Question Paper of Engineering Service Examination 2010 Electrical Engineering Paper-II

Objective

1. In Scott connection if the turns ratio of main transformer is K, then the teaser transformer has turns ratio of

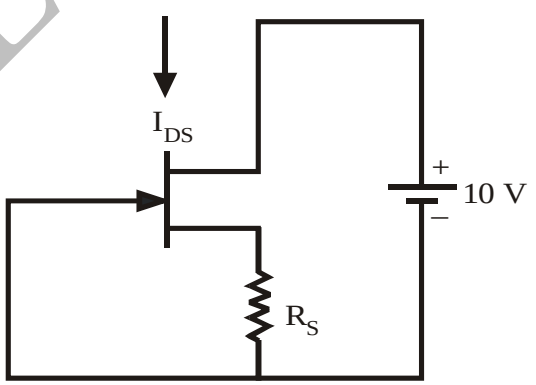
(a) $\frac{2K}{\sqrt{3}}$ (b) $\frac{\sqrt{3}\,K}{2}$

(c) $\frac{K}{\sqrt{3}}$ (d) $\frac{K}{2}$

2. A 3-phase thyristor controlled rectifier is feeding a purely resistive load on the DC side. The firing angle of the 6 thyristors of the converter is 90°. AC side is connected to a balanced 3-phase supply Considering only the fundamental of the input current, active power P and reactive power Q estimated at the AC side of the rectifier are

(a) $P \neq 0, Q = 0$
(b) $P = 0, Q \neq 0$
(c) $P \neq 0, Q \neq 0$
(d) $P = 0, Q = 0$

3.



The JFET in the above circuit has an
I_{DSS} = 10 mA. V_P = 5 V. The value of the resistance R_S for a drain current of I_{DS} = 6·4 mA is

(a) 1·06 kΩ (b) 560 Ω
(c) 470 Ω (d) 156 Ω

4. In mode '0' (Zero) operation of 8255, the ports can be used as port :
(a) A as input port only
(b) B as output port only
(c) A as output port only
(d) A as input or output port

5. Which one of the following modulation techniques has got maximum SNR?
(a) AM-SSB (b) AM-DSB
(c) FM (d) AM-SC

6. Load frequency controllers are carried out with
(a) P controllers only (b) I controllers only
(c) D controllers only (d) PID controllers

7. Three identical generators supply power in a system having lossless transmission lines. Generator 1 is equipped with a speed governor that maintains its speed constant at the rated value while generators 2 and 3 have governors with droops of 5% and 4% respectively. For a given increase in system load in the steady state
(a) Generators 1, 2, 3 will share the increased load in the ratio of 0 : 5 : 4
(b) Generators 1, 2, 3a will share the increased load equally
(c) Generators 1, 2, 3 will share the increased load in the ratio of 0 : 4 : 5
(d) Generators 1 will alone take the entire increased load and the output of generators 2 and 3 will remain unchanged

8. A $\frac{\Delta}{\Delta}$ connected transformer is connected to $\frac{V}{V}$ connected transformer. The ratio of VA rating of $\frac{V}{V}$ connected transformer and $\frac{\Delta}{\Delta}$ connected transformer is
(a) 57·7% (b) 100%
(c) 50% (d) 75%

9. A dc motor operated from a type A chopper is switched to type B chopper. How does the motor operate when type A and B are in operation respectively?
(a) Plugging and motoring
(b) Motoring and plugging
(c) Regenerative braking and motoring
(d) Motoring and regenerative braking.

10. The efficiency of a class B amplifier is 72% when the supply voltage is 24 V. The peak to peak output voltage is
(a) 20 V (b) 22 V
(c) 25 V (d) 16 V

11. If the probability of a message is $\frac{1}{4}$, then the information in bits is
(a) 1 bit (b) 2 bit
(c) 4 bit (d) 8 bit

12. A 16 bit memory address register can address memory locations of
(a) 16 k (b) 32 k
(c) 64 k (d) 128 k

13. Load flow studies must be made on a power system before
(a) Making short circuit studies but not for transient stability studies on the power system
(b) Making transient stability studies but not for short circuit studies on the power system
(c) Making both short circuit and transient stability studies on the power system
(d) For neither making short circuit studies nor transient stability studies on the power system

14. A conventional telephone line with 3 kHz bandwidth and having 30 dB signal-to-noise ratios can carry information at a rate of
(a) 30 kbps (b) 15 kbps
(c) 3 kbps (d) 16 Mbps

15. A dc to dc transistor chopper supplied from a fixed voltage dc source feeds a fixed resistive inductive load and a free wheeling diode. The chopper operates at 1 kHz and 50% duty cycle. Without changing the value of the average dc current through the load, if it is desired to reduce the ripple content of the load current, the control action needed will be to
(a) Increase the chopper frequency keeping its duty cycle constant
(b) Increase the chopper frequency and duty cycle in equal ratio
(c) Decrease only the chopper frequency
(d) Decrease only the duty cycle

16. Neglecting losses, if the power transformed inductively is equal to power transformed conductively in an auto-transformer, then the secondary to primary ratio of transformer is
(a) 0·5 (b) 2
(c) 1·5 (d) 1·25

17. In modelling the equivalent circuit of a short length overhead transmission line, the line resistance and inductance are only considered because line capacitance to ground is
(a) Equal to zero (b) Finite but very small
(c) Finite but very large (d) Infinite

18. A separately excited dc motor is started using a 3-phase ac/dc controlled rectifier using 'Soft starting'. For limiting the starting current, it is required that firing angle should be
(a) Gradually increased from 0° to 180°
(b) Fixed at 30°
(c) Gradually reduced from 180° to 30°
(d) Gradually increased from 30° to 180°

19. The field, which is never present in an assembly language statement, is
(a) Opcode (b) Operand
(c) Continue (d) Comment

20. A JFET is set up as a follower, with $\mu = 200$, $r_d = 100$ k and source load resistance $R_L = 1$ k. The output resistance R_o is
(a) 1000 Ω (b) 500 Ω
(c) 333 Ω (d) 666 Ω

Directions : Each of the next twenty (20) items consists of two statements, one labelled as the 'Assertion (A)' and the other as 'Reason (R)' . You are to examine these two statements carefully and select the answer to these items using the codes given below :

Codes :

(a) Both A and R are individually true and R is the correct explanation of A
(b) Both A and R are individually true and R is ***not*** the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

21. **Assertion (A) :** A key specification of any memory device is its access time.
Reason (R) : The access time of the memory must be more than the access time of the microprocessor.

