

**BHARAT SANCHAR NIGAM LIMITED**  
**Maharashtra Telecom Circle**

**Name of the Examination:-** Open Competitive Exam. For filling the vacancies of Direct Rectt. Quota of TTA to be held on 15<sup>th</sup> & 16<sup>th</sup> December'2007

**Paper No.:** III

**Date:**

**Subject:-** Specialization

**Duration of the examination:** 3Hours

**Maximum Marks:-** 500

**Instructions to candidates:-**

1. There are 7(Seven) sections and each section carries **250 marks**.
2. Only two sections have to be attempted by a candidate.
3. If more than two sections are attempted, the first two attempted sections shall only be taken up for evaluation. Hence candidates are advised not to attempt more than two sections in their own interest.
4. All questions carry equal marks.
5. Calculator is not permitted in examination hall.
6. All the Answers should be written either in English or in Hindi only.
7. Write your Roll Number on the top of the first page of your Answer Book. Do not write your name anywhere in the Answer Book.
8. Marks are liable to be deducted for numbering questions wrongly, bad handwriting and slovenly works.
9. All rough work should be done in the last page/pages of the Answer Book. Cancel all such rough work by drawing prominent lines across it
10. Candidates writing their answers in Hindi Medium must cross check the facts and figures with English version of the questions. In case any doubt, difference and discrepancy between the two versions, the English version shall be treated as correct and final.

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SECTION A: - ELECTRICAL

Answer all the questions.

Choose the most appropriate one from the given choices.

1. In a *D.C.* generator, if the brushes are given a small amount of forward shift, the effect of armature reaction is
  - a. Totally demagnetizing
  - b. Totally magnetizing
  - c. Partly demagnetizing and partly cross magnetizing
  - d. Totally cross magnetizing
  
2. The air gap between stator and armature of an electric motor is kept as small as possible
  - a. To get a stronger magnetic field
  - b. To improve the air circulation
  - c. To reach the higher speed of rotation
  - d. To make the rotation easier.
  
3. Two series motors are coupled. One motor runs as generator and other as motor. The friction losses of the two machines will be equal when
  - a. Both operates at same voltage
  - b. Both have same back *emf*
  - c. Both have same speed
  - d. Both have same excitation
  
4. Plugging of *D.C.* motor is normally executed by
  - a. Reversing the field polarity
  - b. Reversing the armature polarity
  - c. Reversing both the armature and field polarity
  - d. Connecting a resistance across the armature
  
5. Transformer oil used in transformer provides
  - a. Insulation and cooling
  - b. Cooling and lubrication
  - c. Lubrication and insulation
  - d. Insulation, cooling and lubrication
  
6. Leakage fluxes of a transformer may be minimized by
  - a. Reducing the magnetizing current to the minimum
  - b. Reducing the reluctance of the iron core to the minimum
  - c. Reducing the number of primary and secondary turn to the minimum
  - d. Sectionalizing and interleaving the primary and secondary windings

7. Electric power is transferred from one coil to the other coil in a transformer
- Electrically
  - Electro magnetically
  - Magnetically
  - Physically
8. The most suitable and economical connection for small high voltage transformer is-
- Star - Delta connection
  - Delta - Delta connection
  - Delta - Star connection
  - Star - Star connection
9. An alternator is said to be over excited when it is operating at
- Unity power factor
  - Leading power factor
  - Lagging power factor
  - Either lagging or leading power factor
10. In an *A.C.* machine, the armature winding is kept stationary while the field winding is kept rotating for the following reason
- Armature handles very large currents and high voltages
  - Armature friction involving deep slots to accommodate large coils is easy if armature is kept stationary
  - Ease of cooling the stator than rotor
  - None of the above.
11. In a synchronous motor, the torque angle is the
- Angle between the rotating stator flux and rotor poles
  - Angle between the magnetizing current and back *emf*
  - Angle between the supply voltage and back *emf*
  - None of the above
12. A 3-phase synchronous motor is said to be "floating" when it operates
- On no load and without loss
  - On constantly varying load
  - On pulsating load
  - On high load and variable supply voltage
13. Speed of synchronous motor depends upon
- Number of poles
  - Supply frequency
  - Both (a) and (b)
  - Neither (a) nor (b)

14. Imbalance in the shaft of an induction motor occurs due to
- Slip rings
  - Overheating of winding
  - Non-uniform of air gap
  - Rigid construction
15. Squirrel cage induction motor has
- Zero starting torque
  - Very small starting torque
  - Medium starting torque
  - Very high starting torque
16. The principle of operation of a 3-phase induction motor is similar to that of a
- Synchronous motor
  - Repulsion - start induction motor
  - Transformer with a shorted secondary
  - Capacitor - start, induction - run motor
17. The speed / load characteristics of a universal motor are similar to those
- D.C.* shunt motor
  - D.C.* series motor
  - A.C.* motor
  - None of the above
18. Single phase *A.C.* motor generally used for vacuum cleaners is
- Universal motor
  - Repulsion motor
  - Hysteresis motor
  - Reluctance motor
19. Buchholz relay is used for the protection of
- Switch yard
  - Transformers
  - Alternators
  - Transmission lines
20. The type of braking used in traction system is
- Mechanical braking
  - Electro - pneumatic braking
  - Vacuum braking system
  - All the above

21. The function of connecting zener diode in a *UJT* circuit used for triggering of *SCRs* is to
- Expedite the generation of triggering pulses
  - Delay the generation of triggering pulses
  - Provide a constant voltage to *UJT* to prevent erratic firing
  - Provide a variable voltage to *UJT* as the source voltage changes
22. The frequency of a ripple in the output voltage of a 3-phase semi converter depends upon
- Firing angle and load resistance
  - Firing angle and supply frequency
  - Firing angle and load inductance
  - Only on load circuit parameters
23. The *SCR* is turned off when the anode current falls below
- Forward current rating
  - Break - over voltage
  - Holding current
  - Latching
24. *V-I* characteristics of emitter of a *UJT* is
- Similar to *CE* with linear and saturation region
  - Similar to *FET* with a linear and pinch of region
  - Similar to tunnel diode in some respects
  - Linear between the peak point and valley point
25. A transformer works on
- DC
  - AC
  - AC & DC both
  - Neither AC nor DC
26. Which of the following device is used in transformer ?
- Tube light
  - Electric heater
  - Mobile phone
  - Rectifier module
27. Earth electrodes can be in the form of
- rods or pipes
  - stripes
  - plates
  - any of above

28. Carbon or metal brushes are used in
- DC generators only
  - AC generators only
  - Both AC & DC generators
  - None of above
29. Energy is lost due to Joule's heating effects in winding of transformer. This loss is called
- copper loss
  - eddy current loss
  - flux loss
  - none
30. In refrigeration cycle heat is lost in
- cooling coil
  - condenser
  - compressor
  - expansion valve
31. The power factor of AC circuit is
- $R / X$
  - $R / Z$
  - $Z / R$
  - Zero
32. Silicon controlled rectifier (*SCR*) is a
- switch
  - transformer
  - amplifier
  - detector
33. The rectifier output is good if ripple factor is
- more
  - less
  - constant
  - none of above
34. Protective relays can monitor large AC current by means of
- current transformer
  - potential transformer
  - micro transformer
  - none of above

35. The combined A.M.T. of two similar batteries connected in parallel is

- halved
- doubled
- remains constant
- none of above

36. The current in circuit having 5 V EMF source and 10 ohms resistance is

- 2 Amp
- 50 Amp
- 5 Amp
- 1.2 Amp

37. The chopper is a device to change

- voltage
- current
- frequency
- none of these

38. The power consumption, in case of centrifugal loads (like pump, fan, blower, etc.) is proportional to

- speed
- square of speed
- cube of speed
- none of above

39. Which of the following needs to be measured after rewinding of motor

- no load current
- air gap
- winding resistance
- all of above

40. Five percent increase in supply frequency will change the synchronous speed of motor by

- 5%
- +5%
- 10%
- +10%

41. Which one is the best among following inverters

- square wave inverter
- quasi sine wave inverter
- pure sine wave inverter
- triangular wave inverter

42. For driving a tape recorder or a record player, the motor used is generally

- a synchronous motor
- a hysteresis motor
- an induction motor
- a DC series motor

43. The DC motor starter used with a constant speed shunt motor is a

- 2 point starter
- 3 point starter
- 4 point starter
- 5 point starter

44. A commutator in DC machine convert

- AC to DC
- DC to AC
- Both AC to DC and DC to AC
- None of these

45. Two transformers operating in parallel will share the load according to their

- leakage reactance
- pu impedance
- efficiency
- rating

46. The size of the earth wire is determined by

- the ampere capacity of service wires
- the atmospheric conditions
- the voltage of service wires
- none of these

47. The function of lightning arrester is

- to limiting the short circuit fault current
- to provide path to high voltage surge to earth
- to reduce arcing
- none of these

48. Surge protector provides

- high impedance to normal voltage
- low impedance to surge
- both (a) and (b)
- none of these

49. Earthing is necessary to give protection against

- voltage fluctuation
- overloading
- danger of electric shock
- high temperature of conductors

50. the primary function of fuse is to
- protect the appliance
  - open the circuit
  - prevent excessive current
  - protect the line

**SECTION: -B**

**Communication**

**Answer all the questions.**

**Chose the most appropriate one from the given choices.**

- (1) The most common modulation system used for telegraphy is
- FSK
  - PSK
  - PCM
  - single tone modulation
  - Two tone modulation
- (2) VSB is an abbreviation of vestigial sideband, is derived by filtering
- DSB
  - AM
  - either (a) or (b)
  - PM
- (3) The Hartely law states that
- The maximum rate of information transmission depends on the depth of modulation
  - The maximum rate of information depends on the channel bandwidth.
  - Only binary codes may be used
  - Redundancy is essential
- (4) The FM signal with a modulation index  $m_f$  is passed through a frequency tripler. The wave in the output of the tripler will have a modulation index of
- $m_f / 9$
  - $m_f / 3$
  - $m_f$
  - $3 m_f$
  - $9 m_f$
- (5) In high power AM transmission, modulation is done at
- Buffer stage
  - Oscillator stage
  - RF power stage
  - If stage
- (6) Companding is used
- In delta modulator to combat noise
  - To limit amplitude in PCM transmitters.
  - In PWM for working it with TDM
  - To protect small signals in PCM from quantizing distortion
  - In PCM to reduce the SNR

(7) In PCM system the SNR of the output signal increases

- (a) Inversely with bandwidth
- (b) Exponentially with bandwidth
- (c) With rate of sampling
- (d) At low frequencies only

(8) Armstrong modulator generates

- (a) Phase modulated signal
- (b) Frequency modulated signal
- (c) Both of these
- (d) Pulse code modulated signal
- (e) AM and PCM signals

(9) A Klystron is a cavity acting as buncher and catcher is used as microwave tube for

- (a) Guiding waves
- (b) Velocity modulation
- (c) frequency modulation
- (d) impedance matching
- (e) all of these

(10) Easily adjustable tuning component in a waveguide is

- (a) plunger
- (b) plunger and stub
- (c) screw
- (d) both (a) and (c)
- (e) both (b) and (c)

(11) A ferrite is

- (a) A non-conductor with magnetic properties
- (b) A conductor with magnetic properties
- (c) A semiconductors
- (d) An insulator which attenuates magnetic fields
- (e) A compound with good conductivity.

(12) Vacuum tubes eventually fail at microwave frequencies because of their

- (a) Inter electrode capacitance
- (b) Small series inductance
- (c) Large shunt capacitance
- (d) Short transit time
- (e) Increased noise figure.

(13) The biggest disadvantage the IMPATT diode has is its

- (a) Lower efficiency
- (b) high noise
- (c) Low BW
- (d) inability to provide pulse operation
- (e) low power handling ability.

