

Descriptive Questions for Telecommunication

- 1) Explain the principle of transmission through OFC & the application in Railways in detail.
- 2) Explain and depict profile of refractive index in the following fibre cable
 - a) In multimode step index cable
 - b) In graded index fibre
- 3) Explain the following in detail.
 - a) E & M signaling
 - b) Common channel signaling
 - c) Loop signaling
 - d) DTMF signaling
- 4) Explain and draw the block diagram of DTMF control room equipment.
- 5) Explain the services offered by an ISDN exchanges.
- 6) Explain the duties of JE/Tele as per telecom manual.
- 7) Explain in brief CCTV, POET, Touch screen as a passenger amenity equipments.
- 8) List out the telecom items that are maintained in ART/BD special and its periodicity of maintenance?
- 9) What are the quad cable faults and what is the rectification method?
- 10) Draw neat sketch showing the way side station termination of OFC control system and explain its working?
- 11) What is BORSCHT? Explain its functions in electronic exchanges?
- 12) Write short notes (answer any 3)
 - a) Railnet
 - b) Modem
 - c) Radio patch
 - d) SMPS
 - e) Surge protection device
- 13) What is the arrangement made at accident spot, when accident occurs in underground cable area?
- 14) Draw a neat sketch showing mid section radio patching arrangement and explain its working
- 15) Write short notes (answer any 3)
 - a) PRS
 - b) Passenger amenities at railway station
 - c) NTES/DTES
 - d) COIS & FOIS
- 16) Explain the working of an emergency control phone with a neat sketch?
- 17) Write full expansion of the following (any five)
 - a) RDSO
 - b) POET
 - c) ADSL
 - d) HOER
 - e) OTDR
 - f) CLIP
 - g) DAR
- 18) List out the advantage of optical fiber communication system in Indian Railway
- 19) What are the essential arrangements required for V.VIPs functions from telecom side for providing PA system? Explain with neat diagram.
- 20) What are the different types of cable faults and their likely cause, explain the details of periodical test conducted including the tools required, method of testing recommended parameters etc. for each test.

- 21) List out the different types of passenger amenities maintained by Telecommn. department in major stations. What do you mean by integrated Passenger information system? Explain the scheme suggested as per RDSO draft specification, clearly explaining the role of MDCH and PDCH.
- 22) What are the main constituents of surveillances system? Explain with diagram what are differences between Analog and IP based surveillance system.
- 23) Explain the multiplexing structure of STM1 with a neat sketch.
- 24) As per Southern Railway policy what is the procedure for cable laying? What precautions should one take while cable laying? What is the normal length of the cable in a cable drum? What is the periodicity of cable testing?
- 25) What are the communication requirement for a new station?
- 26) What is the VHF frequency band allotted to Railways? What are the possible use of VHF communication in Railways?
- 27) What are the items to be checked while doing survey for laying of OFC cable
- 28) Explain the working of DTMF Wayside station equipment working with the help of a block diagram?
- 29) a)What are the various tests conducted for testing a 6 quad under ground cable
b) List any four types of faults that normally occur in a quad cable ?
- 30) a) Name any five measuring instruments used in Railways for telecommunication circuits.
b) Describe briefly how a OFC cable cut can be localized using OTDR
- 31) Write short notes on any five of the following?
a) PRS B)Radio patching c) Passenger amenities at stations d)HOER f)SMPS g)NMS
h)PA system at stations.
- 32) Explain the quad cable allocation issued with OFC and without OFC
- 33) Explain briefly with neat sketch for extending Railnet connectivity from one Jn. station to remote station through OFC media. List out the network equipment requirements and arrangements.
- 34) Explain the various steps to avoid cable cuts and steps to be followed for quick restoration of cable
- 35) Explain the various types of controls used in RE area.
- 36) List out the advantages of SDH over PDH.
- 37) List out the cards in ISDN exchange and explain its functions.
- 38) Explain the block diagram of VF repeater with neat sketch.
- 39) Write short notes on Primary MUX used in railways.
- 40) Write short notes on VSAT and GSM (R).

One mark questions

I) Fill the blanks with correct answer

- 1) All programs are loaded in ----- disc
- 2) -----is the father of computers
- 3) DOT matrix printers are ----- type of printers
- 4) ----- operating system is open to all
- 5) ----- type of printers need special paper
- 6) -----is the latest operating system of “ Windows “
- 7) ----- memories are volatile memories
- 8) ----- is the unwanted programs spoils your computer
- 9) ----- works normally as input as well as output device
- 10) Floppy discs are ----- type of storage devices

II) Chose and fill the blanks with correct answer

- 1) One byte is equal to ----- no of bits(4,6,8,32)
- 2) ROM s are used in computers in ----- (BIOS , temporary storage ,During shut down)
- 3) ----- card is used for networking (VGA, NIC, Video card)
- 4) IP addressing of computers are done with ----- no of bits (16,8,32,1)
- 5) ----- printer is a impact printer (ink jet, LASER jet , Thermal, DOT matrix)

III) Expand

- 1) RAM 2) ROM 3) HDD 4) NIC 5) BIOS

IV) Match The following

- | | |
|-------------------------|----------------------------------|
| 1) Operating system | a) presentation software |
| 2) Ms. Power point | b) Database software |
| 3) Ms. Word | c) WinZip |
| 4) Ms . access | d) Typing /Letter draft software |
| 5) Compressing software | e) Linux |

V Name the item

- 1) The software used in PRS
- 2) Network equipment used for connecting computers physically
- 3) Equipment used to make virtual LAN in a LAN
- 4) Optical storage device
- 5) Magnetic storage device

V) By the help of block diagram & explain about

- 1) Computer
- 2) CPU

Fill up the Blanks correctly (20*1=20 Marks)

Section "A"

1. Number of conductors in a Quad is _____.
2. Material for screening in RE main cable is-----.
3. Earthing of steel armor & Al. strips of the quad cable is to reduce _____.
4. The diameter of conductor of 6Quad cable is _____ millimeter.
5. Loop resistance of 0.63 mm copper wire is ___ ohms.
6. Transmission loss of loaded 6quad cable is _____ dB/km .
7. The EMC post should be provided at a distance not less than _____ meter from the outermost rail.
(2.8 / 15)
8. In Railways the type of cable laying used is _____ laid system.
9. _____ system of cable laying method used for track crossing in Railways.
10. Cable Markers are provided at every _____ meters within yard.
11. The impedance ratio of VF transformer is _____ ohms.
12. Permissible psopho metric voltage in RE cable is not more than ___ mV.
13. Characteristic impedance of PVC insulated pair is _____ ohm.
14. Insulation resistance value of 6quad cable is _____ Meg ohms.
15. The impedance ratio of the Signal transformer used for Block circuit is ___ ohms in RE area.
16. Interspacing between loading coil is _____ meters.
17. The purpose of loading in RE cable is to minimize the-----.
18. The purpose of condenser joint in RE is to reduce_____.
19. Standard Drum length of 6Quad cable is-----meters.

20. Spacing between two condensers joint is ---- meters.

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Section "B":

(i) (Quad Cable):

Answer any three question each carry ten marks(3*10=30)

Q1.(a) Draw the constructional view of 6Quad Cable and name its parts?

(b) Mention the colour code of the each Quad and name the circuits tapped on it?

Q2. (a) Names the types of Jointing to be carried out for 6Q/4Q copper cable? Explain Normal Joint in brief?

Q3 What are the steps , precautions and procedures involve in Laying of Underground Quad cable?

Q4. What are the maintenance/Testing to be carried for maintaining of Quad cable. Explain?.

Q5. Write short notes:-

- a) Telecom Underground Jelly Filled copper Cable
- b) Paper Insulated Copper Quad Main Telecom cable
- c) PVC Switch Board cable
- d) Field service Cable

I. Fill in the blanks: -20 marks. (Each question carrying equal marks)

1. The specific gravity of a fully charged cell is _____.
2. _____ mode of Fibre is used in Railways.
3. To function as an amplifier/switch a transistor's input shall be _____ (forward/Reverse) biased and output shall be _____ (forward/Reverse) biased.
4. DTMF is in _____ frequency range and have _____ rows & _____ column frequencies.
5. Maximum number of stations can be called using DTMF HQ equipment is _____.
6. One byte contains _____ bits.
7. Total internal reflection happens in an OFC cable when the incident angle is more than _____.
8. Optical fibre cable is made up of _____.
9. In a capacitor, the capacitive reactance is _____ proportional to its value and _____ proportional to frequency.
10. _____ converts acoustic energy in to electrical energy.
11. The barrier potential of Silicon diode is _____ volts.
12. _____ rectifiers circuit requires 2 diodes and requires _____ type transformers.

13. GPS stands for _____
14. In a 2 Mb digital transmission, the number of speech channel will be _____.
15. EMC sockets are provided in every _____ km.
16. The value of earth resistance of telecommunication installations shall be less than _____ ohms.

Write the Hindi equivalent of the following:

17. Seen, Thanks.
18. Sanctioned.
19. urgent
20. Telecommunication.

II. Choose the correct answer: - 15 marks. (Each question carrying equal marks)

21. Loop resistance of 0.63 mm copper wire is _____ ohms.(56, 114, 172)
22. Interspacing between loading coil joint is _____ Km. (one, two, three)
23. The end voltage of the secondary cell is _____ Volts(2.2 V, 1.85 V, 2.0 V)
24. Optic Fibre Cable used in Railways contains ----- fibres (12, 24, 36)
25. _____ number of E1's can be transmitted in STM1. (63, 21, 42)
26. Standard splice loss is _____ (0.2 dB, 2.0 dB, 0.02 dB)
27. The refractive index of cladding is _____ (more/less) than that of core.
28. Decibel is a logarithmic unit to denote _____ (noise level, voltage level, current level).
29. The psophometric voltage is _____ mV. (10 mV, 2 mV, 200 mV)
30. The prime advantage of OFC over copper cable is it eliminates _____ (Electromagnetic interference, power loss)
31. Micro farad is the unit of _____ (resistance, capacitance, inductance)
32. When resistors are connected in parallel the resultant value of the parallel resistance will be _____ (more, less, no change in value)
33. Lead acid cells are classified as _____ (secondary cell, primary cell)
34. The instrument used for measuring cable insulation is _____ (Insulation megger, Multimeter, Voltmeter)
35. Ammeter is always connected in _____ (series/parallel) with the circuit.