22. **Assertion (A) :** Port B of 8255A can only be used as input port.
Reason (R) : Port B can only be operated in Mode 0 or Mode 1.

23. **Assertion (A) :** In a transformer, open circuit (OC) test is conducted from low voltage side and short circuit (SC) test is conducted from high voltage side.
Reason (R) : OC test gives iron loss and SC test gives copper loss.

24. **Assertion (A) :** When large currents are required, it is necessary to use lap winding.
Reason (R) : In lap winding, equalizing connections are definitely needed.

25. **Assertion (A) :** A synchronous motor is not inherently self starting.
Reason (R) : At standstill the rotor of a synchronous motor is subjected to alternate forces of repulsion and attraction.

26. **Assertion (A) :** The diameter of the shaft of a synchronous condenser is very small.
Reason (R) : The synchronous condenser is a machine which is not expected to deliver any mechanical power output as per its design.

27. **Assertion (A) :** In normal operation, the non-inverting and inverting input terminals of an operational amplifier are at almost same potential.
Reason (R) : The two terminals are connected together.

28. **Assertion (A) :** FM systems employ pre-emphasis and de-emphasis.
Reason (R) : Pre-emphasis and de-emphasis are measured in micro-sec.

29. **Assertion (A) :** In mobile radio communication vertically polarized wave is preferred over horizontally polarized wave.
Reason (R) : Receiving antenna is always placed vertically.

30. **Assertion (A) :** The L and C components of the communication circuit in McMurray inverter are chosen such that the peak value of resonant current pulse during communication is sufficiently greater that the load current.
Reason (R) : A thyristor will successfully turn off if the current is maintained below holding value for a time greater than the turn off time of the device.

31. **Assertion (A) :** In HVDC systems, the voltage should be as high as possible and the rectifier control angle α should be as low as possible.
Reason (R) : Control of dc voltage is exercised by the rectifier and inverter control angles α and γ respectively.

32. **Assertion (A) :** Frequency of the system is the same, for synchronously connected machines.
Reason (R) : Frequency can be controlled by synchronous generators only.

33. **Assertion (A) :** D flip-flops are used to construct a buffer register.
Reason (R) : Buffer registers are used to store binary word temporarily.

34. **Assertion (A) :** An I/O device connected to microprocessor in I/O mapped I/O mode has an 8 bit port address.
Reason (R) : Microprocessor based system design uses concept of zero paging.

35. **Assertion (A) :** The port address in IN/OUT instruction is 8 bit.
Reason (R) : The address byte is duplicated in machine cycle for IN/OUT instruction.

36. **Assertion (A) :** A frequency mixer is used in the Armstrong indirect FM wave generator.
Reason (R) : It is required to increase the carrier frequency by a very larger factor than that needed for the frequency deviation increase.

37. **Assertion (A) :** Address bus is unidirectional.
Reason (R) : Data bus is bidirectional.

38. **Assertion (A) :** SIM instruction cannot be used to disable or change priority of INTR pin.
Reason (R) : INTR is a pseudo-vectored interrupt PIN.

39. **Assertion (A) :** Load flow studies are usually carried out using Y_{BUS}.
Reason (R) : Y_{BUS} is a sparse matrix and is generally matching with topology of the p.s. network.

40. **Assertion (A) :** The frequency of 8085 system is $\frac{1}{2}$ of the crystal frequency.
Reason (R) : Microprocessor (8085) requires a two phase clock.

41. **On receiving an interrupt the CPU of an 8085 microprocessor**
(a) Completes the current instruction and then goes to the interrupt service routine
(b) Branches off to the interrupt service routine immediately
(c) Hands over control of address bus and data bus to the interrupting device
(d) Goes to HALT state for pre-determined period

42. **Which one of the following is *not* a characteristic of RTL logic families ?**
(a) High switching speed
(b) Poor noise immunity
(c) Low power dissipation
(d) Fan out is 5

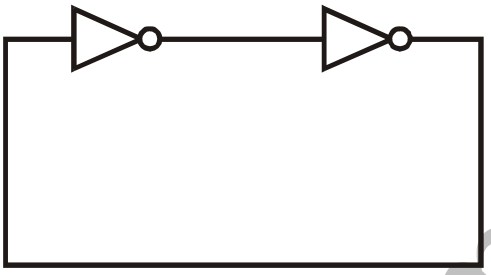
43. **For what value of damping parameter, the transient stability is assured by equal area criterion ?**
(a) Independent of systems damping
(b) If only damping is exactly sero
(c) For all values of damping parameters

(d) If only damping is positive and finite

44. **Armature reaction AT of a synchronous generator supplying power at rated voltage with zero power factor lagging is**

(a) Magnetizing
(b) Demagnetizing
(c) Cross-magnetizing
(d) Both magnetizing and cross-magnetizing

45.