(14) In AM transmission the frequency, which is not transmitted is

- (a) carrier frequency
- (b) audio frequency
- (c) upper side frequency
- (d) lower side frequency

(15) FM broadcast band lies in

- (a) VHF
- (b) UHF
- (c) SHF
- (d) HF

(16) Automatic gain control is used

- (a) to maintain the tuning correct
- (b) to reduce the voltage of loud passage of music
- (c) to maintain the same amount of output, when stations of different strength are received
- (d) to increase the amplification at high frequencies

(17) The modulation system inherently is most noise resistant in

- (a) SSB suppressed carrier
- (b) FM
- (c) PPM
- (d) PCM

(18) In practical waveguide act as

- (a) low pass filter
- (b) high pass filter
- (c) band pass filter
- (d) band stop filter

(19) The antenna efficiencies achieved in practice depend upon

- (a) wave length
- (b) impedance
- (c) frequency
- (d) none of above

(20) The process of compressing the digital codes at the transmitter and then expanding them back to their original form at receiver is known as

- (a) Quantizing
- (b) companding
- (c) step sizing
- (d) modulation

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(21) Digital transmission efficiency is given by  
 (a) information bits / total bits  
 (b) total bits / information bits  
 (c) redundant bits / information bits  
 (d) none of above

(22) The speed of BRI ISDN interface is  
 (a) 2B+D  
 (b) 2D+B  
 (c) 30B+D  
 (d) 30D+B

(23) Which of the following is not microwave generation source  
 (a) Klystron  
 (b) Magnetron  
 (c) TWT  
 (d) Diode

(24) A signal of maximum frequency of 1 KHz is sampled at Nyquist rate. The interval between two successive sample is  
 (a) 50 micro seconds  
 (b) 100 micro seconds  
 (c) 500 micro seconds  
 (d) 1000 micro seconds

(25) In order to get back the original signal, it is necessary to use  
 (a) low pass filter  
 (b) high pass filter  
 (c) band pass filter  
 (d) band reject filter

(26) Man made noise is caused by  
 (a) solar eruptions  
 (b) distant stars  
 (c) lightning discharges  
 (d) arc discharge in electric machines

(27) At microwave frequencies, the size of the antenna becomes  
 (a) very large  
 (b) large  
 (c) small  
 (d) very small

(28) Due to curvature of earth, microwave repeaters are placed at distance of about  
 (a) 10 Km  
 (b) 50 Km  
 (c) 200 Km  
 (d) 500 Km

(29) For handling large microwave power, the best medium is  
 (a) coaxial line  
 (b) rectangular waveguide  
 (c) stripline  
 (d) circular wave guide

(30) An attenuator is used with TWT to  
 (a) prevent oscillations  
 (b) increase gain  
 (c) prevent saturation  
 (d) help bunching

(31) TWT is basically  
 (a) an oscillator  
 (b) tuned amplifier  
 (c) wideband amplifier  
 (d) an audio amplifier

(32) The negative resistance in Gunn diode is due to  
 (a) electron transfer to a less mobile energy level  
 (b) high reverse bias  
 (c) electron domain formation at the junction  
 (d) tunneling across the junction

(33) Which of the following sinusoidal oscillator is preferred for microwave frequencies ?  
 (a) resonant circuit oscillator  
 (b) RC phase shift oscillators  
 (c) negative resistance oscillators  
 (d) all of the above

(34) When electromagnetic waves are propagated in a waveguide  
 (a) they travel along the walls of the waveguide  
 (b) they travel through the dielectric without touching the walls  
 (c) they are reflected from the walls but do not travel along the walls  
 (d) none of above

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- (35) Waveguides are generally made of
- cast iron or steel
  - white metal or gun metal
  - bronze or aluminium
  - plastic or bakelite
- (36) The cutoff frequency of a waveguide means
- lower frequencies will not be propagated
  - it determines the dimensions of the wave guide
  - frequency at which zero transmission takes place
  - none of above
- (37) In case of matched load
- transmission is zero
  - reflection is zero
  - reflection is unity
  - transmission is equivalent to reflection
- (38) In an AM wave with 100% modulation, the carrier is suppressed. The percentage of power saving will be
- 100%
  - 50%
  - 25%
  - 66.7%
- (39) The function of AM detector circuit is
- to rectify the input signal
  - to discard the carrier
  - to provide the audio signal
  - all of above
- (40) In FM, the noise can be further decreased by
- decreasing deviation
  - increasing deviation
  - keeping deviation constant
  - none of these
- (41) In PPM, message resides in
- pulses
  - time location of pulse edges
  - none of these
- (42) Which of the following pulse systems is preferred for communication in presence of noise?
- PAM
  - PDM
  - PPM
  - none of above
- (43) Which of the following pulse systems requires higher bandwidth
- PAM
  - PDM
  - PPM
  - none of these
- (44) The audio frequency range lies between
- 20 to 20,000 Hz
  - 20 to 20,000 KHz
  - 400 to 8,000 Hz
  - 500 to 5,000 Hz
- (45) Maximum undistorted power output of a transmitter is obtained when its modulation is
- more than 100%
  - 100%
  - less than 100%
  - 50%
- (46) The AGC voltage in a radio receiver is proportional to
- the amount of modulation
  - the amplitude of audio signal
  - the amplitude of IF carrier
  - none of these
- (47) An FM transmitter has maximum frequency deviation of 75 KHz and reproduces audio signal up to 15 KHz. Minimum channel width required, in KHz is
- 180
  - 120
  - 90
  - 60
- (48) With 100% modulation, ratio of side band power to total power transmitted in an amplitude modulated wave is
- $\frac{2}{3}$
  - $\frac{1}{3}$
  - $\frac{1}{2}$
  - $\frac{1}{4}$

49. To increase the  $Q$  factor of an inductor, it is wound with

- thicker wire
- thinner wire
- longer wire
- wire with heavy insulation

50. Power factor of a purely resistive circuit is

- zero
- one
- 0.5
- infinity

## SECTION C: NETWORKS, FILTERS AND TRANSMISSION LINES

- Pick up wrong statement.
  - A group of interconnected individual components known as circuit elements is called a network.
  - A lumped network is an arrangement of physically separate resistors, inductors and capacitors.
  - Distributed network is one, which the resistive, inductive and capacitive effects are inseparable for network analysis.
  - A branch is a network having four elements.
- Kirchoff's laws for networks are
  - The algebraic sum of branch currents meeting at any node is zero.
  - The algebraic sum of voltage drops in any set of branches forming a closed circuit or loop must be equal to zero.
  - Both (a) and (b)
  - Neither (a) nor (b)
- Mutually coupled circuit is a circuit which is
  - Bilateral.
  - Unilateral.
  - None of these.
  - Either (a) or (b).
- Duality is a
  - Transformation in which current and voltages are interchanged.
  - Active sources become passive sources.
  - Passive sources become active sources.
  - Both (b) and (c).
- Combined inductance of two inductors  $L_1$  and  $L_2$  connected in parallel is
  - $L_1 + L_2$
  - $(L_1 + L_2) / L_1$
  - $(L_1 + L_2) / (L_1 \times L_2)$
  - $(L_1 \times L_2) / (L_1 + L_2)$
- Normal analysis techniques are based on
  - Thevenin's theorem
  - Tellegan's theorem
  - Superposition theorem
  - Kirchoff's laws

7. Two voltage sources can be connected in parallel when they are equal in
- Magnitude
  - Frequency
  - Phase
  - All the above.
8. The kirchoff's law fail in
- Linear circuits
  - Non-linear circuits
  - Lumped parameter circuits
  - Distributed parameter circuits
9. Which of the following is a nonreciprocal network?
- A network consisting of all resistances
  - A network consisting of all capacitances
  - A network consisting of all inductances
  - A transistor model
10. When two systems obey equations of the same form the systems are said to be
- Similar system
  - Identical system
  - Analogous system
  - Digital system
11. For a highly selective circuit
- It must have large value of  $Q$
  - It must have high value of capacitance to produce resonance at fixed frequency
  - Either (a) or (b)
  - Neither (a) nor (b)
12. A network consisting of four terminals is called a
- One port network
  - Two port network
  - Four port network
  - None of the above
13. Driving point of a network is
- A port where voltage or current source is connected
  - A terminal where load is connected
  - A port where load is connected
  - None of the above

14. Ceramic filters are similar in construction to
- Crystal filters
  - Crystal ladder filters
  - Crystal lattice
  - Mechanical filters
15. When two port networks are connected in parallel the resultant
- Z parameters are the some of individual parameters
  - Y- parameters are the some of individual parameters
  - Both (a) and (b)
  - Neither (a) nor (b)
16. Electric wave filters
- Allow electric signals with specified frequency range
  - Suppress signals outside a specified range
  - Both (a) and (b) occurs simultaneously
  - Either (a) or (b) occur at a time
17. A cascade connection of low pass filter and high pass filter is called
- Band pass filter
  - Band elimination filter
  - Neither (a) nor (b)
  - Both (a) and (b)
18. The response of a network is decided by the location of
- Its poles
  - Its zeros
  - Either (a) nor (b)
  - Both (a) and (b)
19. Example of two port network is
- Transformer
  - Transmission line
  - Bridge circuit and transistor circuit
  - All of the above
20. The circuit whose properties are same in either direction is called
- Universal circuit
  - Reversible circuit
  - Unilateral circuit
  - Bilateral circuit

- 21. Distortion in transmission line is due to
  - a. Delay distortion
  - b. Phase distortion
  - c. Frequency distortion
  - d. All the above
- 22. The general parameters distributed along a transmission line are
  - a. R&L only
  - b. L&C only
  - c. C&G only
  - d. R,L,C&G
- 23. Phase distortion is prominently caused by
  - a. circuit transients
  - b. non linear characteristics
  - c. linearity
  - d. none
- 24. The voltage or current from the receiving end towards the sending end, decreasing in amplitude with increasing distance from the load is called
  - a. incident wave
  - b. medium wave
  - c. reflected wave
  - d. none of above
- 25. E.M. Waves of UHF is propagated efficiently via
  - a. parallel wire transmission lines
  - b. open wire transmission lines
  - c. wave guides
  - d. coaxial cables
- 26. Norton theorem is valid for network containing only
  - a. linear elements
  - b. no linear elements
  - c. resistance
  - d. reactance
- 27. The maximum power is absorbed by one network from other, joined to it at two terminals when the impedance of one is
  - a. complex conjugate of other
  - b. square root of other
  - c. same as other
  - d. none of above

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- 28. The decrease in effective conductor cross section at high frequencies
  - a. decrease the conductor resistance
  - b. increase the conductor resistance
  - c. no change in conductor resistance
  - d. none of above
- 29. Voltage standing wave ratio lies in the range
  - a. 0 to 1
  - b. 1 to infinity
  - c. 0 to infinity
  - d. -1 to +1
- 30. Attenuators have applications
  - a. in AC circuits only
  - b. in DC circuits only
  - c. in AC as well DC circuits
  - d. in low frequency circuits only
- 31. In an network
  - a. the number of tree branches is equal to the number of links
  - b. the number of tree branches cannot be equal to the number of links
  - c. the number of tree branches has no relation with the number of links branches
  - d. none of these
- 32. In open line transmission systems, attenuation is more at
  - a. lower frequencies
  - b. medium frequencies
  - c. higher frequencies
  - d. remains constant
- 33. a power ratio 100 is equivalent to
  - a. 10 dB
  - b. 20 dB
  - c. 50 dB
  - d. 100 dB
- 34. The velocity factor for small widely spaced conductors such as open wire line in air is very nearly
  - a. 0.66
  - b. 0.98
  - c. 0.82
  - d. 0.76

35. Transmission of power to a load over a transmission line achieves optimum value when standing wave ratio (SWR) becomes

- a. 2 : 1
- b. 1 : 2
- c. 1 : 1
- d. 1 : 10

36. The VSWR in a short circuited loss less transmission line equals

- a. infinity
- b. unity
- c. zero
- d. none of above

37. The velocity factor of a transmission line

- a. is always greater than unity
- b. depend upon the permittivity of the surrounding medium
- c. is least for air medium
- d. is governed by skin effect

38. Which of the following is not correct

- a. voltage source is an active element
- b. current source is a passive element
- c. resistance is a passive element
- d. conductance is a passive element

39. A network is said to be nonlinear if it does not satisfy

- a. superposition condition
- b. homogeneity condition
- c. both superposition and homogeneity conditions
- d. associative condition

40. An capacitor with zero initial condition at  $t = 0^+$  act as a

- a. short circuit
- b. open circuit
- c. current source
- d. voltage source

41. An inductor stores energy in

- a. electrostatic field
- b. electromagnetic field
- c. magnetic field
- d. core

42. In series LCR circuit , at resonance,

- a. current is maximum, power factor is zero
- b. current is maximum, power factor is unity
- c. current is minimum, power factor is unity
- d. none of above

43. In an RCL series circuit, during resonance, the impedance will be

- a. zero
- b. minimum
- c. maximum
- d. none of above

44. When a source is delivering maximum power to load, the efficiency of the circuit is always

- a. 50%
- b. 75%
- c. 100%
- d. None of above

45. In a linear network, when the ac input is doubled, the ac output becomes

- a. two times
- b. four times
- c. half
- d. one forth

46. A passive network has

- a. current sources but no voltage sources
- b. voltage sources but no current sources
- c. both current and voltage sources
- d. no voltage or current sources

47. Two resistances are connected in parallel and each dissipates 50 watts. The total power supplied by the source is

- a. 25 watts
- b. 50 watts
- c. 100 watts
- d. 200 watts

48. Three bulbs of 60 watts each are connected in parallel across 220v, 50 Hz supply. If one bulb burns out

- a. only remaining two will operate
- b. remaining two will not operate
- c. all of three will operate
- d. there will be heavy current from the supply

(49) The amplitude of an audio signal is 10 and that of carrier wave is 50. Percentage modulation is

- (a) 0.2
- (b) 20
- (c) 5
- (d) 60

(50) The main advantage of PCM system is

- (a) lower bandwidth
- (b) lower power
- (c) lower noise

**SECTION:-D**

**Instruments and Measurement**

Answer all the questions.

Chose the most appropriate one from the given choices.