III. Match the following: 10 marks. (Each question carrying equal marks)

36. VF transformer	Inductor
37. VHF band	AC to DC
38. Jointing of optic fibre	30 – 300MhZ
39. Hybrid	1120:1120
40. UTP cable	Negative temperature co efficient
41. Electrolyte of Lead Acid cell	Solar energy
42. Thermistors	4W to 2W
43. Rectifiers	Sulphuric acid
44. Hendry	RJ 45
45. Photo voltaic cells	Splicing

IV. State True or False: 10 marks. (Each question carrying equal marks)

46. To protect the electrical equipment from high voltage MOVs are to be connected in parallel with the circuit.
47. EMC sockets are provided at every one km RE/Non RE area.
48. For Platform announcement in Rly. Stations loudspeakers are connected in impedance matching method.
49. One PRI of ISDN contains 30 Base band and one data channel.
50. Always Ammeter is connected in parallel in a circuit to measure the current.
51. The transmission loss of loaded quad cable is 0.63 db per km.
52. The positive terminal of the power supply is connected to earth terminal in Electronic Exchanges.
53. The bit rate of STM1 155.52 Mbps.
54. The nominal ringing voltage of Magneto telephone is 230 Volts AC.
55. V 35 modem is connected at the data communication equipment end.

V. Answer the following: 20 marks. (Each question carrying equal marks)

1. Draw the construction of 6Quad cable.
2. List out the advantages of SDH over PDH.
3. Explain the principle of transmission through optical fibre cable.
4. Explain the services offered by ISDN exchange.
5. What are the Passenger Amenities available in Railway station now a days?

6. Draw the symbol of a NPN Transistors, Silicon controlled rectifier, Variable resistor, Zener diode and Ex – Or gate.
7. Define critical angle in OFC.
8. Give two cases where Hindi and English should be used?
9. When the Hindi day is is celebrated?
10. What are the various Hindi exams conducted by the Department of official languages?

VI. Answer any five of the following: 25 marks. (Each question carrying equal marks)

1. Name the types of joints & purposes for quad cable used for control system?
2. Explain the method of jointing OFC and list out materials required for the above jointing.
3. List out the telecom items that are maintained in ART/BD special & its periodicity of Maintenance.
4. Draw a neat sketch showing mid section radio patching arrangement and explain its working.
5. Write short notes on any two of the following:
 PRS OTDR BRI DTMF Encoder
6. What are the advantages of OFC cable?
7. What is meant by PDH? Write short notes Primary MUX available in your section.

Choose the best answer: (25)

1. Number of conductors in a Quad is _____(2,4)
2. The impedance ratio of VF transformer is _____(120:120, 1120:1120)
3. The loop resistance of 6Quad cable is _____Ohms per Km.(56 , 5.6)
4. Working voltage of DTMF way station equipment_____DC (12V, 24V)
5. Working voltage of telephone exchange _____VDC (48, 12)
6. The diameter of conductor of 6quad cable is _____millimeter (0.9, 0.63, 0.51)
7. In 6Quad cable orange quad used for _____ working. (Block, EMC, BPAC)
8. Walkie talkie radio uses ____battery (torch cell, Ni-cd, NI-MH)
9. EMC circuit is tested once in _____periodically(15 days, 30days, 3months)
10. _____converts Sound energy into electrical energy. (loudspeaker, microphone)
11. Fiber loss/km at 1550 nanometer is ____dB/km (0.25, 0.3, 0.63)
12. _____ mode of optic fiber is used in railways. (single, multi)
13. _____ number of fibers are available in a loose tube. (2, 4)
14. _____ method of splicing is used for jointing OFC cable. (fusion arc, evaporating)
15. Fiber loss/km at 1550 nanometer is ____dB/km. (0.63, 0.25)

16. Standard splice loss is _____db/Km. (0.2, 0.02)
17. Optic Fibre is made up of ----- . (Silica glass, Plastic)
18. Refractive index of core is -----than cladding. (less, more)
19. The principle of OFC working is ------(Total internal reflection, diffraction)
20. Working Voltage of walkie talkie sets _____VDC. (12, 7.5)
21. The working voltage of OFC Equipments ----- (12,24)Volts.
22. The purpose of loading in RE cable is to minimize the -----loss.
23. -----is the equipment used for 4 wire to 2 wire conversion.
24. The working Voltage of EMC portable telephone _____
25. The Earth resistance for ISDN exchange should be less than _____ ohms.

Match the Following: (5)

- | | |
|--------------------------|---------------------|
| 1. Insulation resistance | Earth Meggar |
| 2. Earth Resistance | Insulation Meggar |
| 3. Transmission Loss | Cable Fault locator |
| 4. Loop Resistance | TMS Kit |
| 5. Cable break | Multimeter |

Expand the following:(10)

OFC, DTMF,TX, RX,dB

Choose the best answer: (20)

1. Number of conductors in a Quad is _____(2,4)
2. Voice Frequency is _____.
3. The loop resistance of 6Quad cable is _____Ohms per Km.(56 , 5.6)
4. Working voltage of DTMF way station equipment_____DC (12V, 24V)
5. TME Card should be installed in _____ slot (1, 2, 3, 6).
6. The diameter of conductor of 6quad cable is _____millimeter (0.9, 0.63, 0.51)
7. In 6Quad cable orange quad used for _____ working. (Block, EMC, BPAC)
8. Audio Frequency is _____.
9. EMC circuit is tested once in _____periodically(15 days, 30days, 3months)
10. _____converts Sound energy into electrical energy. (loudspeaker, microphone)
11. _____converts Electrical energy into sound energy. (loudspeaker, microphone)
12. _____ mic is suitable for outdoor meetings. (Condensor, Dynamic).
13. _____ mic is suitable for Indoor meetings. (Condensor, Dynamic).
14. _____reproduces low frequency (Tweeter, Woofer)
15. _____reproduces high frequency (Tweeter, Woofer).

16. _____ number of fibers are available in a loose tube. (2, 4)
17. Working Voltage of walkie talkie sets _____ VDC. (12, 7.5)
18. The working voltage of OFC Equipments ----- (12,48)Volts.
19. The working Voltage of EMC portable telephone _____
20. The Earth resistance for OFC Installations should be less than _____ ohms.

Match the Following: (5)

- | | |
|--------------------------|---------------------|
| 1. Insulation resistance | Earth Meggar |
| 2. Earth Resistance | Insulation Meggar |
| 3. Transmission Loss | Cable Fault locator |
| 4. Loop Resistance | TMS Kit |
| 5. Cable break | Multimeter |

Write the colour code of the conductor in the following Cable (5)

1. 32nd pair in 50 Pair PIJF Cable
2. 32nd pair in 100 Pair PIJF Cable
3. 13th pair in 20 Pair Switch Board Cable
4. 17th Pair in 50 Pair Switch Board Cable
5. 17th pair in 50 Pair PIJF Cable.

Expand the following:(5) :- OFC, DTMF, TX, RX, dB

Draw the symbols of the following. (5) 1. Microphone 2. Loudspeaker 3. Amplifier 4. Resistor
5. Transformer

Name the MUX card for extending the following circuit in PUNCOM and WEBFIL. (5).

1. Section control
2. Datalogger
3. Autophone Number Exchange Side
4. FOIS
5. Autophone Number Subscriber Side.

Write down the Krone terminal for the following port output in mux. (on both methods). (5).

1. Port No.2
2. Port No.22
3. Port No.32
4. Port No.16
5. Port No.11

(A) Fill up the Blanks correctly (20*1=20 Marks)

20. Number of conductors in a Quad is _____.
21. Material for screening in RE main cable is-----.
22. Earthing of steel armor & Al. strips of the quad cable is to reduce _____.
23. The diameter of conductor of 6Quad cable is _____ millimeter.
24. Loop resistance of 0.63 mm copper wire is _____ ohms.
25. Transmission loss of loaded 6quad cable is _____ dB/km .
26. The EMC post should be provided at a distance not less than _____ meter from the outermost rail.

27. In Railways the type of cable laying used is _____ laid system.
28. _____ system of cable laying method used for track crossing in Railways.
29. Cable Markers are provided at every _____ meters within yard.
30. The impedance ratio of VF transformer is _____ ohms.
31. Permissible psophometric voltage in RE cable is not more than ____ mV.
32. Characteristic impedance of PVC insulated pair is _____ ohm.
33. Insulation resistance value of 6quad cable is _____ Meg ohms.
34. The impedance ratio of the Signal transformer used for Block circuit is ____ ohms in RE area.
35. Interspacing between loading coil is _____ meters.
36. The purpose of loading in RE cable is to minimize the-----.
37. The purpose of condenser joint in RE is to reduce_____.
38. Standard Drum length of 6Quad cable is-----meters.
39. Spacing between two condensers joint is ---- meters.

B. Fill up the Blanks correctly (20*1=20 Marks)

- 1)----- gate will give an output when either of one input or both input is high.
- 2)----- gate will give an output when only both inputs are high.
- 3)----- gate will give an output only when both input are Low.
- 4)----- gate will conduct when either of one input is odd.
- 5)----- gate will conduct when both inputs are even.

C. Match the following more correctly:-

1	SPART	a	First aid Package available at all important station
2	Golden Hours	B	An accident in which single line affected for less hours.
3	Disaster	c	A Mini-Operation theatre with medical tools attached to ART
4	Disaster management	d	Forst few hours of Major accident where passengers are injured heavily require first aid attention
5	Minor Accident	e	An accident in which Both lines affected .
6	Major accident	f	Self propelled accident Relief Train
7	AMRV-scale I	g	Most experienced officer who

			has knowledge of Managing the disaster take cool & rational decisions at site
8	AMRV scale II	h	Anything occur untoward which causes great losses to human being & belongings.
9	ATR		Take control of the situation of the major accident occur in order to Restore/Relieve/ Remove/reduce the effect of the accident etc.,
10	Site officer		Accident Relief Train

OFC

I. Fill the Blanks

10 marks

1. Optic Fibre is made up of -----
2. Refractive index of core is ----- than cladding
3. The principle of OFC working is -----
4. _____ nos of fibres available in railway OFC Cable.
5. The wavelength of short haul fibre is _____ nano meters.
6. Size of core is ----- micro meters
7. Cladding size ----- micro meters
8. ----- is used for cutting fibre ends in 90 degrees.
9. No of fibers in one loose tube -----
10. OFC cable jointing is done by _____ machine.