The digital circuit using two inverters as shown above acts as

(a) A bistable multivibrator (b) An astable multivibrator
(c) A monostable multivibrator (d) An oscillator

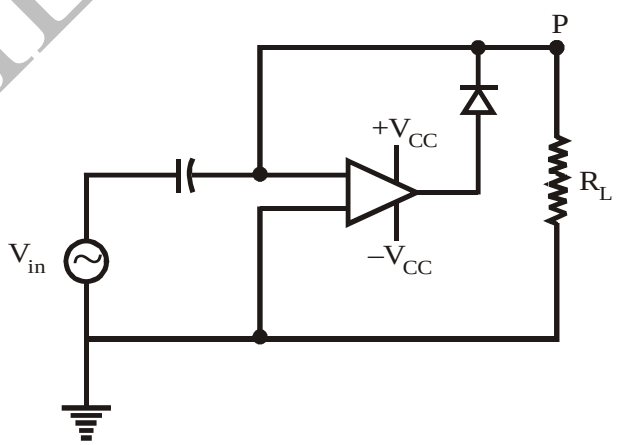
46. **Power factor of an alternator driven by constant prime mover input can be changed by changing its**

(a) Speed (b) Load
(c) Field excitation (d) Phase sequence

47. **Which of the following power stations is mainly used to cover peak load on the system?**

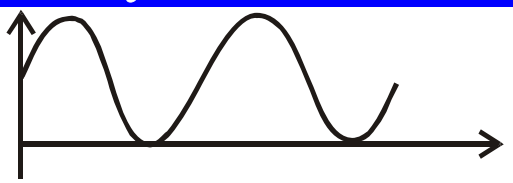
(a) Coal based thermal power plant
(b) Nuclear power plant
(c) Gas based thermal power plant
(d) Pumped storage hydro power plant

48.

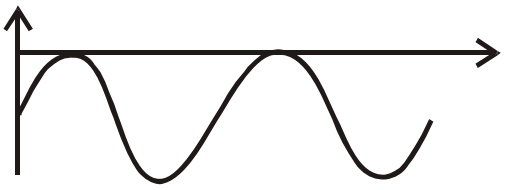


For the given sinusoidal input to the circuit as shown above, the voltage waveform at point 'P' of the clamper circuit is

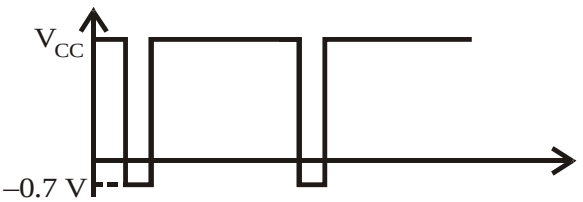
(a)



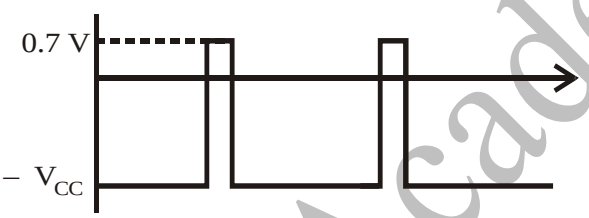
(b)



(c)



(d)



49. **A constant current source inverter supplies 20 A to a load resistance of 1 Ω. If the load resistance is charged to 5 Ω, then the load current**

(a) Remains same at 20 A whereas the load voltage changes to 100 V
(b) Changes to 4 A from 20 A and the load voltage changes to 20 V
(c) Changes to 4 A from 20 A and the load voltage changes to 80 V
(d) And load voltage stay at 20 A and 20 V, respectively

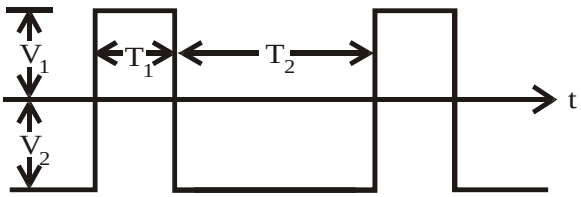
50. **What is the assigned bandwidth of each of the channels in the AM broadcast band?**

(a) 5 kHz (b) 10 kHz
(c) 15 kHz (d) 200 kHz

51. **A 3-phase, 11 kV, 5 MVA alternator has synchronous reactance of 10 Ω per phase. Its excitation is such that the generated e.m.f. is 14 kV. If the alternator is connected to infinite bus bar, the maximum output at the given excitation is**

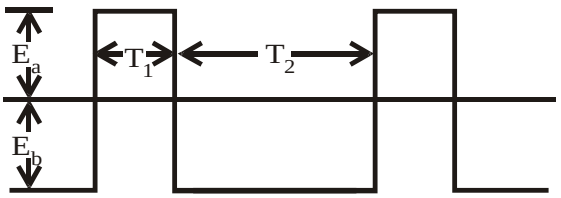
(a) 15,400 kW (b) 8,000 kW
(c) 6,200 kW (d) 5, 135 kW

52.

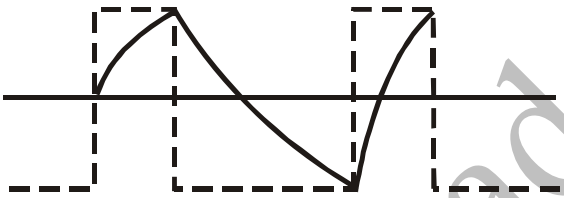


For low pass RC circuit the input waveform is as shown above. What will be the output waveform if the time constant of the circuit is equal to the time period of the input signal ($RC = T_1 + T_2$)?