- (1) Instrument is a device for determining
  - (a) the magnitude of a quantity
  - (b) the physics of a variable
  - (c) either of the above
  - (d) both (a ) and (b)
- (2) Electronic instruments are preferred because they have
  - (a) no indicating part
  - (b) low resistance in parallel circuit
  - (c) very fast response
  - (d) high resistance in series circuit
  - (e) no passive elements.
- (3) A dc wattmeter essentially consist of
  - (a) two ammeters
  - (b) two voltmeters
  - (c) A voltmeter and an ammeter
  - (d) a current and potential transformer
- (4) Decibel is a unit of
  - (a) power
  - (b) impedance
  - (c) frequency
  - (d) power ratio
- (5) A dc voltmeter may be used directly to measure
  - (a) frequency
  - (b) polarity
  - (c) power factor
  - (d) power
- (6) An accurate voltmeter must have an internal impedance of
  - (a) very low value
  - (b) low value
  - (c) medium value
  - (d) very high value
- (7) The insulation resistance of a transformer winding can be easily measured with
  - (a) Wheatstone bridge
  - (b) megger
  - (c) Kelvin bridge
  - (d) voltmeter
- (8) A 100 V voltmeter has full-scale accuracy of 5%. At its reading of 50 V it will give an error of
  - (a) 10 %
  - (b) 5 %
  - (c) 2.5 %
  - (d) 1.25 %

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(9) You are required to check the p.f. of an electric load. No p.f. meter is available. You would use

- (a) a wattmeter
- (b) an ammeter, a voltmeter and a wattmeter
- (c) a voltmeter and an ammeter
- (d) a kWh meter

(10) The resistance of a field coil may be correctly measured by using

- (a) a voltmeter and an ammeter
- (b) Schering bridge
- (c) a Kelvin double bridge
- (d) a Maxwell bridge

(11) An analog instrument has output

- (a) Pulsating in nature
- (b) Sinusoidal in nature
- (c) Which is continuous function of time and bears a constant relation to its input
- (d) Independent of the input quantity

(12) Basic charge measuring instrument is

- (a) Duddel's oscillograph
- (b) Cathode ray oscillograph
- (c) Vibration Galvanometer
- (d) Ballistic Galvanometer
- (e) Battery Charging equipment

(13) A.C. voltage can be measured (using a d.c. instrument) as a value obtained

- (a) by subtracting the d.c. reading from its a.c. reading.
- (b) Using the output function of the multimeter.
- (c) By using a suitable inductor in series with it
- (d) By using a parallel capacitor with it
- (e) None of the above

(14) A moving coil permanent magnet ammeter can be used to measure

- (a) D.C. current only
- (b) A.C. current only
- (c) A.C. and D.C. currents.
- (d) voltage by incorporating a shunt resistance
- (e) none of these.

(15) Select the wrong statement

- (a) the internal resistance of voltmeter must be high.
- (b) The internal resistance of ammeter must be low.
- (c) The poor overload capacity is the main disadvantage of hot wire instruments.
- (d) The check continuity with multimeter, the highest range should be used.
- (e) In moving iron voltmeter, frequency compensation is achieved by connecting a capacitor across its fixed coil.

(16) Which of the following instrument is suitable for measuring both a.c. and d.c. quantities.

- (a) permanent magnet moving coil ammeter.
- (b) Induction type ammeter.
- (c) Quadrant electrometer.
- (d) Moving iron repulsion type ammeter.
- (e) Moving iron attraction type voltmeter.

(17) Swamping resistance is used in moving coil instruments to reduce error due to

- (a) thermal emf
- (b) temperature
- (c) power taken by the instrument
- (d) galvanometer sensitivity.

(18) A power factor meter is based on the principle of

- (a) electrostatic instrument.
- (b) Electro dynamometer instrument
- (c) Electro thermo type instrument
- (d) Rectifier type instrument.

(19) A potentiometer recorder is used for

- (a) a.c. signals
- (b) d.c. signals
- (c) both (a) and (b)
- (d) time varying signals
- (e) none of these.

(20) Transformers used in conjunction with measuring instruments for measuring purposes are called

- (a) Measuring transformers
- (b) transformer meters
- (c) power transformers
- (d) instrument transformers
- (e) pulse transformers.

(21) Leakage flux in an electrical machine is measure by

- (a) Ballistic galvanometer
- (b) Flux meter
- (c) Either (a) or (b)
- (d) Vibration galvanometer
- (e) CRO

(22) A C.R.O. is used to indicate

- (a) supply waveform
- (b) magnitude of the applied voltage
- (c) B.H. loop
- (d) all of these
- (e) Magnitude of the current flowing in it.

- (23) An oscillator is a  
(a) an amplifier having feedback network  
(b) a high gain amplifier  
(c) A wide band amplifier  
(d) A untuned amplifier  
(e) None of these.
- (24) Distortion can be measured by  
(a) Wave meter  
(c) Wein bridge circuit  
(b) Digital filters  
(d) Bridge T filter circuit
- (25) Series connected Q- meter is preferable for measurement of components having  
(a) high impedance  
(c) both (a) & (b)  
(e) low capacitance  
(b) low impedance  
(d) high frequency
- (26) A potentiometer is  
(a) an active transducer  
(c) a secondary transducer  
(e) a current sensing transducer  
(b) a passive transducer  
(d) a digital transducer
- (27) The basic components of a digital voltmeter are:  
(a) A/D converter and a counter  
(b) A/D converter and a rectifier  
(c) D/A converter and a counter  
(d) Ramp generator and counter  
(e) Comparator
- (28) Which of the following electrical equipment cannot convert ac into dc  
(a) diode  
(b) converter  
(c) transformer  
(d) mercury-arc rectifier
- (29) Voltage measurements are often taken by using either a voltmeter or  
(a) an ammeter  
(b) an ohmmeter  
(c) an oscilloscope  
(d) a watt-meter
- (30) The electric device which blocks dc but allows ac is called  
(a) capacitance  
(b) inductor  
(c) amplifier  
(d) transducer

- (31) The range of an ammeter can be extended by using a  
(a) shunt in series  
(b) shunt in parallel  
(c) multiplier in series  
(d) multiplier in parallel
- (32) A device that changes one form of energy to another is called  
(a) rheostat  
(b) oscillator  
(c) transducer  
(d) varicap
- (33) Aquadag is used in CRO to collect  
(a) primary electron  
(b) secondary electron  
(c) both primary and secondary  
(d) none of above
- (34) A vertical amplifier for CRO can be designed for  
(a) only a high gain  
(b) only a broad bandwidth  
(c) a constant gain time bandwidth product  
(d) all of the above
- (35) One of the following is active transducer  
(a) Strain gauge  
(b) Selsyn  
(c) Photovoltaic cell  
(d) Photo emissive cell
- (36) The dynamic characteristics of capacitive transducer are similar to those of  
(a) low pass filter  
(b) high pass filter  
(c) band pass filter  
(d) band stop filter
- (37) Thermocouples are  
(a) passive transducers  
(b) active transducers  
(c) both active and passive transducers  
(d) output transducers
- (38) The size of air cored transducers as compared to iron core counter part are  
(a) bigger  
(b) smaller  
(c) same



(39) From the point of view of safety, the resistance of earthing electrode should be

- (a) low
- (b) high
- (c) medium
- (d) the value of resistance of electrode does not effect the safety

(40) In CRT the focusing anode is located

- (a) between pre accelerating and accelerating anodes
- (b) after accelerating anodes
- (c) before pre accelerating anodes
- (d) none of above

(41) Which transducer converts heat energy into electrical voltage

- (a) L.V.D.T.
- (b) thermocouple
- (c) photoconductor
- (d) none of above

(42) Which of photoelectric transducer is used for production of electric energy by converting solar energy

- (a) photo emission cell
- (b) photo diode
- (c) photo transistor
- (d) both (b) & (c)

(43) Which of the following instruments consumes maximum power during measurement?

- (a) induction instrument
- (b) hot wire instrument
- (c) thermocouple instrument
- (d) electro dynamometer instrument

(44) which of the following meters has the best accuracy

- (a) moving iron meter
- (b) moving coil meter
- (c) rectifier type meter
- (d) thermocouple meter

(45) The function of the safety resistor in ohm meter is to

- (a) limit the current in the coil
- (b) increase the voltage drop across the coil
- (c) increase the current in the coil
- (d) protect the battery

(46) Which of the following instruments is free from hysteresis and eddy current losses?

- (a) M.I. instrument
- (b) electrostatic instrument
- (c) electro dynamometer type instrument
- (d) all of these

(47) The dielectric loss of a capacitance can be measured by

- (a) Wien bridge
- (b) Owen bridge
- (c) Schering bridge
- (d) Maxwell bridge

(48) Reed frequency meter is essentially a

- (a) recording system
- (b) deflection measuring system
- (c) vibration measuring system
- (d) oscillatory measuring system

(49) In measurements made using a Q meter, high impedance elements should preferably be connected in

- (a) star
- (b) delta
- (c) series
- (d) parallel

(50) A digital voltmeter measures

- (a) peak value
- (b) peak-to-peak value
- (c) rms value
- (d) average value

Answer all the questions.

Chose the most appropriate one from the given choices.

- (1) An open loop control system has its
- control action independent of the output or desired quantity
  - controlling action, depending upon human judgment
  - internal system changes automatically taken care of
  - both (a) and (b)
  - all (a),(b) and (c)
- (2) A servo system must have
- feedback system
  - power amplifier to amplify error
  - capacity to control position or its derivative
  - all of these
  - none of these
- (3) The major disadvantage of a feedback system may be
- Inaccuracy
  - inefficiency
  - Unreliability
  - instability
  - Insensitivity
- (4) Properties of a transfer function
- It is ratio of two polynomials in  $S$  and assumes zero initial conditions
  - It depends on system elements and not input and output of the system
  - Coefficients of the powers of  $S$  in denominator and numerator are all real constant. The order of denominator is usually greater than or equal to the order of numerator
  - All of these.
  - It is a function which transfer one physical system into another physical system.
- (5) The classical analogous of a simple lever is
- Capacitor bridge
  - transformer
  - mutual inductor
  - either of these
- (6) Two blocks  $G_1(s)$  and  $G_2(s)$  can be cascaded to get resultant transfer function as
- $G_1(s) + G_2(s)$
  - $G_1(s) / G_2(s)$
  - $G_1(s) G_2(s)$
  - $1 + G_1(s) G_2(s)$
  - $1 - G_1(s) G_2(s)$
  - two blocks cannot be cascaded
- (7) The principles of homogeneity and super position can be applied to
- linear time invariant system
  - non-linear time invariant system
  - digital control system
  - both (a) and (b)
- (8) Pick up the nonlinear systems
- automatic voltage regulator
  - d.c. servomotor with high field excitation
  - temperature control of a furnaces using thermistor
  - speed control using SCR
  - all of these
- (9) Signal flow graph(SFG) is a
- polar graph
  - semi log graph
  - log log graph
  - a special type of graph for analyzing modern control system
  - a topological representation of a set of differential equations
- (10) Disadvantages of magnetic amplifier
- time lag, less flexible, nonsinusoidal waveform
  - low power consumption and isolation of the active circuit
  - saturation of the core
  - all of these
- (11) Pick up false statement regarding magnetic amplifiers
- The gate coil of an ideal magnetic amplifier has either zero or infinite Inductance
  - Resistance of control and gate winding is very small
  - Magnetic amplifier has drooping load characteristics
  - Magnetic amplifiers are not used to control the speed of d.c. shunt motor
  - Magnetic amplifiers can be used in automatic control of electric drivers of higher rating.
- (12) High power amplification is achieved by using
- push pull amplifier
  - amplidyne
  - magnetic amplifier
  - DC amplifier
  - D.C. generator

- (13) Pick up false statement regarding servomotors
- (a) The d.c. servomotors are lighter than equivalent a.c. servomotors
  - (b) The d.c. servomotors develops higher starting and reversing torque than equivalent a.c. servomotor.
  - (c) A drag cup a.c. servomotor has one windings on stator and other on rotor
  - (d) output power of servomotors varies from 1/20 W to 100 W

- (14) To reduce steady state error
- (a) decrease natural frequency
  - (b) decrease damping
  - (c) increase damped frequency
  - (d) increase time constant
  - (e) increase gain constant of the system

- (15) A good factor for  $M_p$  should be
- (a) less than 1
  - (b) lying between 1.1 and 1.5
  - (c) more than 2.2
  - (d) zero
  - (e) infinity

- (16) Pick up false statement. Routh-Hurwitz criterion
- (a) is used for determining stability of a system
  - (b) is an algebraic procedure
  - (c) gives the exact location of roots of the characteristic equation
  - (d) does not indicate relative degree of stability or instability

- (17) Which of the following is the time domain method of determining stability of a control system
- (a) Bode plot
  - (b) Nyquist plot
  - (c) Nicholos chart
  - (d) Routh-Hurwitz array
  - (e) Constant  $M$  and  $\xi(\omega)$  locus
  - (f) Root locus technique

- (18) The technique which gives transient response quickly as well as stability information is
- (a) Nyquist plot
  - (b) Routh-Hurwitz criteria
  - (c) Bode plot
  - (d) Root locus plot
  - (e) Nichols plot

- (19) The bandwidth can be increased by use of
- (a) phase lag network
  - (b) phase lead network
  - (c) both (a) and (b) in cascade
  - (d) both (a) and (b) in parallel
  - (e) none of these

- (20) Nyquist plot is drawn on
- (a) semi log graph paper
  - (b) log log graph paper
  - (c) polar graph paper
  - (d) centimeter graph paper

- (21) If the gain margin is positive and the phase margin is negative the system is
- (a) stable
  - (b) unstable
  - (c) indeterminist

- (22) The Bode plot is applicable to
- (a) all phase network
  - (b) minimum phase network
  - (c) maximum phase network
  - (d) lag lead network
  - (e) none of these

- (23) The valid relation between setting time  $t_s$  and rise time  $t_r$  is
- (a)  $t_r > t_s$
  - (b)  $t_s > t_r$
  - (c)  $t_s = t_r$
  - (d) none of these

- (24) As a root moves further away from imaginary axis the stability
- (a) increases
  - (b) decreases
  - (c) not affected
  - (d) none of these

- (25) Flat frequency response means that the magnitude ratio of output to input over the bandwidth is
- (a) variable
  - (b) zero
  - (c) constant
  - (d) none of above

(26) How many octaves are between 200 Hz and 800 Hz  
 (a) Two octave  
 (b) One octave  
 (c) Four octave  
 (d) None of above

(27) Human system can be considered as  
 (a) open loop system  
 (b) close loop system with single feedback  
 (c) close loop system with multivariable feedback  
 (d) none of these