II. Match the following

5 marks

- | | | |
|------------------------|---|------------------------------|
| a) Critical angle | - | Temporary joint |
| b) Cleaning agent | - | Removing primary coating |
| c) Fibre stripper | - | Isopropyl Alcohol |
| d) Cleaver | - | Refracted angle is 90 degree |
| e) Mechanical splicing | - | 90 degree cutting of fibre |

III. Choose the correct answer

5 marks

- a) Typical Refractive index of core is ----- (1.46, 1.48, 3.12)
- b) Splice loss permitted is ----- (0.2 dB, 0.25 dB, 0.02 dB) or less
- c) Corrugated steel armour isolated at every _____ (1 km, 1.6 km, 2 km)
- d) ----- used to clean after removing primary coating (kerosene, isopropyl alcohol)

- e) -----cable is used to terminate fibre in Fibre Terminal Box (Patch chord ,Pig tail)

IV. Answer in detail

10marks

- a) What are all the advantages of OFC ?

V . True or false

10 marks

- 1) Core has a hole in it to pass light through
- 2) Electro magnetic induction is available in OFC cable.
- 3) Isopropyl alcohol is used to clean fibre cable jelly
- 4) OTDR is used to splice fibres
- 5) FC –PC connector has minimum coupling loss
- 6) Maximum capacity of STM-I is 63 E1s
- 7) SC,ST,LC are the connectors used in OFC
- 8) Railway uses single mode fibre.
- 9) Multimode fibres are suitable for long distance communication
- 10) Working voltage of STM-I equipments is 48 volts DC.

I) Choose correct answer

1. The technique of providing a number of circuits using a single transmission pair is called ____ (combining, multiplexing)
1. The line code used for E1 is _____(HDB₃, AMI, NRZ)
2. Sampling theorem states that F_s should be greater than or equal to ____ (twice, thrice) the maximum frequency of the channel to be sampled.
3. The bit rate of one voice channel is _____Kbps. (256, 64 ,2)
4. In PCM sampling frequency is _____Hz (8000, 4000)
5. In FDM the channels are differentiated by ____ (time, frequency)
6. The timeslot ____ is used for signaling in PCM (1, 16,31)
7. One Multi frame contains ----- no of frames (1,12,16)
8. The multi frame information goes in ----- frame (0,3,16)
9. Time taken to complete one multiframe is ----- micro seconds (2,2000,125)
10. One signal time slot contains ----- channels signal information

II) Fill the blanks

- 1) PDH employs -----inter leaved multiplexing

- 2) ----- bites are used in PDH to adjust the timing Problem
- 3) One STM -1 has ----- no of E1s
- 4) ----- PDH standard cannot be transported through SDH
- 5) ----- technology increases the bandwidth of fibre

III) Explain in detail any three

- 1) Explain the PCM principle
- 2) Compare the PDH and SDH (Advantages and disadvantages)
- 3) Draw the STM -1 frame structure and illustrate the bit rate
- 4) Draw the block diagram of SDH multiplexing structure and explain

IV)Expand

- 1) PDH, AUG, DWDM, BER ,SDH

FILL IN THE BLANKS

2. BORSCHT function related to _____ circuit.
3. The bit rate for 30 channel PCM system _____
4. The Data store includes _____ store and _____ store.
5. The working Voltage of Hipath 4000 Exchange is _____
6. The Earth resistance for ISDN exchange should be less than _____ ohms.
7. In Hipath 4000 ISDN exchange _____ card is used for Digital extensions.
8. Always in Hipath4000, LTUCX card should be placed in the slot _____
9. _____ color quad is used for EMC circuit where 6Quad cable is used.
10. _____ Quad is used for section control where OFC cable is not available.
11. _____ mode of optic fiber is used in railways.
12. _____ number of fibers are available in a loose tube.
13. _____ method of splicing is used for jointing OFC cable.
14. A multiframe contains _____ frames.
15. The time for one timeslot is _____ μ S.
16. Sampling theorem states that F_s should be greater than or equal to _____
17. SDH employs ----- interleaved multiplexing
18. Bit rate of STM-1 is ----- Mbps
19. ----- European standard is not possible to transport through SDH
20. Maximum bit rate of European PDH is ----- Mbps
21. Quality of data is measured in -----

22. _____ color quad is used for EMC circuit where 6Quad cable is used.
23. _____ Quad is used for section control where OFC cable is not available.
24. _____ is provided for mechanical strength in 6Quad cable.
25. _____ number of conductors are available in a quad.
26. _____ is used in EMC joints for isolation & for reducing noise.
27. The technique of providing a number of circuits using a single transmission pair is called _____
(combining, multiplexing)
28. Sampling theorem states that F_s should be greater than or equal to ____ (twice, thrice) the maximum frequency of the channel to be sampled.
29. The Earth resistance for MUX should be less than _____ ohms. (one, ten)
30. The bit rate of one voice channel is _____ Kbps. (256, 64)
31. In PCM sampling frequency is _____ Hz (8000, 4000)
32. In FDM the channels are differentiated by _____ (time, frequency)
33. The timeslot _____ is used for signaling in PCM (1, 16)
34. _____ method of splicing is used for jointing OFC cable.
35. Fiber loss/km at 1550 nanometer is _____ dB/km
36. Standard splice loss is _____ db/Km
37. Optic Fibre is made up of -----
38. Refractive index of core is -----than cladding
39. The principle of OFC working is -----
40. The minimum loss offered by the fibre in ----- wavelength
41. Cladding dia is -----(8 micro meters ,125micro meters ,250 micro meters)
42. Typical Refractive index of core is ----- (1.46 ,1.48 3.12)
43. Splice loss permitted is ----- (0.2 dB,0.25 dB,0.02dB) or less
44. Normal OFC drum length is ----- (1 Km ,2 Km ,5 Km , 3 Km)
45. For total internal reflection, light should pass from ----- to ----- (Denser to rarer , Rarer to denser)
46. In PA system for indoor application _____ matching method is preferred.
47. In conference hall _____ microphone is used.
48. _____ converts electrical energy into sound energy.
49. _____ network splits the frequency for woofer & tweeter
50. The line code used for PCM is _____(HDB₃, AMI)

51. In FDM the channels are differentiated by _____ (time, frequency)
52. The timeslot _____ is used for signaling in PCM (1, 16)
53. _____ method of splicing is used for jointing OFC cable. (fusion arc, evaporating)
54. Fiber loss/km at 1550 nanometer is _____dB/km. (0.63, 0.25)
55. Optic Fibre is made up of ----- . (Silica glass, Plastic)
56. Refractive index of core is -----than cladding. (less, more)
57. In Railways we use ----- type of fibre. (monomode stepindex , multimode stepindex)
58. The minimum loss offered by the fibre in ----- wavelength. (1310, 1550)
59. Cladding dia is ----- (8 μ meters ,125 μ meters ,250 μ meters)
60. The bit rate of STM4 is _____(155Mbps, 625Mbps)
61. _____ number of conductors are available in a quad.
62. _____ is used in EMC joints for isolation & for reducing noise.
63. _____ cable is used for Data communication.
64. The diameter of the conductor of the 6Quad cable is _____.
65. _____ number of Walkie Talkie should be available in ART.
66. _____ cable is used during Emergency at accident site.
67. The specification of 6Quad cable is _____
68. The loop resistance of 6Quad cable is _____
69. The transmission loss of loaded 6Quad cable is _____
70. The characteristic impedance of unloaded 6Quad cable is _____ -
71. WLL means _____.
72. In conference hall _____ microphone is used. (carbon / condenser)
73. _____ converts electrical energy into sound energy. (mike / loudspeaker)
74. For VIP function _____ standby of equipments are required. (100% / 50%)
75. In chairman unit _____ switch will be available. (priority / recording)

Choose the best answer: (25)

1. Number of conductors in a Quad is _____(2,4)
- 2) The impedance ratio of VF transformer is _____(120:120, 1120:1120)
- 3) The loop resistance of 6Quad cable is _____ Ohms per Km.(56 , 5.6)
- 4) Working voltage of DTMF way station equipment _____DC (12V, 24V)
- 5) Working voltage of telephone exchange _____VDC (48, 12)

- 6) The diameter of conductor of 6quad cable is _____ millimeter (0.9, 0.63, 0.51)
- 7) In 6Quad cable orange quad used for _____ working. (Block, EMC, BPAC)
- 8) Walkie talkie radio uses _____ battery (torch cell, Ni-cd, NI-MH)
- 9) EMC circuit is tested once in _____ periodically(15 days, 30days, 3months)
- 10) _____ converts Sound energy into electrical energy. (loudspeaker, microphone)
- 11) Fiber loss/km at 1550 nanometer is _____ dB/km (0.25, 0.3, 0.63)
- 12) _____ mode of optic fiber is used in railways. (single, multi)
- 13) _____ number of fibers are available in a loose tube. (2, 4)
- 14) _____ method of splicing is used for jointing OFC cable. (fusion arc, evaporating)
- 15) Fiber loss/km at 1550 nanometer is _____ dB/km. (0.63, 0.25)
- 16) Standard splice loss is _____ db/Km. (0.2, 0.02)
- 17) Optic Fibre is made up of ----- . (Silica glass, Plastic)
- 18) Refractive index of core is -----than cladding. (less, more)
- 19) The principle of OFC working is ----- (Total internal reflection, diffraction)
- 20) Working Voltage of walkie talkie sets _____ VDC. (12, 7.5)
- 21) The working voltage of OFC Equipments ----- (12,24)Volts.
- 22) The purpose of loading in RE cable is to minimize the -----loss.
- 23) -----is the equipment used for 4 wire to 2 wire conversion.
- 24) The working Voltage of EMC portable telephone _____
- 25) The Earth resistance for ISDN exchange should be less than _____ ohms.

Match the Following: (5)

- | | |
|---------------------------|---------------------|
| 26. Insulation resistance | Earth Meggar |
| 27. Earth Resistance | Insulation Meggar |
| 28. Transmission Loss | Cable Fault locator |
| 29. Loop Resistance | TMS Kit |
| 30. Cable break | Multimeter |

Expand the following: (10)

OFC, DTMF, TX, RX, dB

Choose the best answer: (20)

31. Number of conductors in a Quad is _____ (2,4)
32. Voice Frequency is _____.

33. The loop resistance of 6Quad cable is _____ Ohms per Km.(56 , 5.6)
34. Working voltage of DTMF way station equipment _____DC (12V, 24V)
35. TME Card should be installed in _____ slot (1, 2, 3, 6).
36. The diameter of conductor of 6quad cable is _____ millimeter (0.9, 0.63, 0.51)
37. In 6Quad cable orange quad used for _____ working. (Block, EMC, BPAC)
38. Audio Frequency is _____.
39. EMC circuit is tested once in _____periodically(15 days, 30days, 3months)
40. _____ converts Sound energy into electrical energy. (loudspeaker, microphone)
41. _____ converts Electrical energy into sound energy. (loudspeaker, microphone)
42. _____ mic is suitable for outdoor meetings. (Condensor, Dynamic).
43. _____ mic is suitable for Indoor meetings. (Condensor, Dynamic).
44. _____ reproduces low frequency (Tweeter, Woofer)
45. _____ reproduces high frequency (Tweeter, Woofer).
46. _____ number of fibers are available in a loose tube. (2, 4)
47. Working Voltage of walkie talkie sets _____ VDC. (12, 7.5)
48. The working voltage of OFC Equipments ----- (12,48)Volts.
49. The working Voltage of EMC portable telephone _____
50. The Earth resistance for OFC Installations should be less than _____ ohms.

