked rotor test
B. Sumpner's test
C. Swinburne's test

List II (Machines)
1. Transformer
2. Induction motor
3. Synchronous motor
4. dc motor

	A	B	C
a.	1	4	2
b.	2	1	4
c.	3	4	2
d.	3	1	4

44. Match List 1 with List II and select the correct answer:

List I (Regulation method)
A. Synchronous impedance method
B. Mmf method
C. Zero power factor (ZPF) method
D. American standard Association method

List II (Relevant phasor)
1. emf phasor
2. Predominantly mmf phasor
3. Both emf and mmf phasors
4. emf and mmf phasors including saturation

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

45. In a cylindrical rotor synchronous machine, the phasor addition of stator and rotor mmfs is possib1 because
a. Two mmfs are rotating in opposite direction
b. Two mmfs are rotating in same direction at different speeds
c. Two mmfs are stationary with respect to each other
d. One mmf is stationary and the other mmf is rotating

46. The rotor power output of 3-phase induction motor is 15 kW The rotor copper losses at a s1p of 4% will be
a. 600W
b. 625W
c. 650W
d. 700W

47. Skewing of the rotor in a three-phase squirrel-cage induction motor reduces
a. Noise, parasitic torque, starting torque and pullout torque
b. Noise and parasitic torque, but increases starting torque and pullout torque.
c. Noise and pullout torque, but increases parasitic torque and starting torque
d. Noise, parasitic torque and starting torque, but increases pullout torque

48. In a shaded-pole induction motor, the rotor runs from the
a. Shaded portion to the unshaded portion of the pole while the flux in the former leads that of the latter
b. Shaded portion to the unshaded portion of the pole while the flux in the former lags that in the latter
c. Unshaded portion to the shaded portion while the flux in the former leads that in the latter
d. Unshaded portion to the shaded portion while the flux in the former lags that in the latter

49. The torque of a reluctance motor can be effectively increased by
a. Increasing reluctance of the magnetic circuit along the direct axis

b. Decreasing the reluctance of the magnetic circuit along the quadrature axis
c. Increasing the ratio of the quadrature axis reluctance to direct axis reluctance
d. Decreasing the ratio of quadrature axis reluctance to direct axis reluctance

50. The starting current of a 3ϕ induction motor is 5 times the rated current, while the rated slip is 4%. The ratio of starting torque to full-load torque is
a. 0.6
b. 0.8
c. 1.0
d. 1.2

51. A single-phase transformer when supplied from 220 V, 50 Hz has eddy current loss of 50 W. If the transformer is connected to a voltage of 330V, 50 Hz, the eddy current loss will be
a. 168.75 W
b. 112.5 W
c. 75W
d. 50W

52. In case of auto-transformers, which of the following statements are correct?
1. An auto-transformer requires less copper as compared to a conventional, 2-winding transformer of the same capacity.
2. An auto-transformer provides isolation between the primary and secondary windings.
3. An auto-transformer has less leakage reactance as compared to the conventional, 2-winding transformer of the same capacity.

Select the correct answer using .the codes given below:
a. 1, 2 and 3
b. 1 and 2
c. 1 and 3
d. 2 and 3

53. If P_c and P_{sc} represent core and full-load ohmic losses respectively, the maximum kVA delivered to load corresponding to maximum efficiency is equal to rated kVA multiplied by
a. P_c / P_{sc}
b. $\sqrt{P_c / P_{sc}}$
c. $\left(P_c / P_{sc}\right)^2$
d. $\left(P_{sc} / P_c\right)^2$

54. For a given amount of kinetic energy to be released by the flywheel of ward-Leonard-Ilgner control system at a given percentage reduction in speed, the mass of the flywheel would depend upon its radius of gyration r_g and its initial peripheral speed U_{p1}
a. Directly proportional to both r_g^2 and U_{p1}^2
b. Directly proportional to r_g^2, but inversely to U_{P1}^2
c. Inversely proportional to r_g^2, but directly to U_{P1}^2
d. Inversely proportional to both r_g^2 and U_{P1}^2

55. Match list I with list II and select the correct answer:

List I (Motors)
A. Dc series motor
B. Squirrel-cage induction motor
C. dc shunt motor

List II (Applications)
1. Shearing and pressing
2. Haulage and hoisting
3. Rolling mill