(28) In a feedback system the transient response  
 (a) Decays at constant rate  
 (b) gets magnified  
 (c) decays slowly  
 (d) decays more quickly

(29) Transfer function of a system is used to calculate  
 (a) the steady state gain  
 (b) the main constant  
 (c) the order of system  
 (d) the output for any given input  
 (e) all of the above

(30) Transfer function of a system is defined as the ratio of output to input in  
 (a) Laplace transform  
 (b) Z-transform  
 (c) Fourier transform  
 (d) Simple algebraic form

(31) Introduction of feedback decreases the effect of  
 (a) disturbances  
 (b) noise signals  
 (c) error signals  
 (d) all the above

(32) The system response of a system can be best tested with  
 (a) unit impulse input signal  
 (b) ramp input signal  
 (c) sinusoidal input signal  
 (d) exponentially decaying input signal

(33) Which of the following is a closed loop system  
 (a) electric switch  
 (b) car starter  
 (c) dc generator  
 (d) auto-pilot for an aircraft

(34) Which of the following is used as an error detector  
 (a) potentiometer  
 (b) field controlled ac motor  
 (c) amplidyne  
 (d) armature controlled ac motor

(35) The break away point of root loci are  
 (a) open loop poles  
 (b) closed loop poles  
 (c) open loop zeros  
 (d) closed loop zeros

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(36) Noise in a control system can be kept low by  
 (a) reducing the bandwidth  
 (b) attenuating such frequencies at which external signals get coupled into the system  
 (c) both (a) and (b)  
 (d) none of these

(37) Main cause of absolute instability in the control system is  
 (a) parameters of controlling system  
 (b) parameters of controlled system  
 (c) parameters of feedback system  
 (d) error detector where the two signals are compared

(38) Basically a controller is  
 (a) an amplifier  
 (b) a clipper  
 (c) a comparator  
 (d) a summer

(39) A system with gain margin close to unity or a phase margin close to zero is  
 (a) highly stable  
 (b) highly oscillatory  
 (c) relatively stable  
 (d) none of these

(40) Which of the following elements is not used in an automatic control system

- (a) sensor
- (b) error detector
- (c) oscillator
- (d) final control element

(41) AC systems are usually preferred to the DC systems in control applications because

- (a) AC systems are cheaper
- (b) AC systems are more stable
- (c) AC systems have better performance characteristics and smaller in size
- (d) all of these

(42) A system has the transfer function  $(1-s)/(1+s)$ . It is known as

- (a) low pass system
- (b) high pass system
- (c) all pass system
- (d) none of the above

(43) In control systems, excessive bandwidth should be avoided because

- (a) noise is proportional to bandwidth
- (b) it leads to low relative stability
- (c) it leads to slow speed of response
- (d) none of these

(44) In most systems, an increase in gain leads to

- (a) larger damping ratio
- (b) smaller damping ratio
- (c) constant damping ratio
- (d) none of these

(45) A step function is applied to the input of a system and output is of the form  $y = t$ , the system is

- (a) stable
- (b) unstable
- (c) not necessarily stable
- (d) conditionally stable

(46) Which of the following can be magnified by magnetic amplifier

- (a) voltage
- (b) current
- (c) power
- (d) none of above

(47) The inductance is not used in lag network because of

- (a) big size
- (b) time delay and hysteresis losses
- (c) high reactance
- (d) none of these

(48) Saturation in a stable control system can cause

- (a) conditional stability
- (b) over damping
- (c) low level oscillations
- (d) high level oscillations

(49) Excessive noise in control systems can cause

- (a) reduction in bandwidth
- (b) reduction in gain
- (c) saturation in amplifying stages
- (d) oscillations

(50) The type-0 system has

- (a) net pole at the origin
- (b) no pole at the origin
- (c) simple at the origin
- (d) two poles at the origin

Answer all the questions.

Choose the most appropriate one from the given choices.

1. A 32-bit processor has -
  - (a) 32 registers
  - (b) 32 I/O devices
  - (c) 32 Mb of RAM
  - (d) a 32-bit bus or 32-bit registers
2. Clock speed is measured in -
  - (a) bits per second
  - (b) Hertz
  - (c) bytes
  - (d) baud
3. A 20-bit address bus allows access to a memory of capacity -
  - (a) 1 MB
  - (b) 2 MB
  - (c) 4 MB
  - (d) 8 MB
4. A microprocessor contains
  - (a) most of RAM
  - (b) most of ROM
  - (c) peripheral drivers
  - (d) most of the control and arithmetic logic functions of computer
5. Which of the following is NOT a type of processor -
  - (a) PowerPC
  - (b) Motorola 8086
  - (c) Motorola 68000
  - (d) Intel Pentium
6. If interrupt arrives on the three lines INTR, RTS 6.5 and RTS 7.5, which of them will the 8085 processor acknowledge?
  - (a) INTR
  - (b) RTS 6.5
  - (c) RTS 7.5
7. The Intel 8086 processor is -
  - (a) 8-bit
  - (b) 16-bit
  - (c) 32-bit
  - (d) 64-bit

8. An assembly language instruction -
  - (a) always has a label
  - (b) always takes at least one operand
  - (c) always has an operation field
  - (d) always modifies the status register
9. An interrupt instruction -
  - (a) causes an unconditional transfer of control
  - (b) causes a conditional transfer of control
  - (c) modifies the status register
  - (d) is an I/O instruction
10. Programs are written in assembly language because they -
  - (a) run faster than High-level language
  - (b) are portable
  - (c) easier to write than machine code programs
  - (d) they allow the programmer access to registers or instructions that are not usually provided by a High-level language

11. Given that the subprogram `putc` displays the character in `al`, the effect of the following instructions is -

- ```
mov al, 'c'
sub al, 2
call putc
```
- (a) display 2
  - (b) display 'c'
  - (c) display 'a'
  - (d) display a blank

12. The result of `mov al, 65` is to store -
  - (a) store 0100 0010 in `al`
  - (b) store 42H in `al`
  - (c) store 40H in `al`
  - (d) store 0100 0001 in `al`
13. Microprocessor is also often called a -
  - (a) Chip
  - (b) Resistor
  - (c) Capacitor
  - (d) Transistor
14. A microprocessor's program counter has -
  - (a) the digital value of the data
  - (b) the address of an instruction
  - (c) the address of data

15. Which of the following is a math co-processor -

- (a) 8085
- (b) 8086
- (c) 8087
- (d) 8088

16. Interrupts are classified as -

- (a) Hardware interrupts
- (b) Software interrupts
- (c) Hardware interrupts and Software interrupts
- (d) none of the above

17. The system bus is made up of -

- (a) data bus
- (b) data bus and address bus
- (c) data bus and control bus
- (d) data bus, control bus and address bus

18. The memory address register is used to store -

- (a) data to be transferred to memory
- (b) data that has been transferred from memory
- (c) the address of a memory location
- (d) an instruction that has been transferred from memory

19. When an interrupt occurs, the processor completes the current \_\_\_\_\_ before jumping to the interrupt service subroutine -

- (a) microinstruction it is executing
- (b) instruction it is executing
- (c) macro it is executing
- (d) subroutine it is executing

20. A microprocessor is a processor with a reduced -

- (a) instruction set
- (b) power requirement
- (c) MIPS performance
- (d) none of the above

21. A scheme in which the address specifies which memory word contains the address of the operand, is called -

- (a) Immediate addressing
- (b) Based addressing
- (c) Direct addressing
- (d) Indirect addressing

22. Processor gets the address of the next instruction to be processed from -

- (a) Instruction register
- (b) Instruction counter
- (c) Program counter
- (d) Program register

23. Fetch operations are not required in -

- (a) Immediate addressing
- (b) Register addressing
- (c) Direct addressing
- (d) Indirect addressing

24. What is meant by Maskable interrupts?

- (a) An interrupt that can be turned off by the programmer.
- (b) An interrupt that cannot be turned off by the programmer.
- (c) An interrupt that can be turned off by the system.
- (d) An interrupt that cannot be turned off by the system.

25. Which interrupts are generally used for critical events such as Power failure, Emergency, Shut off etc.?

- (a) Maskable interrupts
- (b) Non-Maskable interrupts
- (c) none of the above

26. Which microprocessor accepts the program written for 8086 without any changes?

- (a) 8085
- (b) 8087
- (c) 8088

27. How many memory locations are required to store the instruction LXI H, 0800H in an 8085 assembly language program?

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

28. How many memory fetches (including instruction fetch) are required to execute the instruction LXI H, 0800H in an 8085 assembly language program?

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

- 29. MPU stands for-
  - (a) Multi-Processing Unit
  - (b) Micro-Processing Unit
  - (c) Mega-Processing Unit
  - (d) Major-Processing Unit
- 30. Which of the following is not possible by a microprocessor -
  - (a) Reading from Memory
  - (b) Writing into Memory
  - (c) Reading from Input port
  - (d) Writing into Input port
- 31. In which microprocessor does the concept of pipelining first introduced?
  - (a) 8086
  - (b) 80286
  - (c) 80386
  - (d) 80486
- 32. LSI stands for -
  - (a) Large Size Instruction
  - (b) Large Scale Instruction
  - (c) Large Size Integration
  - (d) Large Scale Integration
- 33. Which of the following is true about pseudocode -
  - (a) A machine language
  - (b) An assembly language
  - (c) A high level language
  - (d) none of the above
- 34. The macro processor must perform -
  - (a) recognize macro definitions and macro calls
  - (b) save the macro definitions
  - (c) expand macro calls and substitute arguments
  - (d) all of the above
- 35. A 32 bit microprocessor has the word length equal to -
  - (a) 1 byte
  - (b) 2 bytes
  - (c) 4 bytes
  - (d) 8 bytes
- 36. The TRAP interrupts mechanism of the 8085 microprocessor -
  - (a) execute an instruction supplied by an external device through the INTA signal
  - (b) execute an instruction from memory location 20H
  - (c) executes a NOP
  - (d) none of the above

- 37. What are the states of the Auxiliary carry (AC) and Carry flag (CY) after executing the following 8085 program
 

|     |        |
|-----|--------|
| MVI | H, 5DH |
| MVI | L, 6BH |
| MOV | A, H   |
| ADD | L      |

  - (a) AC=0 and CY=0
  - (b) AC=1 and CY=1
  - (c) AC=1 and CY=0
  - (d) AC=0 and CY=1
- 38. Contents of register A after the execution of the following 8085 microprocessor program is -
 

|            |
|------------|
| MVI A, 55H |
| MVI C, 25H |
| ADD C      |
| DAA        |

  - (a) 7AH
  - (b) 80H
  - (c) 50H
  - (d) 22H
- 39. Which of the following is a 16-bit micro processor?
  - (a) Motorola 6800
  - (b) Intel 8085
  - (c) Intel 8086
  - (d) Zilo 80
- 40. The Intel Pentium Pro microprocessor uses 36 address lines to access memory. What is the maximum memory that it can support, in gigabytes?
  - (a) 16
  - (b) 32
  - (c) 64
  - (d) 128
- 41. Out of the following which is not the flag in 8085 microprocessor -
  - (a) Counter flag
  - (b) Carry flag
  - (c) Zero flag
  - (d) Parity flag
- 42. What is a basic element of Memory?
  - (a) Transistor
  - (b) Flip-flop
  - (c) Gate
  - (d) none of the above



- 43. Which group of instructions do not affect the flags -
  - (a) Arithmetic operations
  - (b) Logic operations
  - (c) Data transfer operations
  - (d) Branch operations
- 44. DMA stands for -
  - (a) Direct Memory Allocation
  - (b) Distinct Memory Allocation
  - (c) Direct Memory Access
  - (d) Distinct Memory Access
- 45. In RST interrupts, RST stands for -
  - (a) Repeat Start Test
  - (b) Restart
  - (c) Start
- 46. Which interrupt has the highest priority?
  - (a) TRAP
  - (b) RST 6
  - (c) RST 6.5
  - (d) INTR
- 47. In 8085 microprocessor with memory mapped I/O -
  - (a) I/O device have 8-bit addresses.
  - (b) I/O devices are accessed using IN and OUT instructions.
  - (c) arithmetic and logic operations can be directly performed with the I/O data.
  - (d) there can be a max of 256 input devices and 256 output devices.
- 48. A microprocessor -
  - (a) reads instructions from memory
  - (b) communicates with I/O devices
  - (c) controls the timing of information flow
  - (d) all of the above
- 49. An instruction consists of -
  - (a) Data and Address
  - (b) Register and Memory
  - (c) Opcode and Operand
  - (d) Input and Output
- 50. If the 8085 adds 87H and 79 H, which of the following flags will become 1 -
  - (a) Zero flag and Auxiliary Carry flag
  - (b) Zero flag and Carry flag
  - (c) Carry flag and Auxiliary Carry flag
  - (d) none of the above

### Section G – Computers

Answer all the questions.  
 Chose the most appropriate one from the given choices.

- 1. What is the name of the software that allows us to browse through web pages?
  - (a) Browser
  - (b) Mail Client
  - (c) FTP Client
  - (d) Messenger
- 2. What is the address given to a computer connected to a network called?
  - (a) System Address
  - (b) SYSID
  - (c) Process ID
  - (d) IP Address
- 3. Which one of the following is a valid DOS command?
  - (a) LIST \*.\*
  - (b) LIST ????.???
  - (c) RECOVER A:
  - (d) RENAME A:SAMPLE.TXT C:TEST.DOC
- 4. All system settings in WINDOWS are stored in -
  - (a) CONTROL.INI
  - (b) MAIN.INI
  - (c) SYSTEM.INI
  - (d) SETTING.INI
- 5. Which number system is usually followed in a typical 32-bit computer?
  - (a) 2
  - (b) 10
  - (c) 16
  - (d) 32
- 6. Which of the following is not an output device?
  - (a) Printer
  - (b) Scanner
  - (c) Flat Screen
  - (d) Touch Screen
- 7. A microprocessor is a processor with reduced -
  - (a) instruction set
  - (b) power requirement
  - (c) MIPS performance
  - (d) none of the above

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8. Which of the following is not an output of an assembler?