Match the Following: (5)

- | | |
|---------------------------|---------------------|
| 51. Insulation resistance | Earth Meggar |
| 52. Earth Resistance | Insulation Meggar |
| 53. Transmission Loss | Cable Fault locator |
| 54. Loop Resistance | TMS Kit |
| 55. Cable break | Multimeter |

Write the colour code of the conductor in the following Cable (5)

56. 32nd pair in 50 Pair PIJF Cable
57. 32nd pair in 100 Pair PIJF Cable
58. 13th pair in 20 Pair Switch Board Cable
59. 17th Pair in 50 Pair Switch Board Cable
60. 17th pair in 50 Pair PIJF Cable.

Expand the following:(5) :- OFC, DTMF, TX, RX, dB

Draw the symbols of the following. (5) 1. Microphone 2. Loudspeaker 3. Amplifier 4. Resistor
5. Transformer

Name the MUX card for extending the following circuit in PUNCOM and WEBFIL. (5).

2. Section control
2. Datalogger
3. Autophone Number Exchange Side
4. FOIS
5. Autophone Number Subscriber Side.

Write down the Krone terminal for the following port output in mux. (on both methods). (5).

2. Port No.2 2. Port No.22 3. Port No.32 4. Port No.16 5. Port No.11

TCC

Choose the Best answer:

(1 X 30 = 30)

1. Number of conductors in a Quad is _____(4 / 2)
2. Earthing of steel armor & Al. strips of the quad cable is to reduce _____. (Noise / Signal)
3. The diameter of conductor of 6Quad cable is _____millimeter. (0.9 / 0.63)
4. Loop resistance of 0.63 mm copper wire is ___ ohms. (114 / 172)
5. Transmission loss of loaded 6quad cable is _____ dB/km (0.63 / 0.25)
6. Cable Markers are provided at every _____ meters within yard. (20 / 100)
7. The impedance ratio of VF transformer is _____ ohms. (1120:1120 / 600:1120)
8. Permissible psophometric voltage in RE cable is not more than ___ mV. (2 / 130)
9. Characteristic impedance of PET insulated pair is _____ ohms. (470 / 1120)
10. Insulation resistance value of 6quad cable is _____ Meg ohms. (1 / 100)
11. ----- nos of frequencies in DTMF Signalling (4/8)
12. ----- is used to protect the DTMF decoder from over current. (fuse / diode)
13. -----numbers of dip switch is used for setting a way station code in a decoder. (2 / 4)
14. The purpose of loading in RE cable is to minimize the ____ loss. (Tx. / crosstalk)
15. Purpose of condenser joint in RE is to reduce____. (Cross-talk / Noise)
16. ____is the equipment used for 4 wire to 2 wire conversion. (hybrid / transformer)
17. The EMC post should be provided at distance not less than ___meter from the outermost rail. (2.8 / 1.5)
18. ----- Transformer is used to minimize the induced voltage in RE cable (current / VF isolation)
19. EMC posts are provided every __ Km along the track. (1 / 2)
20. The working voltage of DTMF decoder is ___Volts. (24 / 12)
21. _____ & _____ Hz signals are transmitted when 2 is pressed in DTMF Encoder. (697&1209 / 697& 1336)
22. To have less Tx. loss in a line RC must be _____ LG of the line. (equal to /less than)
23. Control circuits are _____ circuit. (omnibus / linear)
24. In RE area _____ control is used for controlling traction power. (TPC / TLC)
25. Maximum _____ number of stations can be called using DTMF signaling. (72 / 99)
26. _____ Color quad is used for EMC in 6Quad cable section. (Brown / Green)

27. RC control in RE area uses _____ method for working. (DTMF /SCADA)
28. Cable Huts are provided in ____ area. (RE / Non RE)
29. In section having OFC & 6Quad ____ quad is used for BPAC. (5th / 4th)
30. ____amplifier is provided to have conversation between wayside stations. (Leak / Buffer)

Answer any two of the following:

(2 X5 = 10)

1. Explain the details of 6 Quad Cable circuit allocation.
2. Explain the various tests conducted in quad cable.
3. Name the various methods used to extend control communication from HQ to way station.

Fill in the blanks:

(6)

1. Working current for DTMF HQRS equipment is -----mA.
2. The output of DTMF signaling is ----millivolt.
3. -----nos of dip switch is used for setting a way station code in a decoder.
4. The purpose of loading in RE cable is to minimize the -----loss.
5. Purpose of condenser joint in RE is to reduce-----
6. -----is the equipment used for 4 wire to 2 wire conversion.

Match the following:

(6)

- | | |
|------------------------------|-----------------------------------|
| 7. DTMF Encoder | 470 ohms |
| 8. DTMF Decoder | 56 ohms |
| 9. VF Repeater | Control office equipment |
| 10. Leak Amplifier | Way station equipment |
| 11. Characteristic impedance | conversation between way stations |
| 12. Loop resistance | every forty Kilometers |

Choose the best answer:

(6)

13. The cable huts are provided at every ____ Km in RE area. (17 / 30)
14. We can connect maximum ____ number of stations using DTMF signaling.(78 / 99)
15. The loop resistance of 6Quad cable is ____ ohms. (56 / 114)
16. The minimum distance between the last track and the EMC post is ____ m (3 / 5)
17. The periodic test of EMC is done every ____ days. (15 / 30)
18. The characteristic impedance of loaded 6Quad cable is ____ (470 / 1120)

Answer any three of the following: (12)

1. List out the advantages of the DTMF signaling.
2. Draw the block diagram of DTMF HQRS equipment and explain.
3. Write short notes on EMC circuit.
4. Explain the PCM Principle

FILL IN THE BLANKS

1. _____ color quad is used for EMC circuit where 6Quad cable is used.
2. _____ Quad is used for section control where OFC cable is not available.
3. _____ mode of optic fiber is used in railways.
4. _____ number of fibers are available in a loose tube.
5. _____ method of splicing is used for jointing OFC cable.

Match The Following

- | | |
|-------------------------------------|--------------------------------------|
| 1) OFC Material | a) 8 micro meters to 10 micro meters |
| 2) Fiber Loss for 1550 nm | b) - 60dB |
| 3) Tx loss of unloaded 6 quad cable | c) 0.25dB/Km |
| 4) NEXT of 6 Quad cable | d) Silica glass |
| 5) Core Dia | e) 0.63 db/Km |

State True or False

- 1) Distance between two loading coil joint is approximately 1.5 km
- 2) Cleaver is used to remove primary coating of the fibre.
- 3) Standard splice loss is 0.02 db/Km
- 4) Condenser joint is done to reduce the Tx loss
- 5) The characteristic impedance of 6 quad loaded cable is 1120 Ohms

Answer any two of the following

- 1) Draw the construction of 6 Quad cable
- 2) Draw the construction of OFC cable Explain each
- 3) Explain the method of Derivation joint done in 6 quad cable for EMC circuit
- 4) Explain the method of splicing step by step

Choose the best answer:

1. The cable huts are provided at every ____ Km in RE area. (17 / 30)
2. The loop resistance of 6Quad cable is ____ ohms. (56 / 114)
3. The periodic test of EMC is done every ____ days. (15 / 30)
4. The characteristic impedance of loaded 6Quad cable is ____ (470 / 1120)
5. ____ color quad is used for EMC circuit where 6Quad cable is used.(Green/Brown)
6. ____ mode of optic fiber is used in railways. (Mono / Multi)
7. ____ number of fibers are available in a loose tube. (12 / 4)
8. ____ method of splicing is used for jointing OFC cable. (mechanical / fusion arc)
9. The transmission loss of loaded quad cable is ____ (0.63dB/Km / 0.25dB/Km)
10. The insulation resistance is measured using ____ (millimeter / megger)
11. The purpose of loading in cable is to minimize the -----loss. (Transmission / induction)
12. Purpose of condenser joint is to reduce----- (noise / crosstalk)
13. -----is the equipment used for 4 wire to 2 wire conversion. (Hybrid / Transformer)
14. The distance between VF repeaters in section having only quad is ____Km (40 / 17)
15. Standard splice loss is ____ (0.02 dB/Km / 0.2dB/Km)

Match the following:

- | | |
|-------------------------------------|--------------------------------------|
| 1) OFC Material | a) 8 micro meters to 10 micro meters |
| 2) Fiber Loss for 1550 nm | b) - 60dB |
| 3) Tx loss of unloaded 6 quad cable | c) 0.25dB/Km |
| 4) NEXT of 6 Quad cable | d) Silica glass |
| 5) Core Dia | e) 0.63 db/Km |
| 6. DTMF Encoder | f) 470 ohms |
| 7. DTMF Decoder | g) 56 ohms |
| 8. Leak Amplifier | h) Way station equipment |
| 9. Characteristic impedance | i) conversation between way stations |
| 10. Loop resistance of 0.9mm | j) Control office equipment |

State True or False:

- 1) Distance between two loading coil joint is approximately 1.5Km
- 2) Cleaver is used to remove primary coating of the fibre.
- 3) Number of conductors in a Quad is two.
- 4) The impedance ratio of VF transformer is 1120:1120
- 5) Standard Drum length of 6Quad cable is 460m.
- 6) Standard Drum length of OFC cable is 3Km.
- 7) Material for screen in 6Quad cable is Aluminum.
- 8) The screening factor of 6Quad cable is 0.4

- 9) Splicing is performed by fusion arc method.
- 10) In 6Quad cable Green quad used for BPAC working.

Explain in any one detail 5 marks

- 1) What are all the advantages of OFC compared with other medias
- 2) Splicing procedure

Fill in the blanks: (5)

1. Working current for DTMF HQRS equipment is -----mA.
2. The working voltage of DTMF Decoder is -----.
3. -----nos of dip switch is used for setting a way station code in a decoder.
4. The purpose of loading in RE cable is to minimize the -----loss.
5. -----is the equipment used for 4 wire to 2 wire conversion.