	A	B	C
a.	1	2	3
b.	2	3	1
c.	3	1	2
d.	3	2	1

56. Match List 1 (1–ϕ Rectifier topology – feeding resistive Load) with List II (Average output voltage) and select the correct answer: (α is the firing angle)
A. Uncontrolled - half wave
B. Controlled - half wave
C. Controlled - full wave
D. Semi-controlled full wave

List II
1. $V_{peak} / \pi\left(1+\cos\alpha\right)$
2. $2V_{peak} / \pi\cos\alpha$
3. V_{peak} / π
4. $V_{peak} / 2\pi\left(1+\cos\alpha\right)$

	A	B	C	D
a.	3	2	4	1

b. 1 4 2 3
c. 3 4 2 1
d. 1 2 4 3

57. Switched reluctance motor means
a. Salient pole synchronous motor without excitation winding
b. A stepper motor with salient poles
c. Synchronous motor with salient poles on stator and rotor
d. A steeper motor with closed loop control and with rotor position sensor

58. **Assertion (A):** In avalanche breakdown, the reverse current sharply increases with voltage due to a field emission.
Reason (R): The field, emission requires highly doped *p* and *n* regions.
a. Both A and R are hue and R is the correct explanation of A
b. Both A and R are true but R is NOT the correct explanation of A
c. A is true but R is false
d. A is false but R is true

59. **Assertion (A):** In small signal class 'A' amplifier, the output is a magnified replica of the input without any change in frequency.
Reason (R): The dc operating point is fixed in class 'A' position.
a. Both A and R are hue and R is the correct explanation of A
b. Both A and R are true but R is NOT the correct explanation of A
c. A is true but R is false
d. A is false but R is true

60. **Assertion (A):** D-latch and edge-triggered D-flip flop (FF are functionally different.
Reason (R): In D-latch the output (O) can change while enable (EN) is high. In D-FF the output can change only on the active edge of CLK.
a. Both A and R are hue and R is the correct explanation of A
b. Both A and R are true but R is NOT the correct explanation of A
c. A is true but R is false
d. A is false but R is true

61. **Assertion (A):** D-flip flops are used to construct a buffer register.
Reason (R): Buffer registers are used to store a binary word temporarily.
a. Both A and R are hue and R is the correct explanation of A
b. Both A and R are true but R is NOT the correct explanation of A
c. A is true but R is false
d. A is false but R is true

62. **Assertion (A):** Linear AM detector applied with two amplitude-modulated waves simultaneously, one being very weak with respect to the other, detects only the strong signal.
Reason (R): Detector selectivity is increased in the presence of strong signal.
a. Both A and R are hue and R is the correct explanation of A
b. Both A and R are true but R is NOT the correct explanation of A
c. A is true but R is false
d. A is false but R is true

63. **Assertion (A):** Coherent FSK system is preferred over non-coherent FSK.
Reason (R): Coherent FSK requires less power than non-coherent FSK.
a. Both A and R are hue and R is the correct explanation of A
b. Both A and R are true but R is NOT the correct explanation of A
c. A is true but R is false
d. A is false but R is true

64. **Assertion (A):** High frequency power supplies are lightweight.
Reason (R): Transformer size get reduced at high frequency.
a. Both A and R are hue and R is the correct explanation of A
b. Both A and R are true but R is NOT the correct explanation of A
c. A is true but R is false
d. A is false but R is true

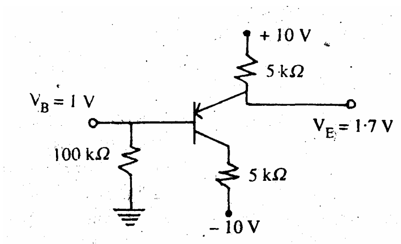
65. A speciment of intrinsic germanium with the density of charge carries of 2.5 $\times 10^{13}/cm^3$, is doped with donor impurity atoms such that there is one donor impurity atom for ever 10^6 germanium atoms. The density of germanium atoms is $4.4\times10^{22}/cm^3$. The hole density would be
a. $4.4\times10^{16}/cm^3$
b. $1.4\times10^{10}/cm^3$
c. $4.4\times10^{10}/cm^3$
d. $1.4\times10^{16}/cm^3$

66. In a forward biased photo diode, an increase in incident light intensity causes' the diode current to

a. Increase
b. Remain constant
c. Decrease
d. Remain constant while the voltage drop across the diode increases

67. If for intrinsic Silcon at 27°C, the charge concentration and mobilities of free-electrons and holes are 1.5×10^{16} per m^3, $0.13 m^2/(Vs)$ and $0.05\ m^2/(Vs)$ respectively, its conductivity will be
a. $2.4\times10^{-3}\ (\Omega\text{-m})^{-1}$
b. $3.15\times10^{-3}\ (\Omega\text{-m})^{-1}$
c. $5\times10^{-4}\ (\Omega\text{-m})^{-1}$
d. $4.32\times10^{-4}\ (\Omega\text{-m})^{-1}$

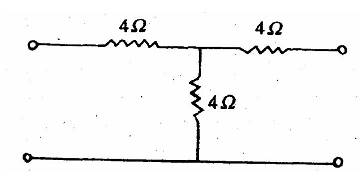
68.