- (a) executable program
- (b) source listing with line numbers and errors
- (c) a symbol table
- (d) object program

9. Which layer of OSI model is responsible for routing and flow control -

- (a) Presentation
- (b) Transport
- (c) Network
- (d) Data Link

10. Arrays are passed as arguments to a function by

- (a) value
- (b) reference
- (c) both a and b
- (d) none of the above

11. Array is -

- (a) linear data structure
- (b) non-linear structure
- (c) none of the above

12. A data structure in which elements are added and removed from only one end, is known as -

- (a) Array
- (b) Stack
- (c) Queue
- (d) none of the above

13. A diamond-shaped box in an Entity-Relationship diagram refers to -

- (a) Entity
- (b) Relationship
- (c) Attribute

14. The principle means of identifying entities within an entity set is -

- (a) Primary Key
- (b) Record
- (c) Attribute
- (d) Tuple

15. Modem refers to -

- (a) Modulator
- (b) Modulation
- (c) Demodulator
- (d) Modulator and Demodulator

16. C language is available for which of the following Operating Systems?

- (a) DOS
- (b) Windows
- (c) Unix
- (d) All of the above

17. Which of the following have the fastest access time?

- (a) Magnetic Tapes
- (b) Magnetic Disks
- (c) Semiconductor Memories
- (d) Compact Disks

18. DMA stands for -

- (a) Direct Memory Allocation
- (b) Distinct Memory Allocation
- (c) Direct Memory Access
- (d) Distinct Memory Access

19. Array subscripts in C always start at -

- (a) -1
- (b) 0
- (c) 1
- (d) Value provided by user

20. Which type of commands in DOS needs additional files for their execution?

- (a) Batch Commands
- (b) Internal Commands
- (c) External Commands

21. Which of the following statements in regard to Directories is false?

- (a) Directories can exist inside directories
- (b) The root directory is always at the highest level
- (c) Directories with files can be deleted
- (d) Directories cannot be renamed

22. It is better to buffer a table when -

- (a) When a table is read infrequently
- (b) When a table is linked to check tables
- (c) When a table is read frequently and the data seldom changes
- (d) When a single record is to be picked up

23. The Operating System is responsible for -

- (a) Controlling peripheral devices such as monitor, printers, disk drives
- (b) Provide an interface that allows users to choose programs to run and to manipulate files
- (c) Manage users' files on disk
- (d) all of the above

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- 24. A company wishes to connect two sites in different parts of the country together. It is decided to use the telephone system. What device should be connected to the file servers on each site?
  - (a) Router
  - (b) Modem
  - (c) Switch
  - (d) Hub
- 25. What is a file server?
  - (a) A computer that performs a service for other computers
  - (b) A computer that controls the printers on the network
  - (c) A computer that stores files that are created by network users
- 26. What is the Protocol used for the Internet?
  - (a) IPX/SPX
  - (b) NetBIOS/NetBEUI
  - (c) CDMA/CA
  - (d) TCP/IP
- 27. Which one of the following is not a Normal Forms (Normalization) rule with regards to the Relational Model?
  - (a) All fields within a table must relate to or directly describe the Primary Key.
  - (b) Repeating Groups must be eliminated from tables.
  - (c) Fields that can contain non-numeric data are to be removed and placed within their own tables with an associated Primary key.
  - (d) Redundant data is to be eliminated by placing the offending fields in another table.
- 28. Choose the answer which best describes the term Primary Key -
  - (a) The Primary Key is a field that contains data that can be duplicated.
  - (b) The Primary Key is a field that contains data that is unique.
  - (c) The Primary Key is a field that is never associated with any field in other tables.
  - (d) The Primary Key field is a concept used only in Microsoft Access.
- 29. Which technique is used to reduce the size of a file -
  - (a) Compression
  - (b) Decompression
  - (c) Encryption
  - (d) Decryption
- 30. BIOS stands for -
  - (a) Binary Input Output Set
  - (b) Binary Input Output System
  - (c) Basic Input Output Set
  - (d) Basic Input Output System

- 31. A floppy disk is consisting of 40 tracks, each track contains 100 sectors, and the capacity of a sector is 512 bytes, what is the approx. size of that disk?
  - (a) 1 MB
  - (b) 2 MB
  - (c) 4 MB
  - (d) 8 MB
- 32. What is the binary equivalent of a decimal number 68 -
  - (a) 1000100
  - (b) 1100100
  - (c) 1000010
  - (d) 1000001
- 33. Assembly language to machine language translation is -
  - (a) One-to-One
  - (b) One-to-Many
  - (c) Many-to-One
  - (d) Many-to-Many
- 34. Maximum size of IP address is -
  - (a) 12 bits
  - (b) 24 bits
  - (c) 32 bits
  - (d) 48 bits
- 35. RAM stands for -
  - (a) Read Access Memory
  - (b) Read After Memory
  - (c) Random Access Memory
  - (d) Random After Memory
- 36. What is the final value of sum?
 

```
main()
{
  int sum=1;
  for(; sum<=9;)
    printf("%d\n", ++sum);
}
```

  - (a) 9
  - (b) 10
  - (c) 11
  - (d) none of the above

37. If  $c$  is a variable initialized to 1, how many times the following loop be executed

```
while(c>0 && c<60)
{
  c++;
}
```

- (a) 59
- (b) 60
- (c) 61
- (d) none of the above

38. The declaration `void fun(int)` indicates the fun is a function which -

- (a) has no arguments
- (b) returns nothing
- (c) both a and b
- (d) none of the above

39. Out of following which is not valid network topology -

- (a) Bus
- (b) Star
- (c) Circle
- (d) Tree

40. The overall logical structure of a database can be expressed graphically by -

- (a) Data Flow Diagram
- (b) Flow Chart
- (c) Directed Graph
- (d) Entity-Relationship Diagram

41. CARRY, in a half-adder, can be obtained using -

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

42. The memory that requires refreshing of data is -

- (a) SRAM
- (b) DRAM
- (c) SRAM
- (d) DRAM

43. The minimum number of bits required to represent numbers in the range -28 to

- +31 is-
- (a) 5
- (b) 6
- (c) 7
- (d) 8

44. Which bus carries information between processors and peripherals?

- (a) Data bus
- (b) Control bus
- (c) Address bus
- (d) Information bus

45. Which part of the computer perform arithmetic calculations?

- (a) Control unit
- (b) Registers
- (c) ALU
- (d) CPU

46. A gigabyte represents -

- (a) 1 billion bytes
- (b) 1000 kilobytes
- (c)  $2^{30}$  bytes
- (d) 10 megabytes

47. The minimum number of bits required to store the hexadecimal number FF is -

- (a) 2
- (b) 4
- (c) 8
- (d) 16

48. Cache memory enhances -

- (a) memory capacity
- (b) memory access time
- (c) secondary storage capacity
- (d) secondary storage access time

49. A UPS -

- (a) increases the storage capacity of a computer system
- (b) increases the processor speed
- (c) provides backup power in the event of a power cut
- (d) none of the above

50. An RDBMS is a -

- (a) Remote DBMS
- (b) Relative DBMS
- (c) Reliable DBMS
- (d) Relational DBMS

**BHARAT SANCHAR NIGAM LIMITED**  
**Maharashtra Telecom Circle**

**Name of the Examination:** Open Competitive Exam. For filling the vacancies of Direct Reett. Quota of TTA to be held on 15<sup>th</sup> & 16<sup>th</sup> December 2007

**Paper No :- I**

**Date :**

**Subject :-** General Ability Test

**Duration of the examination :** 2 Hours

**Maximum Marks :** 100

**INSTRUCTIONS FOR THE CANDIDATE**

1. All the answers should be written either in English or in Hindi only.
2. Write your Roll Number on the top of the first page of your answer book. Do not write your name anywhere in the Answer Book.
3. Marks are liable to be deducted for numbering questions wrongly, bad handwriting and slovenly work.
4. All rough work should be done in the last page/Pages of the Answer book. Cancel all such rough work by drawing prominent lines across it.
5. Candidates writing their answers in Hindi medium must cross check the facts and figures with English version of the questions. In case any doubt, difference and discrepancy between the two versions, the English version shall be treated as correct and final.
6. All the questions are compulsory and Marks are indicated against them.
7. Calculator is not permitted.

## PAPER-I

Time: 2 Hours

Sub: GENERAL ABILITY TEST

Marks: 100

Instructions:

- 1 Answer the questions in the Answer book supplied.
- 2 Marks are indicated against each question.

Que.1 Use prepositions given below and fit them in to the gaps  
( 10 Marks and each question 1 Mark )

(Across, After, On, Against, Under, Round, At, With, In, Above)

- i The traffic is very heavy \_\_\_\_\_ the morning
- ii There are very few people in the streets \_\_\_\_\_ midnight
- iii Tom was born \_\_\_\_\_ 5th February.
- iv Peter is walking home \_\_\_\_\_ Tom.
- v Everybody is looking \_\_\_\_\_ her.
- vi He hung the picture \_\_\_\_\_ the fire place.
- vii Some children are resting \_\_\_\_\_ the tree.
- viii Some children are sitting \_\_\_\_\_ the sand castle.
- ix There are two bridges \_\_\_\_\_ the river.
- x I am playing \_\_\_\_\_ John.

Que.2 Strike out Incorrect word printed in Bold  
( 5 Marks and each question 1 Mark )

- i A good lawyer has plent of **Customers** / Clients
- ii A strong **wind** / air blew his hat way.
- iii Suresh as well as Ramesh **are** / is going.
- iv I **complemented** / complimented him for doing such a wonderful job.
- v He came late **due to** / because of the rain.

Que 3 Choose the word or phrase which is almost same in meaning as the key word  
( 5 Marks and each question 1 Mark )

- i **Acquitted**  
a) Imprisoned      b) Freed      c) Pardoned      d) Summoned
- ii **Elusive**  
a) Evasive      b) Exclusive      c) Abusive      d) Simple
- iii **Lavish**  
a) Profuse      b) Showy      c) Gay      d) Careful
- iv **Stubborn**  
a) Easy      b) Obstinate      c) Willing      d) Pliable
- v **Accentuated**  
a) Projected      b) Exhibited      c) Sharpened      d) Mitigated

**Que.4 Choose the correct plural of the following words.**

**( 10 Marks and each question 1 Mark )**

- |      |           |                |                |                |
|------|-----------|----------------|----------------|----------------|
| i    | Cliff     | a) Cliffes     | b) Cliffies    | c) Cliffs      |
| ii   | Giraffe   | a) Giraffs     | b) Giraffes    | c) Giraffees   |
| iii  | Volcano   | a) Volcanos    | b) Volcanoes   | c) Volcano     |
| iv   | Hippo     | a) Hippos      | b) Hippees     | c) Hippoies    |
| v    | Chimney   | a) Chimney     | b) Chimnies    | c) Chimneys    |
| vi   | Loaf      | a) Loafs       | b) Loaves      | c) Loafes      |
| vii  | Child     | a) Both b&c    | b) Childrens   | c) Children    |
| viii | Deer      | a) Deer        | b) Deers       | c) Both a&b    |
| ix   | Scarf     | a) Scarfs      | b) Scarves     | c) Both a&b    |
| x    | Bookshelf | a) Bookshelf's | b) Bookshelves | c) Bookshelves |

**Que.5 Match the following opposite word.**

**( 5 Marks and each question 1 Mark )**

- |     |          |   |           |
|-----|----------|---|-----------|
| i   | Miserly  | a | Create    |
| ii  | Destroy  | b | Obedience |
| iii | Dreary   | c | Fine      |
| iv  | Defiance | d | Generous  |
| v   | Coarse   | e | Bright    |

**Que.6 Choose the correct alternative**

**( 5 Marks and each question 1 Mark )**

- |     |                                                                                           |              |                |                 |            |
|-----|-------------------------------------------------------------------------------------------|--------------|----------------|-----------------|------------|
| i   | You need _____ shoes for the hills                                                        | a) Good      | b) Comfortable | c) Satisfactory | d) Sturdy  |
| ii  | Anita _____ me of a girl <i>used to know</i>                                              | a) Remembers | b) Recalls     | c) Recollects   | d) Reminds |
| iii | The police decided to _____ the departmental store after they had received a bomb warning | a) Evacuate  | b) Expel       | c) Abandon      | d) Evict   |

- iv The scholarship \_\_\_\_\_ him to complete his studies.  
 a) Abled b) Entitled c) Enabled
- v His most striking \_\_\_\_\_ is the enthusiasm.  
 a) Character b) Factor c) Characteristic