Choose correct answer (5)

6. Transmission loss of loaded 6quad cable is _____ dB/km (0.63 / 0.25)
7. In RE main cable PET quad used for _____ working (Block / EMC)
8. Purpose of condenser joint in RE is to reduce____. (Cross-talk / Noise)
9. ----- type of protection is done in Puncom muxes (Channel wise/E1 level)
10. The screening Factor of Aluminium screened quad cable is _____. (0.1 / 0.4)

Match the following: (5)

- | | |
|--------------------|-----------------------------------|
| 11. DTMF Encoder | every forty Kilometers |
| 12. DTMF Decoder | Reduce Crosstalk |
| 13. VF Repeater | Control office equipment |
| 14. Leak Amplifier | Way station equipment |
| 15. Balancing | conversation between way stations |

Choose the best answer: (10)

16. The cable huts are provided at every _____ Km in RE area. (17 / 30)
17. We can connect maximum _____ number of stations using DTMF signaling.(72 / 99)
18. The minimum distance between the last track and the EMC post is _____ m (3 / 5)
19. The periodic test of EMC is done every _____ days. (15 / 30)
20. The working voltage of VHF Repeater is _____ (12 / 24)
21. Control phone side cable has ----- no of wires (4,6,8)
22. Loading length of 6 quad cable ----- Kms . (1,10,2,1.830)

23. In 6 quad allotment -----quad is used for EMC (1,5,4)
24. ----- dB is the maximum loss permitted in a control section (15,10,20)
25. ----- is used to check the Transmission loss (TMS kit , insulation megger, multimeter)

Answer any three of the following: (15)

1. List out the advantages of the DTMF signaling.
2. Draw the block diagram of DTMF HQRS equipment and explain.
3. Write short notes on EMC circuit.
4. List out the controls available in RE area and Non-RE area.
5. Draw the block diagram of VF Repeater and explain.

Choose the Best answer:

1. Number of conductors in a Quad is _____(4 / 2)
2. Material for screening in RE main cable is_____. (Aluminum / Lead)
3. Earthing of steel armor & Al. strips of the quad cable is to reduce _____. (Noise / Signal)
4. The diameter of conductor of 6Quad cable is _____millimeter. (0.9 / 0.63)
5. Loop resistance of 0.63 mm copper wire is ___ ohms. (114 / 172)
6. Transmission loss of loaded 6quad cable is _____ dB/km (0.63 / 0.25)
7. Aluminum sheath has good _____ effect (screening / moistering)
8. In Railways the type of cable laying used is _____ laid system. (direct / indirect)
9. _____ system of cable laying method used for track crossing (Draw in method / direct)
10. Cable Markers are provided at every _____ meters within yard. (20 / 100)
11. In RE main cable PET quad used for _____ working (Block / EMC)
12. The impedance ratio of VF transformer is _____ ohms. (1120:1120 / 600:1120)
13. Permissible psophometric voltage in RE cable is not more than ___ mV. (2 / 130)
14. Characteristic impedance of PET insulated pair is _____ ohms. (470 / 1120)
15. Insulation resistance value of 6quad cable is _____ Meg ohms. (10 / 100)
16. The impedance ratio of the transformer used for Block circuit is ___ ohms in RE area. (1120:470 / 1120:600)
17. Interspacing between loading coil is _____ meters. (2000 / 1000)
18. Working current for DTMF HQRS equipment is _____mA. (500 / 25)
19. The output of DTMF signaling is ___ mill Volt. (500 / 100)
20. ----- is used in DTMF decoder for reverse voltage protection. (MOV / diode)
21. ----- is used to protect the DTMF decoder from over current. (fuse / diode)

22. -----numbers of dip switch is used for setting a way station code in a decoder. (2 / 4)
23. The purpose of loading in RE cable is to minimize the ____ loss. (Tx. / crosstalk)
24. Purpose of condenser joint in RE is to reduce _____. (Cross-talk / Noise)
25. In DTMF decoder code reception is indicated by ____ colour LED. (Red / Green)
26. In a DTMF decoder power-on condition is indicated by ____ color LED.(Green / Red)
27. ____ is the equipment used for 4 wire to 2 wire conversion. (hybrid / transformer)
28. The EMC post should be provided at a distance not less than ____ meter from the outermost rail.
(2.8 / 15)
29. Loop resistance for 0.9mm RE cable is-----ohms. (56 / 5.6)
30. Standard Drum length of 6Quad cable is-----meters. (460 / 1000)
31. Spacing between two condensers joint is ---- meters.(915 / 2000)
32. ----- Transformer is used to minimize the induced voltage in RE communication cable
(current / VF isolation)
33. The distance between VF repeaters is _____ (40-60Km / 15-17Km)
34. EMC posts are provided every __ Km along the track. (1 / 2)
35. The working voltage of DTMF decoder is ____ Volts. (24 / 12)
36. The normal voltage withstand by telecom equipments is ____ Volt. (130 / 230)
37. The screening Factor of Aluminium screened quad cable is _____. (0.1 / 0.4)
38. _____ & _____ Hz signals are transmitted when 2 is pressed in DTMF Encoder. (697&1209 / 697& 1336)
39. To have less Tx. loss in a line RC must be _____ LG of the line. (equal to /less than)
40. Control circuits are ____ circuit. (omnibus / linear)
41. In RE area ____ control is used for controlling traction power. (TPC / TLC)
42. Maximum ____ number of stations can be called using DTMF signaling. (72 / 99)
43. ____ Color quad is used for EMC in 6Quad cable section. (Brown / Green)
44. RC control in RE area uses _____ method for working. (DTMF /SCADA)
45. Cable Huts are provided in ____ area. (RE / Non RE)
46. In Non RE area ____ quad is used for Section control when OFC is not available. (yellow, black)
47. In section having OFC & 6Quad ____ quad is used for BPAC. (5th / 4th)
48. Number of OH posts available in One Km in overhead line (2W) section is ____ (12 / 15)
49. Transmission Loss allowed between Speaker to Listener is ____ dB. (3 / 20)
50. ____ amplifier is provided to have conversation between wayside stations. (Leak / Buffer)

COMMON

Fill in the blanks: (10)

- 1) Number of conductors in a Quad is _____
- 2) The impedance ratio of VF transformer is _____
- 3) The loop resistance of 6Quad cable is _____ Ohms
- 4) The specific gravity of a fully charged cell is -----
- 5) ----- rectifier is used in battery chargers.
- 6) The minimum inter distance between any two earths shall be ----- m.
- 7) For changing DC to AC ----- is used.
- 8) _____ phone is a point to point communication device
- 9) Required speech battery for P.T phone is -----
- 10) In PCM sampling frequency is _____ Hz

Match the following: (10)

- | | |
|--|--------------|
| 1. VF frequency range | 155.52Mbps |
| 2. VHF band frequency | 140Mbps |
| 3. Inter distance between loading coil | 300 – 3400Hz |
| 4. Inter distance between cable huts | 2Mbps |
| 5. Standard Drum length of 6Quad cable | 30 – 300MHz |
| 6. Standard Drum length of OFC cable | 2000meters |
| 7. The bit rate of E3 | 1000meters |
| 8. The bit rate of E4 | 3000meters |
| 9. The bit rate of E1 | 17Km |
| 10. The bit rate of STM1 | 34Mbps |

State True or False: (10)

1. Material for sheath in 6Quad cable is Aluminum.
2. Electrolyte of Lead Acid cell is dilute hydrochloric acid.
3. Every two Km one EMC socket is provided in RE area.
4. The line code used for PCM is HDB-3.
5. Optic Fiber Cable contains 12 fibers.
6. Splicing is performed by fusion arc method.
7. Loud Speaker used for high frequency is called woofer.
8. Router is a layer three switch.

9. Working current for DTMF HQRS equipment is 500mA.

10. The screening factor of 6Quad cable is 0.1

Choose the best answer: (10)

1. The diameter of conductor of 6quad cable is _____millimeter (0.9, 0.63, 0.51)
2. In 6Quad cable orange quad used for _____ working. (Block, EMC, BPAC)
3. Walkie talkie radio uses ____battery (torch cell, Ni-cd, NI-Mg)
4. EMC circuit is tested once in _____ periodically (15 days, 30days, 3months)
5. _____ converts Acoustic energy into electrical energy. (loudspeaker, Microphone)
6. Noise in a signal is measured by_____ (Psophometer, Multimeter, Ammeter)
7. The Characteristic impedance of loaded 6Quad cable is ____ ohms. (470, 1120, 114)
8. Fiber loss/km at 1550 nanometer is ____dB/km (0.25, 0.3, 0.63)
9. For high directivity _____ speakers are used. (column, cabinet, Horn)
10. Modem is a_____ port device. (Serial, Parallel)

Expand the following: (10)

DTMF	LAN	MODEM	OTDR	BRI
SDH	STM	SLIC	ISDN	INMARSAT

Answer any two of the following: (10)

1. List out the equipments available in ART.
2. Explain the processes involved in PCM.
3. Draw the multiplexing structure of STM1.

I. Fill in the blanks :

1. The technique of providing a number of circuits using a single transmission pair is called _____
2. A multiframe contains _____ frames.
3. The time for one timeslot is _____ μ S.
4. _____ is a code used in PCM system.
5. Sampling theorem states that F_s should be greater than or equal to _____

II. Match the following :

1. E1 64KBPS

2. E2 34MBPS
3. E3 2MBPS
4. E4 8MBPS
5. E0 140MBPS

III. Write short notes on the following :

1. Compare TDM and FDM
2. Explain Non linear quantizing method.
3. Define the structure of the eight bit word.
4. List out the disadvantages of PDH
5. Explain HDB3 coding method.