A circuit using the .BJT is shown in the above figure, the value of β is
a. 120
b. 150
c. 165
d. 166

69. Bridge rectifiers are preferred because
a. They require small transformer
b. They have less peak inverse voltage
c. They need small transformer and also have less peak inverse voltage
d. They have low ripple factor

70.



For the circuit shown in the above figure h_{11}, h_{12}, h_{21} and h_{22} are respectively
a. – 0.5, 0.5, 0.125 and 6
b. 6, 0.5, – 0.5 and 0.125
c. 0.5, – 0.5, 6 and 0.125
d. 0.125, 6, 0.5 and – 0.5

71. In an RC coupled amplifier, the gain decreases in the frequency response due to the
a. Coupling capacitor at low frequency and bypass capacitor at high frequency
b. Coupling capacitor at high frequency arid bypass capacitor at low frequency
c. Coupling junction capacitance at low frequency and coupling capacitor at high frequency
d. Device junction capacitor at high frequency and coupling capacitor at low frequency

72. The Darlington pair has a current gain of approximately β^2, the voltage gain A_V, the input resistance R_i and the output resistance R_0. when the Darlington pair is used in the emitter follower configuration, A_V, R_i and R_0 are respectively
a. Very large, very large and very small
b. Unity, very large and very small
c. Unity, very small and very large
d. Very large, very small and very large

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

List I
A. h_{ie}
B. h_{fe}
C. h_{re}
D. h_{oe}

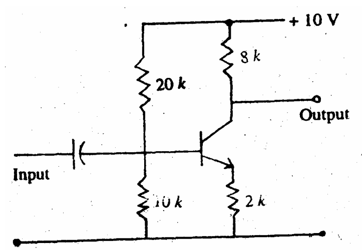
List II (Units/delimitations)
1. Current transfer ratio
2. Ohms
3. Siemens
4. Voltage transfer ratio

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

74. An amplifier having an output resistance of 4 Ω gives an open circuit output voltage of 6 V (rms). The maximum power that it can deliver to a load is
a. 1.5 W
b. 2.25 W
c. 2.4 W
d. 9 W

75. Active load is used in the collector of the differential amplifier of an op-amp to
a. Increase the output resistance
b. Increase the differential gain A_d
c. Increase maximum peak to peak output voltage
d. Eliminate load resistance from the circuit

76.



For the circuit shown in the above figure, β=100 for the transistor, the transistor will be in

a. Cut off region
b. Inverse active region
c. Active region
d. Saturation region

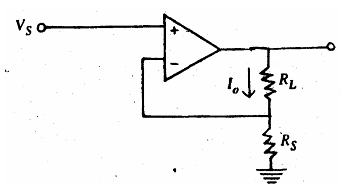
77. "Slope overload" occurs in delta modulation when the

a. Frequency of the clock pulses is too low
b. Rate of change of analog waveform is too large
c. Step size is too small
d. Analog signal varies very slowly with time

78. The slew rate of an op-amp is 0.5V/micro sec. The maximum frequency of a sinusoidal input of 2 V rms that can be handled without excessive distortion is

a. 3kHz
b. 30kHz
c. 200kHz
d. 2MHz

79.



An op-amp is used in the circuit as shown in the above figure. Current I_0 is

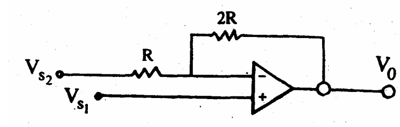
a. $V_s \times \dfrac{R_L}{R_s\left(R_L + R_s\right)}$

b. V_s / R_s

c. V_s / R_L

d. $V_s\left(\dfrac{1}{R_s} + \dfrac{1}{R_L}\right)$

80.