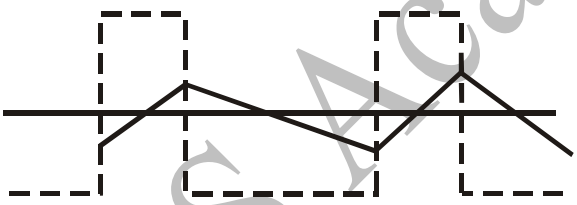
(a)



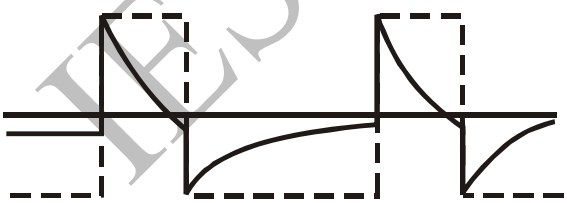
(b)



(c)



(d)

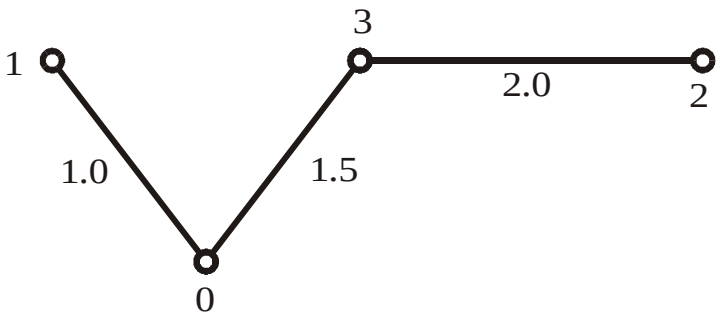


53. Consider the following statements :
The armature torque in a dc motor is a function of
1. Field flux.
2. Armature current.
3. Speed.
4. Damping.

Which of the above statements is/are correct?
(a) 1, 2, 3 and 4
(b) 3 and 4 only
(c) 1 and 2 only
(d) 4 only

54. Sixty-four number of 356 × 1 bit RAM IC is arranged in 8 rows and 8 columns to get memory of
(a) 1 kB
(b) 2 kB
(c) 4 kB
(d) 8 kB

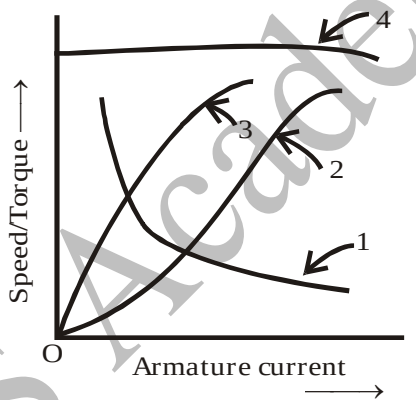
55.



For a graph of power system network shown in figure, where bus numbers and impedances are marked, assuming equal $\frac{R}{X}$ of impedances, find the bus impedance matrix elements Z_{22}.

(a) 2·0 (b) 3·5
(c) 0·5 (d) 4·5

56.



Consider the following statements :
In the above figure, the curves pertain to the dc motor.

A. Speed Vs armature-current characteristic of a dc shunt motor.
B. Torque Vs armature-current characteristic of a dc shunt motor.
C. Speed Vs armature-current characteristic of a dc series motor.
D. Torque Vs armature-current characteristic of a dc series motor.

What is the correct sequence of characteristics?
Code :

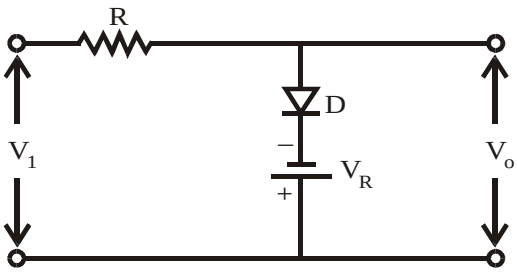
	A	B	C	D
(a)	4	1	3	2
(b)	2	1	3	4
(c)	4	3	1	2
(d)	2	3	1	4

57. For a non-uniform quantizer more quantizing steps are used for signals of
(a) Low frequency (b) High amplitude
(c) Low amplitude (d) High frequency

58. The armature MMF waveform of a dc machine is
(a) Pulsating (b) Rectangular

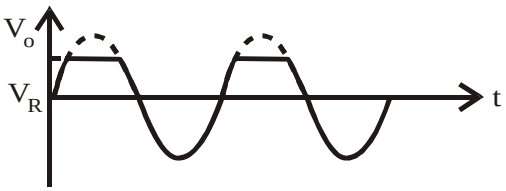
(c) Triangular (d) Sinusoidal

59.

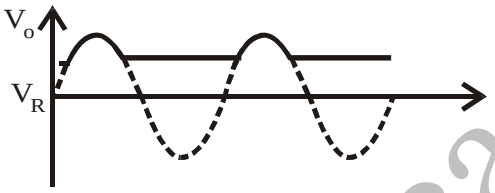


For a sinusoidal input of peak value V_P, the output waveform V_o will be

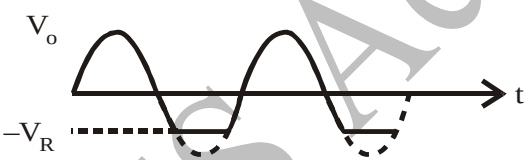
(a)



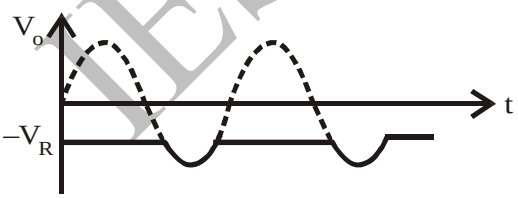
(b)



(c)



(d)



60. Consider the following :

1. EMF 2. Reversal
3. MMF 4. Direct

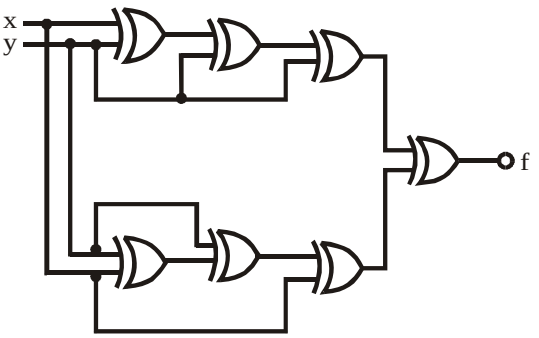
Which methods among these are for the determination of voltage regulation of an alternator ?