I) Fill the blanks with suitable correct answer from the brackets 10 marks

- 1) Father of computer is ----- (Newton ,Charles Babbage, Henry Jacobitz)
- 2) Key board uses ----- code (BCD,Hexa Decimal , ASCII)
- 3) ----- is an open operating system (windows ,Linux, Apple)
- 4) CD's & DVD 's are ----- type of storage devices (Semiconductor, Magnetic ,
Optical)
- 5) All the programme in computer is stored in ----- disc (Hard disc, Floppy disc , PEN
drive)
- 6) Hard disc is a -----storage device (Optical, magnetic, Semiconductor)
- 7) Registers are ----- speed read /write memories (low , average , high)
- 8) DOT matrix printers are ----- type printers (impact ,Non impact)
- 9) ----- is the latest operating system of windows (xp, Vista, windows 7)
- 10) ----- is used to stop the unwanted programs entering in the computer (Anti virus, Virus, OS)

II) Expand 1) ROM, 2) RAM 3) ALU 4) UTP 5) NIC 5 marks

III) Fill the blanks with correct answer 10 marks

- 1) Printers are classified into -----& -----
- 2) -----paper is required for a thermal printers.
- 3) ----- application software can be used only for one purpose.
- 4) For networking ----- is required in a PC
- 5) RAM is a ----- type of memory
- 6) ----- software is used to make Text documents
- 7) ----- is a presentation software in Ms office
- 8) ----- softwares are used to easy our work
- 9) ROM is used in ----- setup in PC's
- 10) ----- port in computer is used to connect monitors

IV) Match the following 5 marks

- | | |
|------------------------|----------------------------|
| 1) Byte | a) CD /DVD Writing program |
| 2) Non Volatile memory | b) Compressing Software |
| 3) Nero | c) 8 bits |

- | | | |
|---|------------------|---------|
| 4) Win zip | d)Impact Printer | |
| 5) LASER Printer | e)ROM | |
| V) Draw the block diagram of computer and explain about each block | | 5 marks |
| VI) Explain about the different type of softwares used | | 5 marks |

Choose the best answer: (10)

- The unit of resistance is _____ (Ohms, Volts)
- The colour code for 10% tolerance in resistor is _____ (Gold, Silver)
- 'N' indicates _____ in QN1 (Number, Neutral)
- 'L' indicates _____ in QL1 (Line, Latch)
- Ohm's law states 'I' is _____ proportional to 'R'. (Indirectly, directly)
- The pickup voltage of QN1 relay is _____ (10V, 19.2V)
- The drop away voltage of QN1 relay is _____ (7V, 10V)
- The value of resistance having colour code Brown, Black & Red is _____ (1K Ω , 10K Ω)
- The total resistance when two 200 Ω are in parallel is _____ (100 Ω , 400 Ω)
- The total resistance when two 50 Ω are in series is _____ (100 Ω , 25 Ω)

Match the following: (10)

- | | |
|---------------------------|---------------------|
| 1. Moving coil instrument | controlling force |
| 2. Moving iron instrument | damping force |
| 3. QB3 | lamp checking relay |
| 4. QTA2 | DC measurement |
| 5. QCX1 | Biased relay |
| 6. Spring | AC measurement |
| 7. Liquid friction | AC immunised relay |
| 8. Copper | Insulator |
| 9. Wood | attention |
| 10. Double Yellow | Conductor |

State true or false: (5)

- Whenever there is change in flux linkage emf is induced.
- The current in a circuit is always indirectly proportional to the applied voltage.
- The sum of the incoming currents at a node is always equal to sum of the outgoing currents.
- Home signal is used for despatching a train from a station.
- The coil resistance of track relay is greater than the coil resistance of line relays.

Choose the best answer: (10)

1. The unit of resistance is _____ (Ohms, Volts)
2. Number of conductors in a Quad is _____(4 / 2)
3. Insulation resistance value of 6quad cable is _____ Meg ohms. (50 / 100)
4. Control circuits are ____ circuit. (omnibus / linear)
5. Maximum ____ number of stations can be called using DTMF signalling. (72 / 99)
6. Standard Drum length of 6Quad cable is-----meters. (460 / 1000)
7. The Earth resistance for ISDN exchange should be less than _____ Ω (5, 1)
8. The method of jointing OFC cable is _____(Splicing, welding)
9. Ammeter is used to measure _____(Current, Voltage)
10. EMC posts are provided every __ km along the track. (1 / 2)

Match the Following correctly: (5)

1	Working voltage of DTMF decoder	a) converts sound energy to Electrical
2	Working voltage of Hipath exchange	b) converts electrical to sound energy
3	Working voltage of EMC phone	c) 12 Volts, DC
4	Microphone	d) 3Volts, DC
5	Speaker	e) 48Volts, DC

Expand the abbreviation for the following: (5)

DTMF, ISDN, FOIS, PRS, NMS

Draw the symbols for the following: (8)

Fuse, Battery, resistor, diode, Amplifier, microphone, capacitor, transformer

Answer the following: (12)

List out the colours of 6Quad cable. ?

Name the various measuring Instruments ?

I. Fill up the the best answer:

- 1) In PA system for platform announcement system, _____ matching method is preferred.(Voltage, Impedance).
- 2) In conference hall _____ microphone is used.(condenser, Ribbon)
- 3) _____converts Sound energy into electrical energy. (loudspeaker, microphone)
- 4) _____converts Electrical energy into sound energy. (loudspeaker, microphone)
- 5) _____ mic is suitable for outdoor meetings. (Condensor, Dynamic).
- 6) _____ mic is suitable for Indoor meetings. (Condensor, Dynamic).
- 7) _____reproduces low frequency (Tweeter, Woofer).
- 8) _____reproduces high frequency (Tweeter, Woofer).
- 9) POET connectivity is extended from _____ (Local Terminal Server, DTES Network).
- 10) Touch Screen connectivity is extended from _____ (Local Terminal Server, DTES Network).
- 11) Electronic Reservation Chart connectivity is extended from _____ (PRS network, Railnet).
- 12) Railway Enquiry Telephone number is _____ (131, 139).
- 13) _____ are the main colour LED used in True Colour Display Board. (RGB, YCM, RED).
- 14) At a glance Display Board will display _____ (Train information, Coach Formation, Both Train Information and Coach Formation).
- 15) Coach Guidance Board is connected from _____ in IPIS. (PDCH, MDCH).
- 16) _____ is required for WAN connectivity. (Switch, Router).
- 17) _____ is required for LAN connectivity. (Switch, Router).
- 18) _____ Topology is normally used in LAN connectivity at Railway Divisional office.(Star, Mesh).
- 19) Railnet is a _____ network. (Private, Public).
- 20) _____ type of transmission used in Coach Guidance Boards (Serial, Parallel).

II. State True or False:

- 1) Amplispeaker consist of amplifier and speaker.
- 2) V.35 modem is connected near Router.
- 3) IPIS consist of Announcement system, Display Boards and Surveillance camera.
- 4) ISS System consist of Baggage Scanner, Surveillance camera and Under Vehicle scanner.
- 5) Bass control knob is used to control Low frequency.

III. Expand:

- | | | | | |
|---------|--------|--------|--------|--------|
| 1.PRS | 2.CRIS | 3.IPIS | 4.ISS | 5.PDCH |
| 6. MDCH | 7.WAN | 8.iUTS | 9.POET | 10.DSL |

IV. List out the passenger amenity items maintained by Telecom Staff.

Choose the best answer: 5 marks

1. In PA system for indoor application _____ matching method is preferred.
a) Impedance b) Voltage
2. In conference hall _____ microphone is used.
a) Carbon b) condenser
3. VHF frequency band is _____
a) 30KHz to 300KHz b) 30MHz to 300MHz
4. _____ converts electrical energy into sound energy.
a) Microphone b) loudspeaker
5. Frequency allotted for Driver to Guard is _____
a) 150.150MHz b) 161.150MHz

State True or False: 5 marks

- 6) The working voltage of walkie talkie is 12V / DC.
- 7) LAN extender is used to extend Ethernet protocol.
- 8) V.35 modem is connected near mux.
- 9) Router is in layer two of OSI model.
- 10) Ni-cd cell is nowadays used for walkie talkie sets.

Match the following: 5 marks

- | | |
|----------------------------------|--|
| 1. VHF frequency for railway use | split the frequency for woofer & tweeter |
| 2. Woofer | outdoor use |
| 3. Horn speaker | increase the high frequency response |
| 4. Cross over network | 134MHz to 176MHz |
| 5. Treble control | low frequency speaker |

Expand: 5 Marks

- | | | | | |
|--------|--------|-------|-------|-------|
| 1. PRS | 2.CRIS | 3.FAX | 4.LAN | 5.DSL |
|--------|--------|-------|-------|-------|

Answer briefly: 5 marks

- | | | | | |
|----------|-----------------|-------|-------|----------|
| 1.Router | 2.Dialogic card | 3.NIC | 4.Hub | 5.Switch |
|----------|-----------------|-------|-------|----------|

Draw the block & Explain briefly 5 each

- 1) PRS connectivity
- 2) Draw the Block diagram of FAX machine & explain the working
- 3) Draw the block diagram of IVRS system of working & give the advantages

a) Fill up the Blank correctly: (5*1=5)

- 1) In PA system for indoor application _____ matching method is preferred.
- 2) In conference hall _____ microphone is used.
- 3) VHF frequency band is _____
- 4) _____ converts electrical energy into sound energy.
- 5) Frequency allotted for Driver to Guard is _____.
- 6) ----- used in platform to connect CGBs
- 7) MCDH and server is connected in ----- protocol
- 8) At a glance display board is connected directly to ----- equipment
- 9) ----- card required for IVRS to interface the system with public
- 10) ----- no of CGBS can be connected in one port

b) Say True or False: (5*1=5)

- 11) Switch used to derive more no. of systems .
- 12) V.35 modem is connected near DTE
- 13) Router is in layer three of OSI model
- 14) MLLN modem is connected in Networking circuit where status of protocol can be pinged..
- 15) Cross over network is to split the amplifier output for tweeter & woofer

c) Match the following Correctly: (5*1=5)

1	VHF frequency for railway use	split the frequency for woofer & tweeter
2	Woofer	outdoor use
3	Woofer	increase the high frequency response
4	Cross over network	136MHz to 174MHz
5	Treble control	low frequency speaker

d) Answer any 3 briefly of the following: (5*3=15)

1. Voltage /Impedance matching 2. Dialogic card 3. MCDH 4. IVRS 5. IPIS

Expand the following: (5*1=5)

1. PRS 2. MDCH 3. IVRS 4. PDCH 5. CTI

Answer any two of the following Questions: - (2*10=20)

- 1) List out the application of PA system in railways.
- 2) Draw the block diagram of PRS connectivity and explain.

- 3) Draw the front and rear view of amplifier used for PA system.
- 4) List out the duties of telecom staff in PRS.

(A) Fill up the Blanks correctly (20*1=20 Marks)

Section "A"

1. Number of conductors in a Quad is _____.
2. Material for screening in RE main cable is-----.
3. Earthing of steel armor & Al. strips of the quad cable is to reduce _____.
4. The diameter of conductor of 6Quad cable is _____ millimeter.
5. Loop resistance of 0.63 mm copper wire is ___ ohms.
6. Transmission loss of loaded 6quad cable is _____ dB/km .
7. The EMC post should be provided at a distance not less than _____ meter from the outermost rail.
(2.8 / 15)
8. In Railways the type of cable laying used is _____ laid system.
9. _____ system of cable laying method used for track crossing in Railways.
10. Cable Markers are provided at every _____ meters within yard.
11. The impedance ratio of VF transformer is _____ ohms.
12. Permissible psophometric voltage in RE cable is not more than ___ mV.
13. Characteristic impedance of PVC insulated pair is _____ ohm.
14. Insulation resistance value of 6quad cable is _____ Meg ohms.
15. The impedance ratio of the Signal transformer used for Block circuit is ___ ohms in RE area.
16. Interspacing between loading coil is _____ meters.
17. The purpose of loading in RE cable is to minimize the-----.
18. The purpose of condenser joint in RE is to reduce_____.
19. Standard Drum length of 6Quad cable is-----meters.
20. Spacing between two condensers joint is ---- meters.