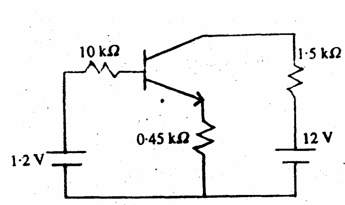
A circuit with op-amp .is shown in the above figure. The voltage V_0 is

a. $3Vs_1 - 6Vs_2$
b. $2Vs_1 - 3Vs_2$
c. $2Vs_1 - 2Vs_2$
d. $3Vs_1 - 2Vs_2$

81. A sinusoidal waveform can be converted to a square waveform by using a

a. Two stage transistorized ovel7driven amplifier
b. Two stage diode detector circuit
c. Voltage comparator based on op-amp
d. Regenerative voltage comparator circuit

82.



For the circuit shown in the above figure, by assuming β=200 and V_{BE} = 0.7V, the best approximation for the collector current I_c in the active region is

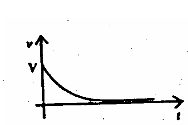
a. 1 mA
b. 2.4 mA
c. 3 mA
d. 9.6 mA

83. High power efficiency of the push-pull amplifier is due to the face that

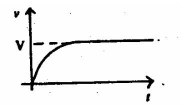
a. Each transistor conducts on different cycle of the input
b. Transistors are placed in CE configuration
c. There is no quiescent collector current
d. Low forward biasing voltage is required

84. Which one of the following is the output of the high pass filter to a step input?

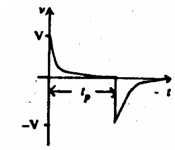
a.



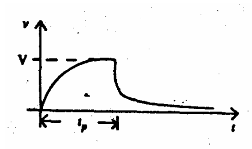
b.



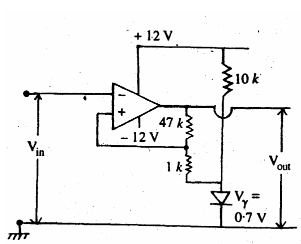
c.



d.



85.



The Schmitt trigger circuit is shown in the above figure. If $V_{sat} = \pm 10$ V, the tripping point for the increasing input voltage will be

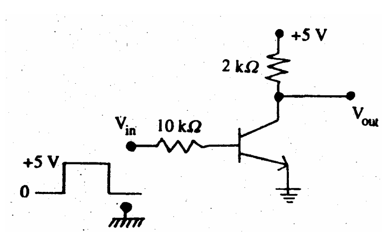
a. 1 V
b. 0.893 V
c. 0.477V
d. 0.416V

86. In Boolean Algebra,

If $F = (A+B)(\overline{A}\quad C)$, then

a. $F = AB + \overline{A}C$
b. $F = AB + \overline{AB}$
c. $F = AC + \overline{A}B$
d. $F = AA + \overline{A}B$

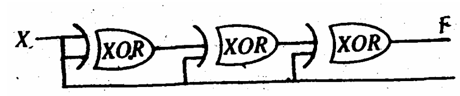
87.



A switch circuit using the transistor is shown in the above figure. Assume $h_{FE(min)} = 20$ and $f_\tau = 100$MHz. The most dominant speed limitation is brought by

a. Rise time
b. Fall time
c. Storage time
d. Delay time

88.



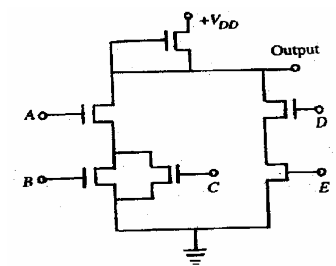
For the circuit shown in the above figure, the output F will be

a. 1
b. X
c. Zero
d. $\overline{X}$

89. In the CMOS inverter, the power dissipation is

a. Low only when V_{EN} is low
b. Low only when V_{EN} is high
c. High during dynamic operation
d. Low during dynamic operation

90.



An NMOS circuit is shown in the above figure. The logic function for the output (o/p) is

a. $\left(\overline{A+B}\right).C+\overline{D}.\overline{E}$
b. $\left(AB+\overline{C}\right).\left(\overline{D}+E\right)$
c. $\overline{A.\left(B+C\right).D.E}$
d. $\overline{ABCDE}$

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

List I (Type of gates)

A. ECL
B. TTL
C. CMOS
D. NMOS

List II (Values of propagation delay)

1. 5ns
2. 20ns
3. 100 ns
4. 1ns

	A	B	C	D
a.	1	4	3	2
b.	4	1	3	2
c.	1	4	2	3

d. 4 1 2 3

92. The length of a bus cycle in 8086/8088 is four clock cycles, T_1, T_2, T_3, T_4 and an indeterminate number of wait state clock cycles denoted by T_w. The wait states are always inserted been
a. T_1 and T_2
b. T_2 and T_3
c. T_3 and T_4
d. T_4 and T_1