(a) 1, 2, 3 and 4 (b) 1 and 2 only
(c) 2 and 3 only (d) 1 and 3 only

61. In a 3-phase induction machine, motoring, generating and braking operations take place in the range of slip "S" is :

(a) $1 > S > 0$, $0 > S > -2$ and $S > 1$ (b) $S > 1$, $1 > S > -1$ and $0 > S > -1$
(c) $S > 1$, $0 > S > -1$ and $1 > S > 0$ (d) $0 > S > -1$, $S > 1$ and $1 > S > 0$

62.



The circuit shown above generates the function of

(a) x □ y
(b) 0
(c) $x\bar{y} + yx + \bar{y}x$
(d) $x \cdot \bar{y}$

63. Match List I with List II and select the correct answer using the code given below the lists :

List I

A. 

B. 

C. 

D. 

List II

1. AB
2. $\overline{AB}$
3. A + B
4. $\overline{A + B}$

Code :

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

64. Match List I with List II and select the correct answer using the code given below the lists :

List I

A. All types of faults

B. All unsymmetrical faults

C. Fault involving ground with neutral of the system grounded

D. Fault involving ground with floating neutral

List II

1. Negative sequence currents are present
2. Zero sequence currents are present
3. Zero sequence currents are absent
4. Positive sequence currents are present

Code :

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

65. The power factor of an induction motor operating at no load will have a value around
(a) 0·9 lag (b) 0·2 lead
(c) 0·2 lag (d) 0·9 lead

66.
```
LXI     SP,     7FFFH
MVI     A,      25H
XRI     02H
PUSH    PSW
POP     H
MOV     A,      L
ORI     10H
HLT
```
What are the contents of A, H, L, SP and PSW registers after executing the above set of instructions? Assume undefined flags always remain cleared.
(a) 10H, 25H, 00H, 7FFFH, 00H respectively
(b) 14H, 27H, 04H, 7FFFH, 04H respectively
(c) 14H, 25H, 00H, 7FFFH, 04H respectively
(d) 10H, 27H, 04H, 7FFFH, 00H respectively

67. The MMF 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 with respect to stator MMF
(c) Rotates at slip speed with respect to stator MMF
(d) Rotates at synchronous speed with respect to rotor

68. The restriking voltage is measured in
(a) RMS value (b) Peak value
(c) Instantaneous value (d) Average value

69. In a PWM inverter, f_o and f are the frequencies in Hz for the carrier signal and reference signal respectively. Then the number of pulses per half cycle is
(a) $N = \frac{f}{f_o}$ (b) $N = \frac{f}{2f_o}$
(c) $N = \frac{f_o}{2f}$ (d) $N = \frac{f_o}{f}$

70. A squirred cage induction motor having a rated slip of 2% on full load has a starting torque of 50% of full load torque. The starting current is
(a) Two times the full load current
(b) Four times the full load current
(c) Five times the full load current
(d) Equal to the full load current

71. If a line of surge impedance Z_o is terminated in an impedance Z then the reflection for current and voltage surges at the termination are given respectively by

(a) $\frac{Z_o - Z}{Z_o + Z}, \frac{2Z}{Z_o + Z}$

(b) $\frac{Z_o - Z}{Z_o + Z}, \frac{Z - Z_o}{Z_o + Z}$

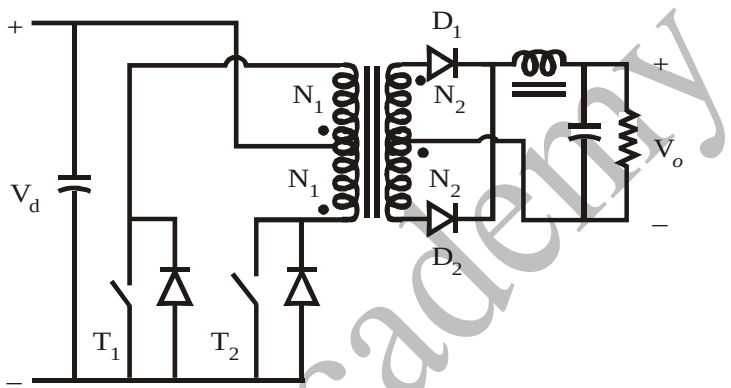
(c) $\frac{2Z_o}{Z_o + Z}, \frac{2Z}{Z_o + Z}$

(d) $\frac{2Z_o}{Z_o + Z}, \frac{Z - Z}{Z_o + Z}$

72. Under voltage relays are mainly used for

(a) Motor protection
(b) Transformer protection
(c) Transmission line protection
(d) All of the above

73.