**Que.7 Choose the correct.****( 10 Marks and each question 1 Mark )**

- i) Kurukshetra is Modern  
 a) Panipat b) Ayodhya c) Gaya
- ii) Which state in India is known as the 'Land of spices'  
 a) Kerala b) Assam c) Punjab
- iii) Where is the Victoria Memorial situated  
 a) Pune b) Mumbai c) Kolkata
- iv) The state where there is a lowest literacy rate as per the 2001 census is  
 a) Uttar Pradesh b) Bihar c) M.P.
- v) Which Greek ruler was defeated by Chandragupta Maurya  
 a) Megasthenese b) Seleucus c) Alexander
- vi) The capital of Manipur is  
 a) Kohima b) Imphal c) Port Blair
- vii) In which of the following states of India, English is the official language  
 a) Tamil Nadu b) Nagaland c) Kerala
- viii) The methods of grouping human blood was discovered by  
 a) Hippocrates b) Karl Landsteiner c) Lister
- ix) Which city is known as "Milk City of India"  
 a) Kolkata b) Panipat c) Anand
- x) The term 'TEE' is related with which of the following games  
 a) Table Tennis b) Polo c) Golf

**Que.8 Match the following****( 10 Marks and each question 1 Mark )**

- |                          |                    |
|--------------------------|--------------------|
| i) Haryana Hurricane     | a) Arundhati roy   |
| ii) Vishwanathan Anand   | b) Tennis          |
| iii) Char Minar          | c) Lucknow         |
| iv) Night angel of India | d) Rudyard Kipling |
| v) Sarod                 | e) Amjad Ali Khan  |
| vi) Yen                  | f) Chess           |
| vii) God of small things | g) Kapil Dev       |
| viii) Gomati             | h) Hyderabad       |
| ix) Jungle Book          | i) Sarojini Naidu  |
| x) Ivan Lendal           | j) Japan           |



Que 9 Pick out the odd  
( 5 Marks and each question 1 Mark )

- i) Speaker of the Loksabha  
a) Somnath Chaterji    b) P.A. Sangma    c) N Sanjiva Reddy    d) Sonia Gandhi
- ii) Badminton Player  
a) P Gopichand    b) Saina Nehwal    c) Prakash Padukone    d) Pankaj Advani
- iii) Union Territories of India  
a) Pondicherry    b) Goa    c) Lakshdweep    d) Chandigarh
- iv) Deserts  
a) Sahara    b) Nubian    c) Kalahari    d) Limpopo
- v) Ruler of Mughal Dynasty  
a) Akbar    b) Sher Shah Suri    c) Shah Jahan    d) Babar

Que 10 What do the following abbreviations stand for  
( 10 Marks and each question 1 Mark )

- i) C-DoT  
ii) HTTP  
iii) CID  
iv) CDMA  
v) SAARC  
vi) ISRO  
vii) SEBI  
viii) AIDS  
ix) LCD  
x) ESMA

Que 11. Fill in the blanks with one of the options

( 10 Marks and each question 1 Mark )

- i) Smallest state in India in area is \_\_\_\_\_  
(Kerla , Tripura , Goa )
- ii) Author of ' Shahnama ' is \_\_\_\_\_  
(Al Beruni , Abul Fazl, Firdausi)
- iii) J&K enjoys a special status under which articles of Indian Constitution  
(356 , 368 ,370 )
- iv) \_\_\_\_\_ provides fixed line telephone service with numbers starting with ' 6 '  
(Reliance, BSNL, Tata Indicom)
- v) Acrophobia is the fear of \_\_\_\_\_  
(Flowers, Pain , Height)
- vi) \_\_\_\_\_ is called the land of white elephants  
(Thailand, Nepal , Japan)
- vii) Rafael Nadal is a \_\_\_\_\_ player  
(Tennis, Foot Ball, Cricket)

- viii Conjunctivitis is connected with \_\_\_\_\_  
(Ear, Nose, Eyes)
- ix Birju Maharaj is a famous \_\_\_\_\_  
(Poet, cook, Dancer)
- x \_\_\_\_\_ is the author of 'Madhushala'  
(Harivanshrai Bacchan, Ravindranath Tagore, Iqbal)

**Que.12 Write the odd one out.**

**( 5 Marks and each question 1 Mark )**

- i Ugly, Coarse, Decent, Filthy
- ii Cheap, Priceless, Precious, Valuable
- iii Invincible, Unsurmountable, Fragile, Unconquerable
- iv Intrepid, brave, timid, courageous
- v lack, abundance, plentifulness, luxuriant

**Que. 13 Indicate the write answer**

**( 5 Marks and each question 1 Mark )**

- i The Filament of the Electric bulb is made of  
a) Iron                                  b) Tungsten                                  c) Silicon                                  d) Nickel
- ii Which layer of the atmosphere reflects radiowaves back to the the earth's surface  
a) Troposphere                          b) Stratosphere                          c) Ozone layer                          d) Ionosphere
- iii The bats fly in the dark without hitting the obstruction because  
a) They emit ultrasonic waves to detect obstruction  
b) They can see in the dark  
c) They fly with limited speed  
d) None of these
- iv Which arteries supplies blood to the heart  
a) Carotis                                  b) Hepatic                                  c) Pulmonary                                  d) Coronary
- v Which gas is used in the multi-coloured display signs  
a) Neon                                          b) Argon                                          c) Krypton                                          d) Helium

**Que 14 State True & False**

**( 5 Marks and each question 1 Mark )**

- i Kanha National park is located in West Bangal
- ii Grape contains citric acid
- iii The founder of slave dynasty was Qutb-ud-din aibak
- iv Nile is the worlds longest river.
- v The Thomas cup is associated with Football

**BHARAT SANCHAR NIGAM LIMITED**  
**Maharashtra Telecom Circle**

**Name of the Examination:** Open Competitive Exam. For filling the vacancies of Direct Rectt. Quota of TTA to be held on 15<sup>th</sup> & 16<sup>th</sup> December 2007

**Paper No :- I I**

**Date :**

**Subject :- Basic Engineering**

**Duration of the examination : 3 Hours**

**Maximum Marks : 500**

**INSTRUCTIONS FOR THE CANDIDATE**

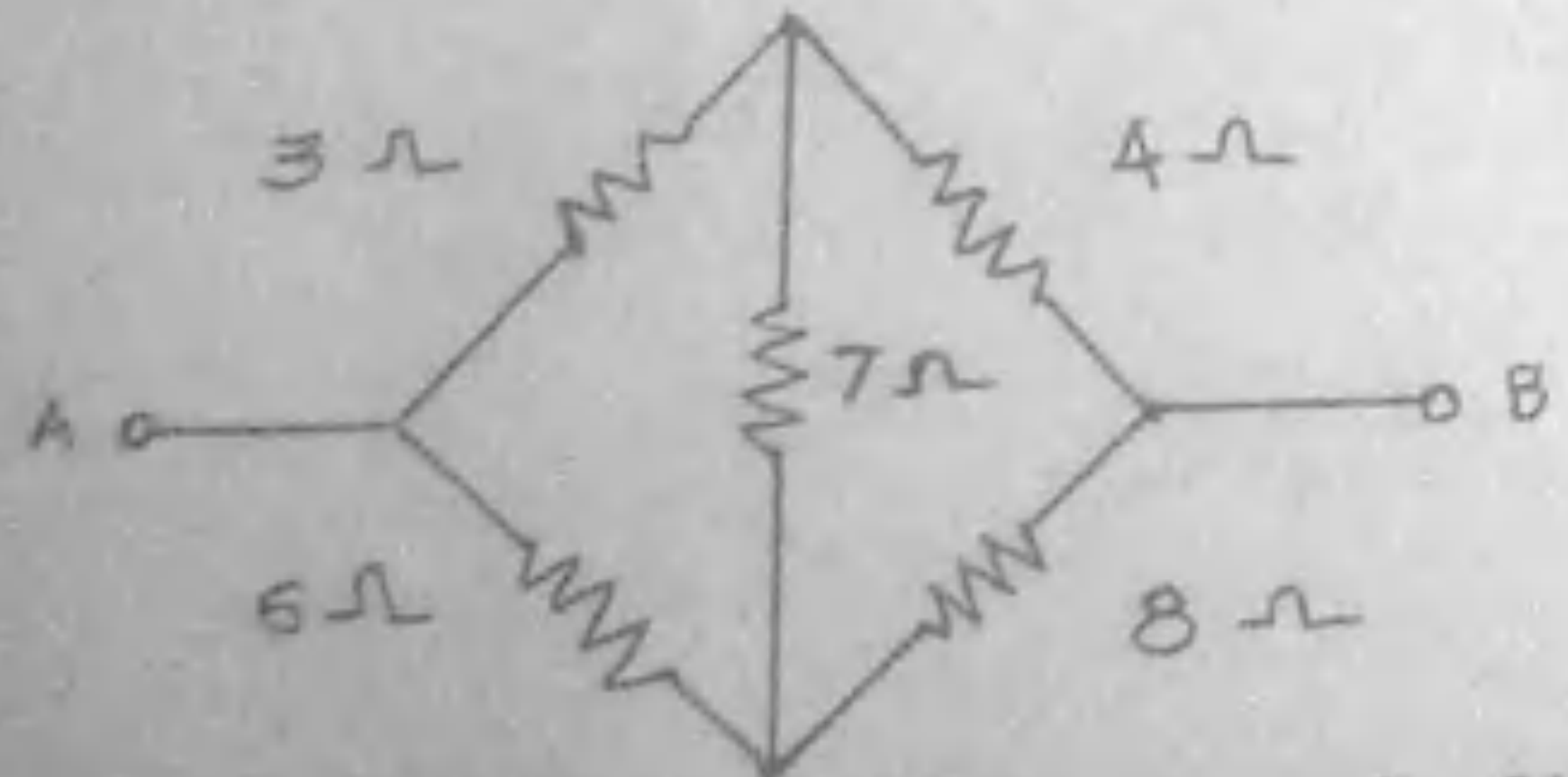
1. All the answers should be written either in English or in Hindi only.
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6. All the questions are compulsory and carrying equal Marks.
7. Calculator is not permitted.

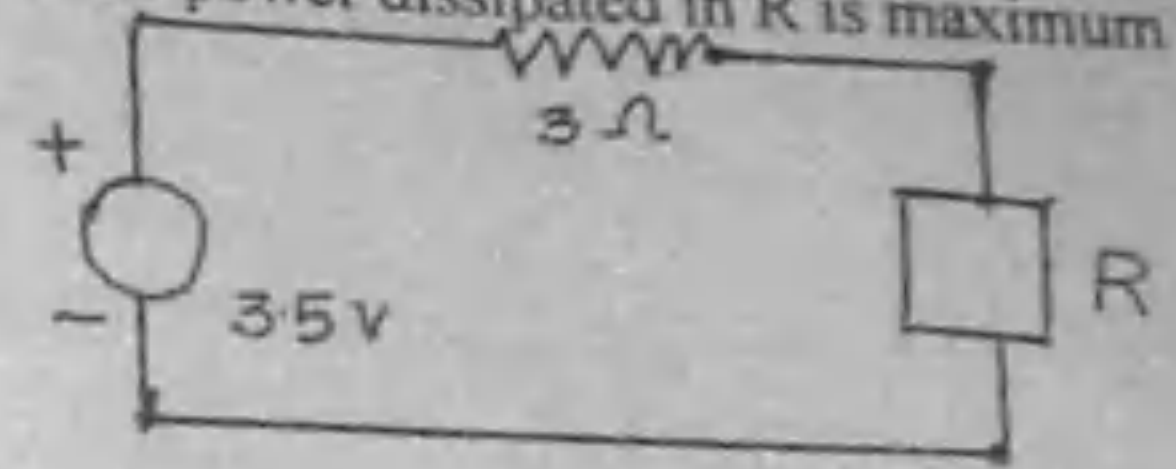
| Q. No. | Questions                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | <p>The co factor of '<math>\alpha</math>' in the determinant</p> $\begin{vmatrix} 3 & -4 & -3 \\ 2 & 7 & \alpha \\ 5 & -9 & 2 \end{vmatrix}$ <p>is</p> <p>a) 7                                      b) 5                                      c) 9                                      d) 3</p>                                                                                                                                                               |
| 2      | <p>If a, b, c are three complex numbers such that <math>a^2 + b^2 + c^2 = 0</math> and</p> $\Delta = \begin{vmatrix} b^2 + c^2 & ab & ac \\ ab & c^2 + a^2 & bc \\ ac & bc & a^2 + b^2 \end{vmatrix} = ka^2b^2c^2,$ <p>Then the value of k is</p> <p>a) 1                                      b) 2                                      c) -2                                      d) 4</p>                                                                   |
| 3      | <p>If <math>A = \begin{bmatrix} 3 &amp; 2 \\ 1 &amp; 4 \end{bmatrix}</math></p> <p>then <math>A(\text{adj } A)</math> equals</p> <p>a) <math>\begin{bmatrix} 10 &amp; 0 \\ 0 &amp; 10 \end{bmatrix}</math>                                      b) <math>\begin{bmatrix} 0 &amp; 10 \\ 10 &amp; 0 \end{bmatrix}</math></p> <p>c) <math>\begin{bmatrix} 10 &amp; 1 \\ 1 &amp; 10 \end{bmatrix}</math>                                      d) none of these</p> |