93. When RET instruction is executed by any subroutine then
a. The top of the stack will be popped out and assigned to the PC
b. Without any operation, the calling program would resume from instruction immediately following the call instruction
c. The PC will be incremented after the execution of the instruction
d. Without any operation, the calling program would resume from instruction immediately following the call instruction, and also the PC will be incremented after the execution of the instruction

94. Consider the following set of 8085 instructions used to read a byte of data from the output of an ADC. The byte represents digital equivalent of analog input voltage V_{in} applied to ADC when RD is asserted.

ADC	EQU	30H
GETADC:	IN	ADC
	RET	

When RET is executed
1. Op-code of IN is fetched
2. port address 30H is decoded
3. Op-code of IN is decoded
4. I/O read operation is performed

The correct sequence of these operations is
a. 3, 1, 4, 2
b. 1, 3, 2, 4
c. 1, 3, 4, 2
d. 3, 1, 2, 4

95. In an AM signal when the modulation index is one, the maximum power P_t, (where P_c is the carrier power) is equal to
a. P_c
b. $1.5p_c$
c. $2p_c$
d. $2.5p_c$

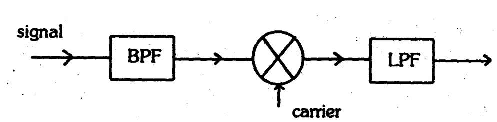
96. In the frequency modulation if f_m is modulating frequency, Δf is maximum frequency deviation and B is bandwidth, then
a. $B = \Delta f + f_m$
b. $B = \Delta f - f_m$
c. $B = 2(\Delta f \quad f_m) +$
d. $B = 2(\Delta f \quad f_m) -$

97. In 8085 microprocessor, a number of the form 000XXXXO stored in the accumulator is processed by the programme (Assume Cy = 0) as follows

ANI	OFFH
RAL	
MOV	
ANI	B,A
RAL	
ANI	
RAL	
ADD	B

The operation carried out by the programme is
a. Multiplication of accumulator content by 10
b. Complement of accumulator content
c. Multiplication of accumulator content by 9
d. Rotation of accumulator content three times

98. Which one of the following circuits transmits two messages simultaneously in one direction?
a. Duplex
b. Diplex
c. Simplex
d. Quadruplex

99.


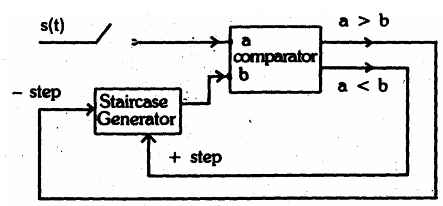
A DSB suppressed carrier reception is shown in the above figure. If $(SNR)_i$ is the S/N ratio for direct (incoherent) detection and $(SNR)_s$ is that for (coherent) synchronous detection, then
a. $(SNR)_s = 2(SNR)_i$
b. $(SNR)_s = (SNR)_i$
c. $(SNR)_s = 4(SNR)_i$
d. $(SNR)_s = ½ (SNR)_i$

100. An AM super-heterodyne receiver with IF of 455kHz is tuned to the carrier frequency of 1000 kHz. The image frequency is
   a. 545 kHz
   b. 1 MHz
   c. 1455kHz
   d. 1910 kHz

101. A 4 GHz carrier is amplitude-modulated by a low-pass signal of maximum cut off frequency 1 MHz. If this signal is to be ideally sampled, the minimum sampling frequency should be nearly
   a. 4 MHz
   b. 4 GHz
   c. 8 MHz
   d. 8 GHz

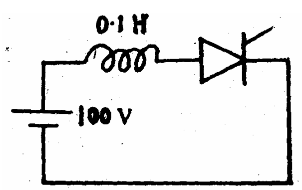
102. If the modulation index of an AM wave is changed from 0 to 1, the transmitted power
   a. Increases by 50%
   b. Increases by 75%
   c. Increases by 100%
   d. Remains unaffected

103.



Which one of the following PCM schemes is depicted in the above figure?
   a. Adaptive DM
   b. Differential PCM
   c. Companding
   d. Delta Modulation

104.