B.Fill up thBlanks correctly (20*1=20 Marks)

- 1) ----- gate will give an output when either of one input or both input is high.
- 2) ----- gate will give an output when only both inputs are high.
- 3) ----- gate will give an output only when both input are Low.
- 4) ----- gate will conduct when either of one input is odd.
- 5) ----- gate will conduct when both input sare even.
- 6) IC7432 is a 16 pin ----- Gate.
- 7) IC 7400 is a 16 pin-----Gate.
- 8) IC ----- is a 16 pin Quadruple AND Gate.
- 9) IC-----IS A 16 pin Quadruple NOR Gate.
- 10) IC -----is a 16 pin six no. of NOT gate.
- 11) IC 74180 is a -----.
- 12) Binary (110110)₂ can be converted in to (-----)₁₀ Decimal value.
- !3) Decimal (130)₁₀ will be converted in to Binary as (-----)₂.
- 14) CMOSFET means -----
- 15) SSI means-----.
- 16) LSI means-----.
- 17) VLSI means -----.
- 18) Flip Flop will store ----- Bit.
- 19) Flip Flop will have ----- inputs and -----out puts which are conflict to Each other.
- 20) IC 74175 IS A ----- Flip Flop.

Section”B”:

(i) (Quad Cable):

Answer any three question each carry ten marks(3*10=30)

- Q1.(a)Draw the constructional view of 6Quad Cable and name its parts?
(b)Mention the colour code of the each Quad and name the circuits tapped on it?
- Q2. (a)Names the types of Jointing to be carried out for 6Q/4Q copper cable? Explain each one in brief?
- Q3.(a) What are the effects on copper cable due to AT catenaries wire in RE area?
(b)Mention the remedies to reduce the effect on cable? Explain?
- 3-
- Q4.What are the maintenance/Testing to be carried for maintaining of Quad cable. Explain?

(ii)Digital electronics:

Answer any three question each carry ten marks(3*10=30)

- Q5.(a)Define Logic Gate ? Why it is required?
(b)Names the Basic Logic gates & Derived Logic gates?
©Draw its symbols & Logic circuit?
- Q6.Write the truth table and application of any five Logic gates.?

Q7. Draw the symbol, Logic circuit, Truth table of Half Adder.

And Prove its Logic?

Q8. Define Flip-Flop. Draw its symbol, and construction of Flip-Flop?

Q9.(a) Convert the following Decimals in to Binary:

$(231)_{10}$, $(111)_{10}$, $(225)_{10}$,

(b) Convert the following in to Decimals Binary:

$(11111)_2$, $(10000)_2$, $(1010101)_2$

(A) Fill up the Blanks correctly (20*1=20 Marks)

1. Number of conductors in a Quad is _____.
2. Material for screening in RE main cable is-----.
3. Earthing of steel armor & Al. strips of the quad cable is to reduce _____.
4. The diameter of conductor of 6Quad cable is _____ millimeter.
5. Loop resistance of 0.63 mm copper wire is ___ ohms.
6. Transmission loss of loaded 6quad cable is _____ dB/km .
7. The EMC post should be provided at a distance not less than _____ meter from the outermost rail.
(2.8 / 15)
8. In Railways the type of cable laying used is _____ laid system.
9. _____ system of cable laying method used for track crossing in Railways.
10. Cable Markers are provided at every _____ meters within yard.
11. The impedance ratio of VF transformer is _____ ohms.
12. Permissible psophometric voltage in RE cable is not more than ___ mV.
13. Characteristic impedance of PVC insulated pair is _____ ohm.
14. Insulation resistance value of 6quad cable is _____ Meg ohms.
15. The impedance ratio of the Signal transformer used for Block circuit is ___ ohms in RE area.
16. Interspacing between loading coil is _____ meters.
17. The purpose of loading in RE cable is to minimize the-----.
18. The purpose of condenser joint in RE is to reduce_____.
19. Standard Drum length of 6Quad cable is-----meters.

20. Spacing between two condensers joint is ---- meters.

B. Fill up the blanks correctly (20*1=20 Marks)

- 1)----- gate will give an output when either of one input or both input is high.
- 2)----- gate will give an output when only both inputs are high.
- 3)----- gate will give an output only when both input are Low.
- 4)----- gate will conduct when either of one input is odd.
- 5)----- gate will conduct when both inputs are even.

FILL IN THE BLANKS

1. BORSCHT function related to _____ circuit.
2. Control function in a exchange performs to control the _____ & _____
3. The bit rate for 30 channel PCM system _____
4. The Data store includes _____ store and _____ store.
5. The working Voltage of Hipath 4000 Exchange is _____
6. The Earth resistance for ISDN exchange should be less than _____ ohms.
7. In Hipath 4000 ISDN exchange _____ card is used for Digital extensions.
8. Always in Hipath4000, LTUCX card should be placed in the slot _____

Expand

1. SLIC
2. SPC
3. ISDN
4. PCM
5. TDM

ANSWER ANY TWO OF THE FOLLOWING

1. LIST OUT ANY THREE ADVANTAGES OF ISDN THAN NON-ISDN EXCHANGES
2. LIST OUT THE CARDS USED IN TADARIAN EXCHANGE SEEN IN COIMBATORE STATION
3. LIST OUT THE CARDS USED IN HIPATH EXCHANGES

FILL IN THE BLANKS

1. _____ color quad is used for EMC circuit where 6Quad cable is used.
2. _____ Quad is used for section control where OFC cable is not available.
3. _____ mode of optic fiber is used in railways.
4. _____ number of fibers are available in a loose tube.
5. _____ method of splicing is used for jointing OFC cable.

Match The Following

- | | |
|-------------------------------------|--------------------------------------|
| 1. OFC Material | a) 8 micro meters to 10 micro meters |
| 2. Fiber Loss for 1550 nm | b) - 60dB |
| 3) Tx loss of unloaded 6 quad cable | c) 0.25dB/Km |
| 4) NEXT of 6 Quad cable | d) Silica glass |
| 5) Core Dia | e) 0.63 db/Km |

State True or False

- 6) Distance between two loading coil joint is approximately 1.5 km
- 7) Cleaver is used to remove primary coating of the fibre.
- 8) Standard splice loss is 0.02 db/Km
- 9) Condenser joint is done to reduce the Tx loss
- 10) The characteristic impedance of 6 quad loaded cable is 1120 Ohms

Answer any two of the following

- 1) Draw the construction of 6 Quad cable
- 2) Draw the construction of OFC cable Explain each
- 3) Explain the method of Derivation joint done in 6 quad cable for EMC circuit
- 4) Explain the method of splicing step by step.

IV. Fill in the blanks :

1. The technique of providing a number of circuits using a single transmission pair is called _____
2. A multiframe contains _____ frames.
3. The time for one timeslot is _____ μ S.
4. _____ is a code used in PCM system.
5. Sampling theorem states that F_s should be greater than or equal to _____

V. Match the following :

- 6. E1 64KBPS
- 7. E2 34MBPS
- 8. E3 2MBPS
- 9. E4 8MBPS
- 10. E0 140MBPS

VI.

- 1) SDH employs ----- interleaved multiplexing
- 2) Bit rate of STM-1 is ----- Mbps
- 3) ----- European standard is not possible to transport through SDH
- 4) Maximum bit rate of European PDH is ----- Mbps
- 5) Quality of data is measured in -----

11) Write short notes on the following :

- 6. Compare TDM and FDM
- 7. Explain Non linear quantizing method.
- 8. Define the structure of the eight bit word.
- 9. List out the disadvantages of PDH
- 10. List Advantages of SDH.

FILL IN THE BLANKS

- 1) _____ color quad is used for EMC circuit where 6Quad cable is used.
- 2) _____ Quad is used for section control where OFC cable is not available.
- 3) _____ is provided for mechanical strength in 6Quad cable.
- 4) _____ number of conductors are available in a quad.
- 5) _____ is used in EMC joints for isolation & for reducing noise.

Match the Following

- 1) Dia of the conductor of quad cable a) 0.25db/Km

- | | |
|-----------------------------------|---------------|
| 2) Tx Loss of loaded quad cable | b) - 60dbm |
| 3) Tx loss of unloaded quad cable | c) 0.9mm |
| 4) NEXT of 6 Quad cable | d) 2mV |
| 5) Psophometric noise | e) 0.63 db/Km |

State True or False

- 1) Distance between two loading coil joint is approximately 1.5 km.
- 2) Balancing is done to remove primary coating of the fiber.
- 3) Standard splice loss is 0.02 db/Km.
- 4) Condenser joint is done to reduce the Tx loss
- 5) The characteristic impedance of 6 quad loaded cable is 1120 Ohms

Answer any two of the following

- 5) Draw the construction of 6 Quad cable
- 6) Draw the construction of OFC cable Explain each
- 7) Explain the method of Derivation joint done in 6 quad cable for EMC circuit
- 8) Explain the method of splicing step by step

Choose the best answer : (10)

1. The technique of providing a number of circuits using a single transmission pair is called ____
(combining, multiplexing)
2. A multiframe contains _____ frames. (32, 16)
3. The time for one timeslot is _____ μ S. (125, 3.9)
4. Sampling theorem states that F_s should be greater than or equal to ____ (twice, thrice) the maximum frequency of the channel to be sampled.
5. The Earth resistance for MUX should be less than _____ ohms. (one, ten)

6. The bit rate of one voice channel is _____Kbps. (256, 64)
7. In PCM sampling frequency is _____Hz (8000, 4000)
8. The line code used for PCM is _____(HDB₃, AMI)
9. In FDM the channels are differentiated by _____ (time, frequency)
10. The timeslot _____ is used for signaling in PCM (1, 16)

Match the following : (5)

- | | |
|-------|---------|
| 1. E1 | 64KBPS |
| 2. E2 | 34MBPS |
| 3. E3 | 2MBPS |
| 4. E4 | 8MBPS |
| 5. E0 | 140MBPS |

Fill in the blanks (20)