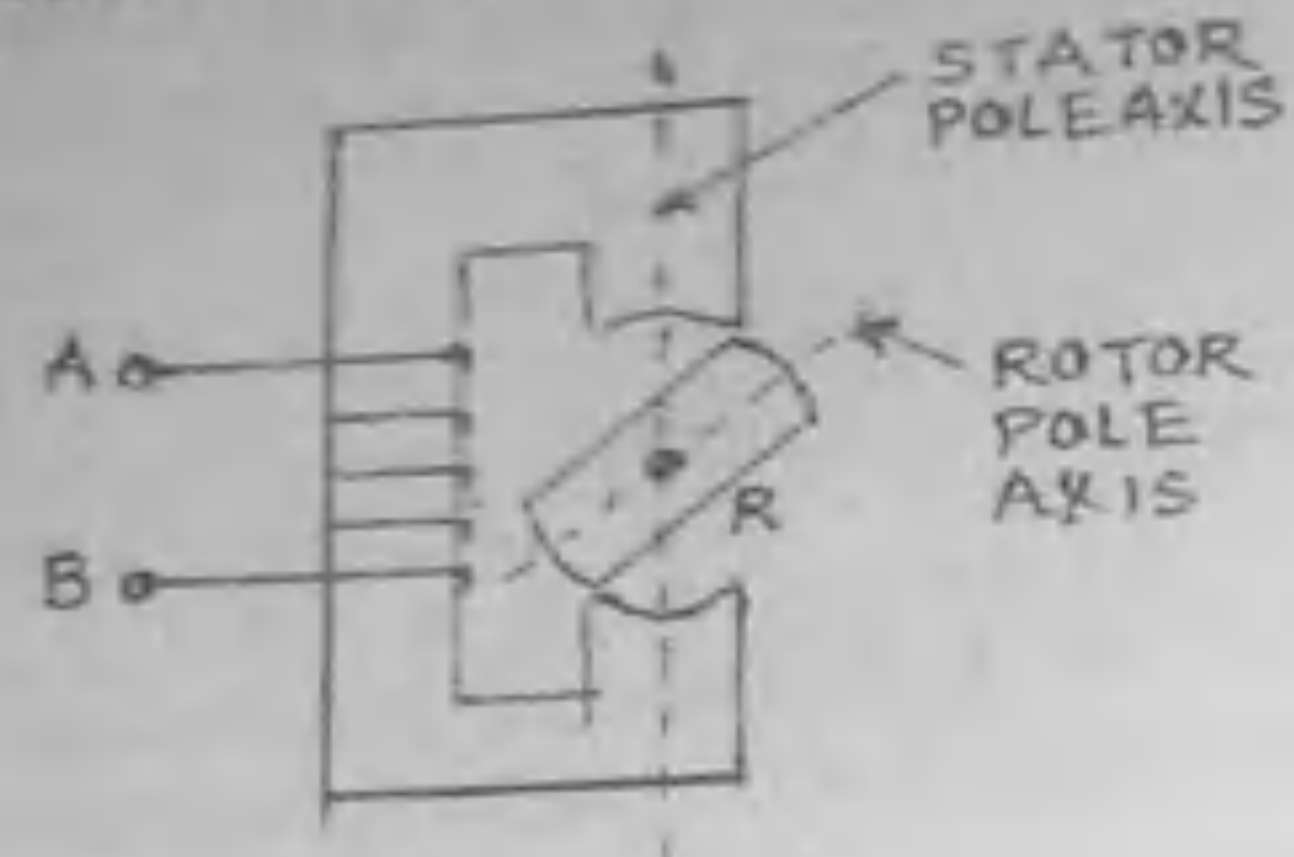
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| 4  | The determinant remains unaltered by changing its rows into columns and columns into rows<br>a) True<br>b) False                                                                                                                                                                                   |
| 5  | If each element of a line consists of $m$ terms, the determinant can be expressed as the sum of $m$ determinants.<br>a) True<br>b) False                                                                                                                                                           |
| 6  | The rank of the given matrix is<br>$A = \begin{bmatrix} 2 & -3 & 1 \\ 3 & 5 & 7 \\ 5 & 3 & 8 \end{bmatrix}$<br>a) 3      b) 5      c) 7      d) 2                                                                                                                                                  |
| 7  | If $A = \begin{bmatrix} a & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}$<br>Then the value of 'a' for which $A^2 = B$ is<br>a) 1      b) -1      c) i      d) no real value of a                                                                               |
| 8  | The inverse of a Skew matrix (if it exists) is<br>a) a symmetric matrix<br>b) a skew symmetric matrix<br>c) a diagonal matrix<br>d) none of these                                                                                                                                                  |
| 9  | By applying the elementary transformation to a matrix, its rank<br>a) Increases      b) Decreases,      c) Does not change.                                                                                                                                                                        |
| 10 | The value of $x$ for which the matrix<br>$A = \begin{bmatrix} 2 & 0 & 7 \\ 0 & 1 & 0 \\ 1 & -2 & 1 \end{bmatrix}$<br>is inverse of<br>$B = \begin{bmatrix} -x & 14x & 7x \\ 0 & 1 & 0 \\ x & -4x & -2x \end{bmatrix}$<br>is<br>a) $\frac{1}{2}$ b) $\frac{1}{3}$ c) $\frac{1}{4}$ d) $\frac{1}{5}$ |

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| 11 | OPQR is a square and M, N are the middle points of the sides PQ and QR then the ratio of the areas of the square and the triangle OMN is<br>a) 4 : 1<br>b) 2 : 1<br>c) 8 : 3<br>d) 4 : 3                                        |
| 12 | The circle passing through the distinct points $(1, x)$ , $(x, 1)$ and $(x, x)$ for all the values of $x$ , passes through the point<br>a) $(1, 1)$ ,      b) $(-1, -1)$ c) $(1, -1)$ d) $(-1, 1)$                              |
| 13 | If the tangent at the point P on the circle $x^2 + y^2 + 6x + 6y = 2$ meets the straight line $5x - 2y + 6 = 0$ at a point Q on the y-axis, then the length of PQ is<br>a) 4<br>b) $2\sqrt{5}$<br>c) 5<br>d) $3\sqrt{5}$        |
| 14 | The vector $i \times (a \times i) + j \times (a \times j) + k \times (a \times k)$ is equal to<br>a) 0      b) a      c) 2a      d) none of these                                                                               |
| 15 | Which of the following vectors are perpendicular to each other<br>1) $2i - 2j + 4k$ 2) $10i + 8j + 12k$ 3) $3i + 11j + 4k$<br>a) 1 and 2    b) 1 and 3    c) 2 and 3    d) none.                                                |
| 16 | The vectors $(1, 2, 3)$ , $(2, 1, 0)$ and $(3, -1, 2)$ are linearly dependent.<br>a) True      b) False                                                                                                                         |
| 17 | $\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx =$<br>a) $\pi^2/8$ b) $\pi^2/16$ c) $\pi^2/4$ d) $\pi^2/32$ ans c) TTA page 51                                                                                                   |
| 18 | $\int \frac{\sin \theta + \cos \theta}{\sqrt{\sin 2\theta}} d\theta$<br>a) $\sin^{-1}(\sin \theta + \cos \theta)$<br>b) $\sin^{-1}(\sin \theta - \cos \theta)$<br>c) $\sin^{-1}(\cos \theta - \sin \theta)$<br>d) None of these |
| 19 | The solution of $y \frac{d^2 y}{dx^2} + \frac{dy}{dx} \left( \frac{dy}{dx} - 2y \right)$ is<br>a) $y^2 = c$ b) $y = c^2$ c) $y = c$ d) $y = -c$                                                                                 |
| 20 | $\lim_{x \rightarrow \pi/2} \tan x \log e \sin x =$<br>a) 1      b) -1      c) 0      d) none of these                                                                                                                          |

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| 21 | The sum of the Fourier components of a function at discontinuities is equal to<br>a) upper value of the function at the discontinuity<br>b) lower value of the function at the discontinuity<br>c) average of the upper and lower values of the function at the discontinuity<br>d) none of the above. |
| 22 | Fourier expansion of an odd function has only ----- terms<br>a) sine b) cosine c) odd d) even                                                                                                                                                                                                          |
| 23 | Z is a complex number with $ z =1$ and $\arg(z) = 3\pi/4$ . The value of z is<br>a) $(1+i)/\sqrt{2}$ b) $(-1+i)/\sqrt{2}$ c) $(1-i)/\sqrt{2}$ d) $(-1-i)/\sqrt{2}$                                                                                                                                     |
| 24 | If $x+iy = \sqrt{2}+3i$ , then $x^2+y$ is<br>a) 7 b) 5 c) 13 d) $\sqrt{2}+3$                                                                                                                                                                                                                           |
| 25 | If $z = x+iy$ and $W = \frac{1-iz}{z-i}$ , then $[W]=1$<br>implies that in the complex plane<br>a) z lies on imaginary axis<br>b) z lies on the real axis<br>c) z lies on unit<br>d) none of these                                                                                                     |
| 26 | The inverse transform of $\frac{s^2-3s+4}{s^2}$ is<br>a) $1+3t-2t^2$<br>b) $1-3t+2t^2$<br>c) $1-3t+2t^2$<br>d) $1+3t+2t^2$                                                                                                                                                                             |
| 27 | The dimensional formula of Plank's constant 'h' is<br>a) $ML^2T^{-2}$ b) $ML^2T$ c) $M^{-1}L^2T^2$ d) $ML^2T^{-1}$                                                                                                                                                                                     |
| 28 | The velocity of the light observed by observers moving towards each other with the with the relative velocity $c/2$ is<br>a) $c/2$ b) $c/\sqrt{2}$ c) c d) $2c$                                                                                                                                        |
| 29 | Five resistance have been connected as shown in the figure. The effective resistance between A and B<br>                                                                                                           |
|    | a) $14/3 \Omega$ b) $20/3 \Omega$ c) $14 \Omega$ d) $21 \Omega$                                                                                                                                                                                                                                        |

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| 30 | There is series LCR circuit such that the impedance of L and C is very high as compared to resistance. The resonance frequency of the circuit<br>a) $\frac{1}{\sqrt{L^2+C^2}}$ b) $\frac{1}{\sqrt{LC}}$<br>c) $\sqrt{LC}$ d) $\frac{1}{2\pi\sqrt{LC}}$                                                                                |
| 31 | In the given circuit the power dissipated in R is maximum when<br><br>a) $R=0.5\Omega$ b) $R=3.5\Omega$ c) $R=3\Omega$ d) $R=1\Omega$                                                                                                              |
| 32 | In a current carrying solenoid coil, having N number of turns, the length L of the coil is very large as compared to Radius R. The intensity of the magnetic field H at the center of solenoid is<br>a) $\frac{I}{2\pi R}$ b) $\frac{I \times L}{4\pi R^2}$ c) $\frac{I \times N}{R}$ d) $\frac{N \times I}{L}$<br>where I = current. |
| 33 | In commercial AC network the power factor is<br>a) Generally lagging<br>b) Generally leading<br>c) Is zero<br>d) Is always 1                                                                                                                                                                                                          |
| 34 | What is the frequency of the commercial power supply in India<br>a) 50 Hz b) 60 Hz c) 100 Hz d) 230 Hz                                                                                                                                                                                                                                |
| 35 | Which of the following gives best indication of fully charged battery<br>a) Open circuit cell voltage<br>b) Level of electrolyte<br>c) Specific gravity<br>d) Temperature of the electrolyte                                                                                                                                          |
| 36 | A lead acid battery having 100 Ah capacity is 25% charged. After being charged to 10 A for 5 hours, it will approximately<br>a) $\frac{1}{2}$ charged<br>b) $\frac{3}{4}$ charged<br>c) Fully charged<br>d) Over charged                                                                                                              |
| 37 | Time constant of R-C circuit increases if the value of resistance is<br>a) Increased<br>b) Decreased<br>c) Does not depend upon the resistance<br>d) None of above                                                                                                                                                                    |

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| 38 | In electrical Machines, laminated cores are used to with a view to reducing<br>a) Hysteresis losses<br>b) Eddy current losses<br>c) Copper losses<br>d) None of the above                                                                                                                                                                                            |
| 39 | In fig., a free rotating magnetic rotor R lies between the poles of a stator. If dc supply is connected to terminals AB, rotor will<br><br>a) Start rotating<br>b) Oscillate about the stator pole axis<br>c) Align itself with the pole axis of the stator<br>d) Remain unaffected |
| 40 | A parallel plate capacitor with air between the plates has a capacitance of 4 pF. What will be the capacitance if the distance between the plates is reduced by half and the space between them is filled with a substance of dielectric constant 6<br>a) 48 pF      b) 12 pF      c) 6 pF      d) 24 pF                                                             |
| 41 | The dielectric breakdown strength of air is nearly<br>a) 11 V/cm    b) 500 V/cm    c) 32.5 KV/cm    d) 57 MV/cm                                                                                                                                                                                                                                                      |
| 42 | A current of 2 amps is passing through an induction coil of 1 mH. What will be the stored magnetic energy in the coil?<br>a) 4 mili joule    b) 2 mili joule    c) 1 mili joule    d) 1/2 mili joule                                                                                                                                                                 |
| 43 | A 240-volt RMS sinusoidal alternating voltage is put across a capacitor of such a value that the RMS current 5 amp is passing through it. What is the power being delivered to the capacitor?<br>a) 1200 watt    b) 48 watt    c) zero    d) none                                                                                                                    |
| 44 | In an AC circuit the current phasor is lagging the voltage phasor by 30 degree. The circuit may consists of following components:<br>a) Resistor only<br>b) Inductor only but no capacitor<br>c) Both resistor and inductor but no capacitor<br>d) All components, capacitor, resistor and inductor.                                                                 |