The latching current in the above circuit is 4 mA. The minimum width of the gate pulse required turn on the thyristor is
   a. 6 μs
   b. 4 μs
   c. 2 μs
   d. 1 μs

105. Triac cannot be used in
   a. ac voltage regulators
   b. Cycloconverters
   c. Solid state type of switch
   d. Inverter

106. The snubber circuit is used in thyristor circuits for
   a. Triggering
   b. dv/dt protection
   c. di/ dt protection
   d. Phase shifting

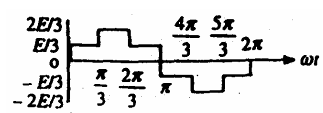
107. It is preferable to use a train of pulse of high frequency for gate triggering of SCR in order to reduce
   a. dv/dt problem
   b. di/dt problem
   c. The size of the pulse transformer
   d. The complexity of the firing circuit

108. A four quadrant chopper cannot be operated as
   a. One quadrant chopper
   b. Cycloconverter
   c. Inverter
   d. Bi- directional rectifier

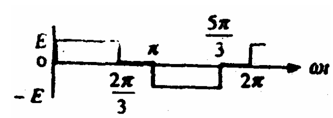
109. Match List I (Waveforms) with List II (Descriptions) and select the correct answer:

List I

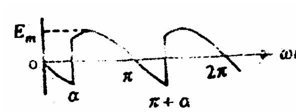
A.



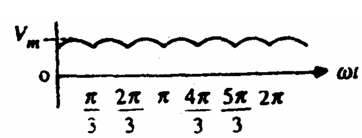
B.



C.



D.



List II

1. Single phase fully controlled ac to dc converter
2. Voltage commuted dc to dc chopper with input dc voltage E
3. Phase voltage of a three phase inverter with 180° conduction and input dc voltage E

4. Line voltage of a three phase inverter with 120° conduction and input dc voltage E
5. Three-phase diode bridge rectifier

	A	B	C	D
a.	3	4	1	5
b.	5	1	4	2
c.	3	1	4	5
d.	5	4	1	2

110. The total harmonic distortion (THD) of ac supply input current of rectifiers is maximum for
a. Single - phase diode rectifier with dc inductive filter
b. 3-phase diode rectifier with dc inductive filter
c. 3-phase thyristor rectifier with inductive filter
d. Single-phase diode rectifier with capacitive filter

111. A single phase ac voltage controller feeding a pure resistance load has a load voltage of 200 V (rms) when fed from a source of 250 V(rms). The input power factor of the controller is
a. 0.64
b. 0.8
c. 0.894
d. Difficult to estimate because of insufficiency of data

112. In a thyristor-controlled reactor, the firing angle of thyristor is to be controlled in the range of
a. 0° to 90°
b. 0° to 180°
c. 90° to 180°
d. 90° to 270°

113. A 3-phase wound rotor induction motor is controlled by a chopper-controlled resistance in its rotor circuit. A resistance of 2Ω is connected in the rotor circuit and a resistance of 4Ω is additionally connected during OFF periods of the chopper. The average resistance in the rotor circuit for the chopper frequency of 200 Hz is
a. 26/5Ω
b. 24/5 Ω
c. 18/5Ω
d. 16/5Ω

114. The most suitable solid state converter for controlling the speed of the three-phase cage motor at 25 Hz is
a. Cycloconverter
b. Current source inverter
c. Voltage source inverter
d. Load commutated inverter

115. In case of voltage source inverter, free-wheeling can be avoided for the load of
a. Inductive nature
b. Capacitive nature
c. Resistive nature
d. Back emf nature

116. PWM switching is preferred in voltage source inverters for the purpose of
a. Controlling output voltage
b. Output harmonics
c. Reducing filter size
d. Controlling output voltage, output harmonics and reducing filter size

117. Which one of the following is NOT the advantage of solids state switching of ac capacitors into ac supply over relay based switching?
a. Low transients
b. Low losses
c. Fast response
d. Long life

118. The most suitable device for high frequency inversion in SMPS is
a. BJT
b. IGBT
c. MOSFET
d. GTO

119. The quality of output ac voltage of a cycloconverter is improved with
a. Increase in output voltage at reduced frequency
b. Increase in output voltage at increased frequency
c. Decrease in output voltage at reduced frequency
d. Decrease in output voltage at increased frequency

120. A cycloconverter is operating on a 50 Hz supply. The range of output frequency that can be obtained with acceptable quality, is
a. 0 – 16 Hz
b. 0 – 32 Hz
c. 0 – 64 Hz
d. 0 – 128 Hz