In push-pull type DC-DC converter the output voltage V_0 is given by

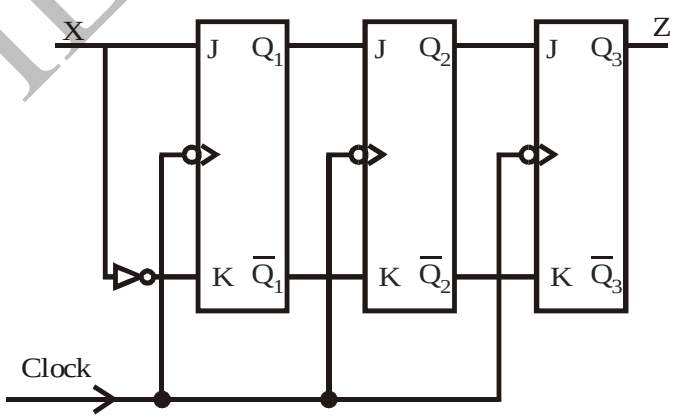
(a) $V_o = 2\frac{N_2}{N_1}.V_d\left(\frac{t_{ON}}{t_{ON} + t_{OFF}}\right)$

(b) $V_o = \frac{N_2}{N_1}.V_d\left(\frac{t_{ON}}{t_{ON} + t_{OFF}}\right)$

(c) $V_o = 2\frac{N_2}{N_1}.V_d\left(\frac{t_{ON}}{t_{OFF}}\right)$

(d) $V_o = \frac{N_2}{N_1}.V_d\left(\frac{t_{ON}}{t_{OFF}}\right)$

74.



Circuit shown above is a

(a) Shift register
(b) Binary counter
(c) Ripple counter
(d) Sequence detector

75. Fibre optic cables are used in power system application mainly for
(a) SCADA
(b) Communication between power station and sub station
(c) Communication between power station and load control centre
(d) All of the above

76. Consider the following statements :
The suitable configuration of HVDC converter is decided on the requirements of
1. High pulse number
2. Converter transformer utilization factor should be near to unity
Which of the above statements is/are correct?
(a) 1 only (b) Both 1 and 2
(c) Neither 1 nor 2 (d) 2 only

77. A shift register with the serial output connected back to the serial input is a
(a) Feedback shift register (b) Shift register counter
(c) Universal shift register (d) Serial to parallel converter

78. The average output voltage of a fly-back converter is $V_o = 24$ V at a resistive load of $R = 0.8\ \Omega$. The duty cycle ratio is $\alpha = 50\%$ and the switching frequency is $f = 1$ kHz. The on-state voltage drop of transistors and diodes are $V_t = 1{\cdot}2$ V and $V_d = 0{\cdot}7$ V respectively. The turn ratio of the transformer is $a = \frac{N_s}{N_p} = 0{\cdot}25$. What is the efficiency of the converter ?
(a) 86·5% (b) 96%
(c) 75% (d) 90%

79. Which of the following counter in least delay?
(a) Ring counter (b) Ripple counter
(c) Synchronous counter (d) Asynchronous counter

80. In how many different modes a universal shift register operates?
(a) 2 (b) 3
(c) 4 (d) 5

81. Three individual 3-phase 400 kV power systems, each one of which consists of a generator transformer and a radial line having 3-ϕ symmetrical fault level of 20 GVA for fault at the remote end of lines, are now reinforced by interconnecting the remote end lines by three lines each of reactance j12 Ω so that the fault level at each remote end of the radial lines on ignoring resistance becomes
(a) 10 GVA (b) $\left(\frac{20}{3}\right)$ GVA
(c) 24 GVA (d) 29 GVA

82. Handshaking mode of data transfer is
(a) Synchronous data transfer (b) Asynchronous data transfer
(c) Interrupt driven data transfer (d) Level mode of DMA data transfer

83. Match List I with List II and select the correct answer using the code given below the lists :

List I	List II
A. Source encoder	1. Reduce ISI

B. Channel encoder	2. Synchronization
C. Line coder	3. Message protection
D. Equalizer	4. Maximization of information transmitted

Code

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

84. Consider the following statements :
When Darlington circuit and normal single stage emitter followers are compared
1. Both have near unity voltage gain.
2. Both have equal current gain.
3. Darlington circuit has higher output resistance.
4. Emitter follower has lower input resistance.

Which of the above statements is/are correct?
(a) 1 only (b) 1 and 4 only
(c) 2 and 4 only (d) 1, 2, 3 and 4

85. Static VAR controllers are used to provide dynamic voltage regulation. These controllers are primarily of
(a) Thyristor switched inductors
(b) Thyristor controlled capacitors
(c) Thyristor switched resistors
(d) Thyristor controlled inductors and thyristor switched capacitors

86. For the parallel operation of transformers, which of the following conditions must be satisfied?
(a) Same voltage ratios
(b) Must be connected in proper polarities
(c) Re/Xe ratio should be the same
(d) Same kVA rating

87. A 10 kVA, $\frac{400V}{200V}$ single-phase transformer with 10% impedance, draws a steady short circuit current of
(a) 50 A (b) 150 A
(c) 250 A (d) 350 A

88. The smallest valid signed integer that can be stored in a memory location of a 4k × 8 bit RAM is
(a) 0 (b) –128
(c) –2048 (d) –65536

89. Which one of the following statements is *incorrect* about the matched filter?
(a) The maximum output SNR depends on the input signal energy.
(b) The impulse response is reversed delayed version of the input signal.
(c) The error probability depends on the wave shape of the signal.
(d) Matched filter and correlator gives identical reception performances.

90.

A \ BC	$\bar{B}\bar{C}$	$\bar{B}C$	BC	$B\bar{C}$
$\bar{A}$		1	1	1
A		1	1	

For a function F, the Karnaugh map is shown above. Then minimal representation of F is

(a) $AB + \bar{C}$ (b) $C + \bar{A}B$

(c) $A + B + C$ (d) $A + \bar{B}C$

91. Consider the following devices :

1. Synchronous condenser
2. Saturable reactor
3. SCCR
4. FCCR

In which of these devices, the accuracy of compensation is very high and noise level is very low ?