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| 45 | In a fluorescent tube light circuit, the function of the choke is<br>a) To limit the current<br>b) To give a high pulse voltage for discharge to start.<br>c) Both a and b above<br>d) To improve the efficiency.                                                                                                                                                                                |
| 46 | The reverse saturation current in P-N junction approximately doubles for every 10 degree rise in temperature<br>a) True      b) false                                                                                                                                                                                                                                                            |
| 47 | When reverse bias of a P-N junction diode is increased, a stage comes when electric field set up is sufficient to rupture covalent bonds and release large number of holes and electrons. This phenomenon is known as<br>a) Avalanche breakdown<br>b) Zener-breakdown<br>c) Early effect<br>d) High field emission.                                                                              |
| 48 | Which statement is true for the mobility of electron and holes in a doped semiconductor<br>a) The mobility is same for holes and electrons.<br>b) The mobility of the holes is more<br>c) The mobility of the electrons is more<br>d) Depends on their relative concentration.                                                                                                                   |
| 49 | Which statement is true for the cut-off voltage of a diode<br>a) It increases with the temperature<br>b) It decreases with the temperature<br>c) It increases for germanium diode and decreases for silicon diode<br>d) It is not effected by temperature changes                                                                                                                                |
| 50 | In microscopic world, which statement is true<br>a) Particle with lower potential energy cannot cross a higher potential barrier.<br>b) The particle with lower potential energy can also cross a higher potential barrier which is thin<br>c) The behavior of the particle is same for both microscopic and macroscopic world<br>d) None of the above                                           |
| 51 | In a doped semiconductor which statement is correct<br>a) The fermi energy level is the average of valance band and conduction band energy levels.<br>b) For a P type semiconductor the fermi energy level is nearer to the conduction band<br>c) For a N type semiconductor fermi energy level is neare to the conduction band<br>d) Fermi energy level is not affected by the level of doping. |

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| 52 | Which one is true about the band gaps (difference between valance and conduction energy levels) of different semiconductors<br>a) Silicon > Germanium > Gallium Arsenide.<br>b) Gallium Arsenide > Silicon > Germanium<br>c) Germanium > Silicon > Gallium Arsenide<br>d) Germanium > Gallium Arsenide > Silicon.                                                                                          |
| 53 | Which of the following statement is true<br>a) The current gain for common source configuration of FET is generally more than the common emitter gain of BJT.<br>b) The gate currents of FET amplifier are generally more than BJT amplifier gate currents.<br>c) The distortion added by FET amplifier is less than BJT amplifier<br>d) The distortion added by FET amplifier is more than BJT amplifier. |
| 54 | By adding negative feedback in an amplifier, which of the following statement is true<br>a) Gain is the same but the bandwidth increases<br>b) Gain and Bandwidth both increases<br>c) The multiple of Gain and Bandwidth remains almost constant<br>d) Gain is increased and the Bandwidth remains the same.                                                                                              |
| 55 | In Cascoding of the transistor amplifier<br>a) Current gain is high and is suitable for low frequency amplification.<br>b) Voltage gain is less than one but suitable for high frequency amplification.<br>c) Current gain is less than one but is suitable for high frequency amplification.<br>d) Negative feedback from output to input is high.                                                        |
| 56 | In cascading of two amplifiers.<br>a) The Gain and Bandwidth both increases<br>b) The Gain remains the same but the Bandwidth increases<br>c) The Gain increases but the Bandwidth decrease.<br>d) The Gain increases but the Bandwidth remains same.                                                                                                                                                      |
| 57 | A sampled signal can be reproduced faithfully<br>a) If sampling frequency = the highest Fourier frequency component of the signal<br>b) If the sampling frequency is more than twice the Fourier frequency component of the signal<br>c) If the sampling frequency is average of the Fourier frequency component of the signal<br>d) And it does not depend on the sampling frequency.                     |
| 58 | Differential amplifiers are used<br>a) For high power amplification<br>b) For high voltage amplification<br>c) For very high bandwidth and voltage gain<br>d) For high amplification of common mode signal.                                                                                                                                                                                                |

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| 59 | The maximum conversion efficiency of the push-pull power amplifier is<br>a) 100%<br>b) 50%<br>c) 78.5%<br>d) 39.25%                                                                                                                                                                                                                      |
| 60 | UJT amplifiers are suitable for generating<br>a) Perfect sine waves<br>b) Perfect saw tooth pulses<br>c) Pulses of high frequencies<br>d) High output power.                                                                                                                                                                             |
| 61 | There are two infinitely long thin conductors at a distance of 1 meter and parallel to each other and carrying 1 Amp current. What will be the force between them per unit length if the value of $\mu$ is $4\pi \times 10^{-7}$ in MKS units<br>a) 1 Newton    b) $10^{-7}$ Newton    c) $10^{-7}/2\pi$ Newton    d) none of the above. |
| 62 | In MKS system had we defined the value of permeability of vaccum $\mu = 1$ , what would have been the value of permittivity $\epsilon_0$<br>a) $1/C^2$ b) $1/C$ c) $C^2$ d) $C$ .<br>Where C is the velocity of light in the vaccum                                                                                                      |
| 63 | Michelson Morley experiment proved<br>a) The dual nature of the matter<br>b) The quantum nature of electromagnetic radiations<br>c) That the velocity of light is constant for all observers irrespective of their relative velocities.<br>d) That the universe is expanding.                                                            |
| 64 | Maxwell predicated mathematically that whenever there will be change in electrical or magnetic field, electromagnetic waves traveling at the speed of light will be produced. Who demonstrated this experimentally?<br>a) Max Planck.<br>b) Heinrich Hertz<br>c) De Broglie<br>d) J. J. Thompson.                                        |
| 65 | Which one is true for the speed of the sound<br>a) It is more in water than air<br>b) It is more in air than water<br>c) It is same in air and water<br>d) It is more in water than through the earth surface.                                                                                                                           |
| 66 | A diffraction grating is used to measure<br>a) Frequency of Sound<br>b) Energy of the light waves<br>c) Frequency of light waves<br>d) Mass of the atomic particles.                                                                                                                                                                     |

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| 67 | The maximum number of electrons in the $n$ th Bohr orbit can be<br>a) $n^2$ b) $2n^2$ c) $n$ d) $2n$                                                                                                                                                                                                                                                                                                |
| 68 | The Nobel prize to Albert Einstein awarded for his contribution in<br>a) Explaining the photoelectric effects and there by quantum theory<br>b) Theory of general relativity<br>c) Special theory of relativity<br>d) For proposing Bose-Einstein statistics                                                                                                                                        |
| 69 | A photosensitive surface is receiving light of wavelength $5000\text{\AA}$ at the rate of light $10^{-7}\text{ J/s}$ . The number of photons received per second is<br>a) $2.5 \times 10^{12}$ b) $2.5 \times 10^{11}$ c) $2.5 \times 10^{10}$ d) $2.5 \times 10^9$<br>(Considering $h = 6.625 \times 10^{-34}\text{ Joules-s}$ )                                                                   |
| 70 | The photoelectric threshold wavelength for a metal surface is $6600\text{ \AA}$ . The work function of the metal is<br>a) $1.87\text{ V}$ b) $1.87\text{ eV}$ c) $18.7\text{ eV}$ d) $0.18\text{ eV}$                                                                                                                                                                                               |
| 71 | If the electron in a hydrogen atom jumps from the third orbit to second orbit, the emitted radiations has wavelength ( $R$ is the Rydberg's constant)<br>a) $36/5R$ b) $5R/36$ c) $6/5R$ d) $5R/6$                                                                                                                                                                                                  |
| 72 | Who satisfactorily explained the spectrum of the light emitted by Hydrogen Atom<br>a) J J Thompson<br>b) Rutherford<br>c) Heisenberg<br>d) Neil's Bohr                                                                                                                                                                                                                                              |
| 73 | James Chadwick is associated with<br>a) Discovery of Radioactivity<br>b) Study of the Electromagnetic fields<br>c) Development of Cyclotron<br>d) Discovery of Neutron                                                                                                                                                                                                                              |
| 74 | The frequency of the whistle of an engine is $600\text{ Hz}$ . It is moving with a speed of $30\text{ m/s}$ towards a stationary observer. The apparent frequency is (speed of sound = $330\text{ m/s}$ )<br>a) $630\text{ Hz}$ b) $660\text{ Hz}$ c) $570\text{ Hz}$ d) $540\text{ Hz}$ .                                                                                                          |
| 75 | Which statement is correct from the followings:<br>a) There is a red shift in the spectrum of light coming from the other galaxies, but no violet shift<br>b) The absence of violet shift of the spectrum proves the steady state of the universe<br>c) The red shift proves the slow contraction of the universe due to gravity.<br>d) The black holes in the universe do not absorb the red light |

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| 76 | Ultrasonic waves are those which<br>a) Human beings can not hear<br>b) Human beings can hear<br>c) Have high velocity<br>d) Have large amplitude                                                                                                                                                                                                                                                           |
| 77 | For measuring low resistances which one is the most accurate method<br>a) Volt/Ampere method<br>b) Wheat stone comparison bridge method<br>c) Kelvin's double bridge method<br>d) Digital multimeter method                                                                                                                                                                                                |
| 78 | In optical fiber communication the wavelength of the laser used is nearly.<br>a) $500\text{ nm}$ b) $1300\text{ nm}$ c) $8000\text{ nm}$ d) $4000\text{ nm}$                                                                                                                                                                                                                                               |
| 79 | A loop is placed in x-y plane in a magnetic field, which is in positive z direction. the magnetic field suddenly decreases to zero. What will be the direction of current in the loop?<br>a) Clockwise      b) Anticlockwise      c) Alternating      d) There will be no current.                                                                                                                         |
| 80 | The electrostatic potential can be measured accurately by<br>a) Ballistic galvanometer<br>b) Digital Voltmeter<br>c) Gold leaf electrometer<br>d) Potentiometer.                                                                                                                                                                                                                                           |
| 81 | From the following pairs, choose the pair that does not have identical dimensions<br>a) Momentum and impulse<br>b) Moment of inertia and moment of force.<br>c) Angular momentum and Plank's constant<br>d) Work and torque                                                                                                                                                                                |
| 82 | A star emits light of wavelength ' $\lambda$ ' and it is receding from the earth with a speed ' $v_s$ '. The wave length of the spectral line observed on the earth is<br>a) $\lambda \frac{v_s^2}{C^2}$ ( more than $\lambda$ )      b) $\lambda \frac{v_s^2}{C^2}$ ( less than $\lambda$ )<br>c) $\lambda \frac{v_s}{C}$ ( less than $\lambda$ )      d) $\lambda \frac{v_s}{C}$ ( more than $\lambda$ ) |
| 83 | The transverse nature of the light is shown by<br>a) Interference<br>b) Refraction<br>c) Polarization<br>d) Dispersion                                                                                                                                                                                                                                                                                     |

84 The contrast in the in the fringes in an interference pattern depends on  
 a) Fringe width  
 b) Wavelength  
 c) Intensity ratio of the sources  
 d) Distance between the slits

85 In a stationery longitude wave, nodes are points of  
 a) Maximum pressure  
 b) Minimum pressure  
 c) Minimum pressure variation  
 d) Maximum pressure variation.

86 The output of a two input EX-OR gate assumes the 1 state if one and only one input assume the 1 state.  
 a) True                      b) False.

87 A NAND gate is called universal logic element because  
 a) It is used by everybody  
 b) Any logic function can be realized by NAND gate alone.  
 c) All the minimization techniques are applicable for optimum NAND gate realization  
 d) Many digital computers use NAND gate.

88 The arrangement shown in fig gives the action of

a) EX-OR gate    b) NOR gate    c) NAND gate    d) AND gate

89 An AND gate is a  
 a) Sequential circuit  
 b) Combinational circuit  
 c) Memory circuit  
 d) Relaxation circuit

90 If an inverter is placed at the input to an SR flip-flop, the result is  
 a) T flip-flop  
 b) D flip-flop  
 c) JK flip-flop  
 d) BCD decode counter

91 A master slave flip-flop is made up of  
 a) Two flip-flops connected in series  
 b) Two flip-flops connected in parallel  
 c) A debouncer circuit  
 d) A D-latch.

92 If one wants to design a binary counter, preferred type of flip-flop is  
 a) D-type  
 b) SR type  
 c) Latch  
 d) JK type  
 e)

93 The decimal equivalent of a binary number (100101) is  
 a) 37  
 b) 69  
 c) 41  
 d) -5

94 The purpose of introducing feedback loop in a digital counter circuit is  
 a) It improve stability  
 b) To improve distortion  
 c) Synchronize input and output pulses  
 d) To reduce the number of input pulses to reset the counter

95 The disadvantage of a counter type A/D converter as compared to simultaneous A/D converter is that.  
 a) The resolution is low.  
 b) Longer conversion time is required  
 c) The circuitry is more complex  
 d) Its stability is low

96 Schmitt trigger can be used as  
 a) Comparator  
 b) Square-wave generator  
 c) Flip-flop  
 d) All of these

97 The disadvantage of magnetic drum storage is that  
 a) Its size is very large  
 b) Only read out is possible  
 c) Access time is high  
 d) Access time is less.

98 The function of a multiplexer is  
 a) To select 1 out of N input data sources and to transmit it to single channel.  
 b) To transmit data on N channels.  
 c) To perform serial-to-parallel conversion.  
 d) To decode information.

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| 99  | <p>Which of the following circuits can be used as parallel-to-serial converter.</p> <ul style="list-style-type: none"><li>a) Digital counter</li><li>b) Decoder</li><li>c) De-multiplexer</li><li>d) Multiplexer</li></ul>                                                                                                 |
| 100 | <p>The disadvantage of an open shift register is that</p> <ul style="list-style-type: none"><li>a) Both shift-left and shift-right operations cannot be performed.</li><li>b) The quantity stored is lost at every shift pulses.</li><li>c) The register is reset when read-out is over.</li><li>d) All of these</li></ul> |

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