(a) 1, 2, 3 and 4 (b) 3 and 4 only

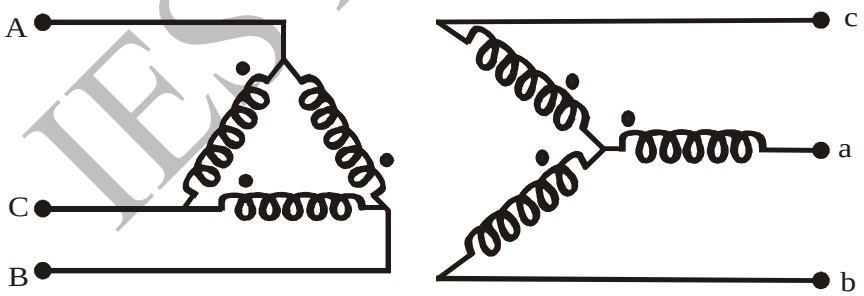
(c) 3 only (d) 2 and 3 only

92. For a P-pole machine, the relation between electrical and mechanical degrees is

(a) $\theta_{elec} = \frac{2}{P}\theta_{mech}$ (b) $\theta_{elec} = \frac{4}{P}\theta_{mech}$

(c) $\theta_{elec} = \theta_{mech}$ (d) $\theta_{elec} = \frac{P}{2}\theta_{mech}$

93.



For ΔY transformer, connections and terminal markings are shown in the above figure. If 1 and 2 represents position and negative sequence, then the correct solution in per unit values for VA_1 and VA_2 is

(a) jVa_1 and $-jVa_2$ (b) Va_1 and $-jVa_2$

(c) jVa_1 and $-Va_2$ (d) Va_1 and $-Va_2$

94. What will happen if a short circuit fault occurs in a switched capacitor controlled reactor?

(a) Oscillation (b) Capacitor discharge

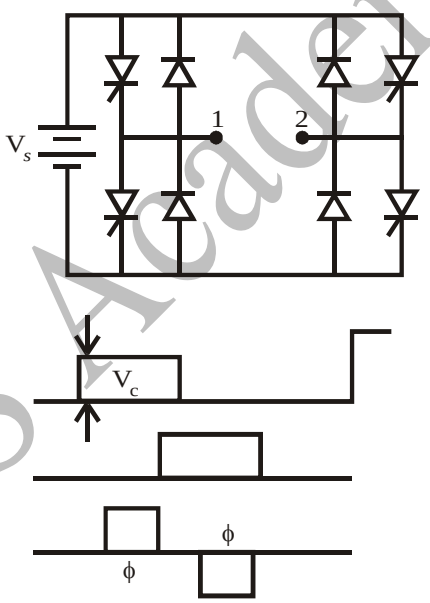
(c) Over voltage (d) Noise

95. MVI A, AAH
ORI FFH
RRC
RRC
CMC
INR A
What are the contents of A and PSW registers after executing the above set of instructions in sequence?
(a) AAH and 00H
(b) FFH and 66H
(c) 00H and 54H
(d) 00H and 00H

96. The input resistance R_i and output resistance R_o of an ideal current amplifier, in ohms, are
(a) 0 and 0
(b) 0 and ∞
(c) ∞ and 0
(d) ∞ and ∞

97. Which one of the following pulse communication systems is digital?
(a) PAM
(b) PCM
(c) PPM
(d) PWM

98.



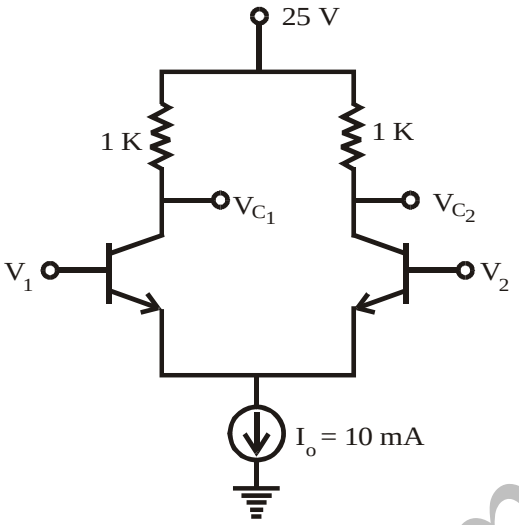
The above figure shows an inverter circuit with a dc source voltage V_s. The semi-conductor switches of the inverter are operated in such a way that the pole voltages of V_{10} and V_{20} are shown in the figure (b). What is the RMS value of the pole voltage V_{12}?

(a) $\frac{V_s\phi}{\sqrt{2\pi}}$
(b) $V_s\sqrt{\frac{\phi}{\pi}}$
(c) $V_s\sqrt{\frac{\phi}{2\pi}}$
(d) $\frac{V_s}{\pi}$

99. Consider the following parts of a dc machine :
1. Yoke
2. Armature core
3. Brushes
4. Pole core
Which of the above parts are subjected to iron loss?
(a) 1 and 2 only
(b) 2 only

(c) 1 only (d) 1, 2, 3 and 4

100.



In the difference amplifier as shown above, the differential output $(V_{c_2} - V_{c_1})$ for $V_1 = +5$ V, $V_2 = 0$ V is

(a) 0 V (b) 5 V
(c) 10 V (d) 15 V

101. An example of 8085-instruction that uses direct addressing is
(a) RLC (b) STA
(c) RRC (d) CMA

102. Consider the following statements about FM :
1. Modulation index determines the number of significant sideband components.
2. Theoretical bandwidth is infinite.
3. Carrier suppression is not possible
4. Sidebands are not symmetric about carrier .

Which of the above statements is/are correct?
(a) 1, 2, 3 and 4 (b) 1 and 2 only
(c) 3 and 4 only (d) 3 only

103. The Fermi function for an electron is f(E), where E is energy. Then, the Fermi function for a hole is
(a) f(F) (b) 1 – f(E)
(c) $\frac{1}{f(E)}$ (d) 1 + f(E)

104. In an LC series circuit connected to a dc supply of E volts via a thyristor when it turns off, the voltage that appears across the thyristor is
(a) + E (b) + 2E
(c) – E (d) –2E

105. In an auto-transformer, power is transferred, through
(a) Conduction process only
(b) Induction process only
(c) Both conduction and induction processes

(d) Mutual coupling

106. For a 3-element feed water control in a coal fixed thermal power stations, measurements of level of water in the boiler durms is made so that the water level does not
(a) Exceed a specified upper limit
(b) Fall below a specified lower limit
(c) Violate specified upper and lower limits
(d) Restrict to a specified limit

107. In 8085 microprocessor, the order of priority for hardware interrupts, are
(a) INTR, RST 7·5, REST 6·5, REST 5·5 TRA,
(b) TRAP, RST 7·5, RST 6·5, RST 5·5, INTR
(c) TRAP, INTR, RST 5·5, RST 6·5, RST7.5
(d) INTR, RST 5·5, RST 6·5, RST 7·5 TRAP

108. The de-emphasis filter in an FM receiver comes
(a) Before FM demodulator
(b) After FM demodulator and before baseband filter
(c) After baseband filter
(d) Before RF amplifier

109. If a fixed amount of power is to be transmitted over certain length with fixed power loss, it can be said that volume of conductor is
(a) Inversely proportional to magnitude of the voltage and that of power factor of the load
(b) Inversely proportional to square of the voltage and square of power factor of the load
(c) Proportional to square of voltage and that of power factor of the load
(d) Proportional to magnitude of the voltage only

110. Consider the following statements :
Pumped storage plants when operated in interconnected power systems serve to
1. Increase load factor of steam plant.
2. Provide added capacity to meet peak loads.
3. Decrease load factor of steam plant.
4. Provides added capacity to meet base loads.
Which of the above statements are correct?
(a) 1, 2, 3 and 4
(b) 1 and 3 only
(c) 1 and 2 only
(d) 3 and 4 only

111. Consider the following devices :
1. SCR
2. GTO
3. BJT
4. MOSFET
5. IGBT
Which of these devices do not belong to the family of transistors?
(a) 1 and 2 only
(b) 1, 2 and 3 only
(c) 2, 3 and 5 only

(d) 1, 2, 3, 4 and 5

112. It is advisable to use auto-transformer if the transformation ratio is

(a) Greater than 1 (b) Near to 1
(c) 0·25 (d) 0·5

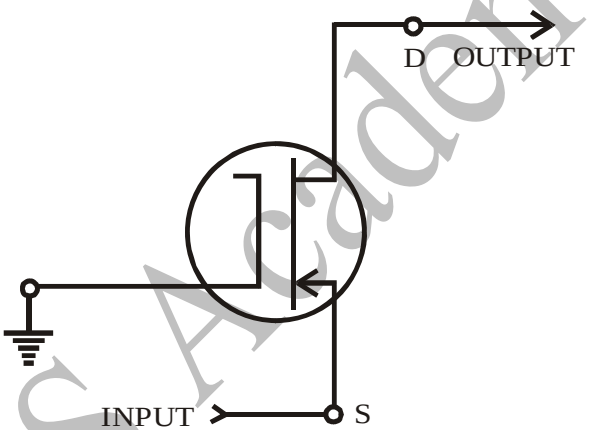
113. Thermal runaway is not encountered in FETs because

(a) I_{DS} has a zero temperature coefficient
(b) I_{DS} has a negative temperature coefficient
(c) I_{DS} has a positive temperature coefficient
(d) The mobility of the carriers increases with increase in temperature

114. The opcode for the instruction "Add Imemediately to Accumulator with carry" in 8085 microprocessor is

(a) ADI
(b) ACI
(c) ADC
(d) ADD

115.



Tne FET shown above is a

(a) Common drain (b) Common gate
(c) Common source (d) Common source follower

116. Consider the following statements :

1. Nuclear fission occurs whenever Uranium reacts with a neutron.
2. Nuclear fission is accompanied by the release of neutrons and gamma rays.
3. About 200 MeV of energy is released in the fission of a U^{235} nucleus.
4. Energy from the fission of U^{235} nucleus is released mainly as kinetic energy of the neutrons and the energy of gamma radiations.

Which of the above statements are correct?

(a) 1, 2, 3 and 4 (b) 3 and 4 only
(c) 2, 3 and 4 only (d) 1, 2 and 4 only

117. The most noise immune system is

(a) SSB (b) PCM
(c) PDM (d) PWM

118. A 10 km long lossless transmission line has a reactance of 0·3 Ω/km and negligible shunt capacitance. The value of $\begin{bmatrix} A & B \\ C & D \end{bmatrix}$ is

(a) $\begin{bmatrix} 1 & 0 \\ j3 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 0 \\ 0\cdot3 & 1 \end{bmatrix}$

(c) $\begin{bmatrix} 1 & j3 \\ 0 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} j3 & 0 \\ 1 & 1 \end{bmatrix}$

119. The content of the programme counter of an 8085 microprocessor is
(a) The total number of instruction in the program already executed
(b) The total number of times a subroutine is called
(c) The memory address of the instruction that is being currently executed
(d) The memory address of the instruction that is to be executed next

120. A 3000 Hz bandwidth channel has a capacity of 30 kbps. The signal-to-noise ratio of the channel is
(a) 20 dB (b) 25 dB
(c) 30 dB (d) 40 dB