1. _____ mode of optic fiber is used in railways.
2. _____ number of fibers are available in a loose tube.
3. _____ method of splicing is used for jointing OFC cable.
4. Fiber loss/km at 1550 nanometer is _____dB/km
5. Standard splice loss is _____db/Km
6. Optic Fibre is made up of -----
7. Refractive index of core is -----than cladding
8. The principle of OFC working is -----
9. For all communication purposes we use ----- type of fibre
10. The minimum loss offered by the fibre in ----- wavelength

Choose the correct answer: (5)

1. Cladding dia is -----(8 micro meters ,125micro meters ,250 micro meters)
2. Typical Refractive index of core is ----- (1.46 ,1.48 3.12)
3. Splice loss permitted is ----- (0.2 dB,0.25 dB,0.02dB) or less
4. Normal OFC drum length is ----- (1 Km ,2 Km ,5 Km , 3 Km)
5. For total internal reflection, light should pass from ----- to ----- (Denser to rarer , Rarer to denser)

Match the following : (5)

1. Critical angle
 2. Cleaning solution
 3. Cleaver
 4. Mechanical splicing
 5. Fibre stripper
- i) Temporary joint
 - ii) Removing primary
 - iii) Isopropyl Alcohol
 - iv) Refracted angle is 90 degree
 - v) 90 degree cutting

Expand the following (5)

- a) FMS b) FAW c) SDH d) HDB₃ e) OTDR

FILL IN THE BLANKS

1. BORSCHT function related to _____ circuit.
2. Control function in a exchange performs to control the _____ & _____
3. The working Voltage of Hipath 4000 Exchange is _____
4. The Earth resistance for ISDN exchange should be less than _____ ohms.
5. In Hipath 4000 ISDN exchange _____ card is used for Digital extensions.
6. Always in Hipath4000, LTUCX card should be placed in the slot _____

7. In PA system for indoor application _____ matching method is preferred.
8. In conference hall _____ microphone is used.
9. _____ converts electrical energy into sound energy.
10. _____ network splits the frequency for woofer & tweeter

Expand

SLIC SPC ISDN LMT TDM PRS CRIS LAN DSL VHF

Match the following:

VHF frequency band	LMT
Driver to Guard	Low frequency speaker
Treble control	30MHz to 300MHz
Woofer	161.150MHz
Voltage matching	high frequency control

State True or False:

- 16) The working voltage of walkie talkie is 12V / DC.
- 17) LAN extender is used to extend Ethernet protocol.
- 18) V.35 modem is connected near mux.
- 19) Router is in layer two of OSI model.
- 20) Ni-cd cell is nowadays used for walkie talkie sets.

Answer any two of the following

1. List out any five advantages of ISDN than NON-ISDN exchanges.
2. List out the cards used in TADARIAN or CORAL or HIPATH exchange.
3. Draw the front and rear view of amplifier used for PA system.
4. How will you provide a PA system for a function in an auditorium using an amplifier of 50watts power, four 4Ohms loudspeaker and 3 mikes?

Choose the best answer : (10)

1. The technique of providing a number of circuits using a single transmission pair is called _____
(combining, multiplexing)
2. A multiframe contains _____ frames. (32, 16)
3. The time for one timeslot is _____ μ S. (125, 3.9)

4. Sampling theorem states that F_s should be greater than or equal to ____ (twice, thrice) the maximum frequency of the channel to be sampled.
5. The Earth resistance for MUX should be less than _____ ohms. (one, ten)
6. The bit rate of one voice channel is _____ Kbps. (256, 64)
7. In PCM sampling frequency is _____ Hz (8000, 4000)
8. The line code used for PCM is _____ (HDB₃, AMI)
9. In FDM the channels are differentiated by _____ (time, frequency)
10. The timeslot _____ is used for signaling in PCM (1, 16)

Match the following : (5)

- | | |
|-------|---------|
| 1. E1 | 64KBPS |
| 2. E2 | 34MBPS |
| 3. E3 | 2MBPS |
| 4. E4 | 8MBPS |
| 5. E0 | 140MBPS |

Choose the best answer (15)

1. _____ mode of optic fiber is used in railways. (single, multi)
2. _____ number of fibers are available in a loose tube. (2, 4)
3. _____ method of splicing is used for jointing OFC cable. (fusion arc, evaporating)
4. Fiber loss/km at 1550 nanometer is ____ dB/km. (0.63, 0.25)
5. Standard splice loss is _____ db/Km. (0.2, 0.02)
6. Optic Fibre is made up of ----- . (Silica glass, Plastic)
7. Refractive index of core is ----- than cladding. (less, more)
8. The principle of OFC working is ----- (Total internal reflection, diffraction)
9. In Railways we use ----- type of fibre. (monomode stepindex , multimode stepindex)
10. The minimum loss offered by the fibre in ----- wavelength. (1310, 1550)
11. Cladding dia is ----- (8 μ meters , 125 μ meters , 250 μ meters)
12. Typical Refractive index of core is ----- (1.46 , 1.48 3.12)
13. Normal OFC drum length is ----- (1 Km , 2 Km , 5 Km , 3 Km)
14. For total internal reflection, light should pass from ----- to ----- (Denser to rarer , Rarer to denser)
15. The bit rate of STM4 is _____ (155Mbps, 625Mbps)

Match the following : (5)

- | | |
|---|----------------------------------|
| 1. Critical angle | i) Temporary joint |
| 2. Cleaning solution after removing primary coating | ii) Removing primary coating |
| 3. Fibre stripper | iii) Isopropyl Alcohol |
| 4. Cleaver | iv) Refracted angle is 90 degree |
| 5. Mechanical splicing | v) 90 degree cutting |

Expand the following (5)

FMS	FAW	SDH	HDB ₃	OTDR	SLIC
SPC	ISDN	PCM	TDM		

Answer any two of the following (10)

1. List out the advantages of ISDN exchange.
2. List out the advantages of SDH
3. Draw the multiplexing structure of STM1.

Fill in the blanks: (14)

1. _____ color quad is used for EMC circuit where 6Quad cable is used.
2. _____ Quad is used for section control where OFC cable is not available.
3. _____ is provided for mechanical strength in 6Quad cable.
4. _____ number of conductors are available in a quad.
5. _____ is used in EMC joints for isolation & for reducing noise.
6. _____ cable is used for Data communication.

7. The diameter of the conductor of the 6Quad cable is _____.
8. _____ number of Walkie Talkie should be available in ART.
9. _____ cable is used during Emergency at accident site.
10. The specification of 6Quad cable is _____
11. The loop resistance of 6Quad cable is _____
12. The transmission loss of loaded 6Quad cable is _____
13. The characteristic impedance of unloaded 6Quad cable is _____ -
14. WLL means _____.

Answer the following: (3 X 5 = 15)

1. List out the cables used in Railways for Telecom circuits.
2. Write the color code of the 6Quad cable.
3. Write the applications of Switch board cable.
4. List out the allocation of 6Quad cable where OFC is available.
5. Draw the construction of PIJF cable.

Answer the following: (3 X 7 = 21)

1. List out the equipments provided in ART.
2. What is the duty of TCM at Accident spot?
3. Draw the construction of 6Quad cable neatly.

Choose the best answer: (10)

1. BORSCHT function related to _____ circuit. (SLIC / DIUN2)
2. The working Voltage of Hipath 4000 Exchange is _____ (12V / 48V)
3. The Earth resistance for ISDN exchange should be less than _____ ohms.
4. In Hipath exchange _____ card is used for Digital extensions. (SLMO2 / SLMA2)
5. Always in Hipath4000, LTUCX card should be placed in the slot _____ (63/73)
6. In PA system for indoor _____ matching method is preferred. (Impedance / Voltage)
7. In conference hall _____ microphone is used. (carbon / condenser)
8. _____ converts electrical energy into sound energy. (mike / loudspeaker)
9. The working voltage of walkie talkie is _____ (12V DC / 7.5V DC)

10. _____ antenna is used for VHF base station. (Slim jim / Whip)

Expand (10)

SLIC	ISDN	LMT	TDM	PRS
SPC	CRIS	LAN	DSL	VHF

Match the following: (10)

- | | |
|-----------------------|---------------------------|
| 1. VHF frequency band | PRI card |
| 2. Driver to Guard | Low frequency speaker |
| 3. Treble control | 30MHz to 300MHz |
| 4. Woofer | 161.150MHz |
| 5. DIUN2 | high frequency control |
| 6. PPS | digital subscriber card |
| 7. SLMA2 | Trunk card |
| 8. 4TBR | power supply card |
| 9. TMEW2 | basic rate interface card |
| 10. SDT | analog subscriber card |

State True or False: (5)

1. The bit rate of BRI is 144Kbps.
2. LAN extender is used to extend Ethernet protocol.
3. V.35 modem is connected near mux.
4. Router is in layer two of OSI model.
5. Ni-cd cell is used for walkie talkie sets.

Answer any three of the following (15)

1. List out any five advantages of ISDN than NON-ISDN exchanges.
2. List out the cards used in TADARIAN or CORAL or HIPATH exchange.
3. Draw the front and rear view of amplifier used for PA system.
4. Draw the block diagram for extending a data circuit from PTJ to CBE.
5. List out the services provided by ISDN exchange.

In PA system for indoor _____ matching method is preferred. (Impedance / Voltage)

In conference hall _____ microphone is used. (carbon / condenser)

_____ converts electrical energy into sound energy. (mike / loudspeaker)

In telephone instruments _____ microphone is used. (Carbon/ condenser)

For VIP function _____ standby of equipments are required.(100% / 50%)

In chairman unit _____ switch will be available. (priority / recording)

a) Woofer

outdoor use

- | | |
|-----------------------|--|
| b) Horn speaker | high frequency control |
| c) Cross over network | split the frequency for woofer & tweeter |
| d) Treble control | low frequency speaker |
- 5) List out the application of PA system in railways.
- 6) Draw the front and rear view of amplifier used for PA system.

OFC

Fill the Blanks

1. Optic fibre is made up of -----.
2. Refractive index of core is -----than cladding.
3. The principle of OFC working is -----.
4. For all communication purposes we use ----- type of fibre.
5. The minimum loss offered by the fibre in ----- wavelength.
6. Size of core is ----- micro meters.
7. Cladding size----- micro meters.

8. Loose tube size----- mm.
9. No of fibers in one loose tube -----.
10. Size of fibre after primary coating is----- micro meters.

Expand

- a) FMS b) FCPC c) SDH d) HDPE e) OTDR

Match the following

- | | |
|---|------------------------------|
| 1. Critical angle | i) Temporary joint |
| 2. Cleaning solution after removing primary coating | ii) Removing primary coating |
| 3. Fibre stripper | iii) Isopropyl Alcohol |
| 4. Cleaver | iv) Refracted angle is 90 |
| 5. Mechanical splicing | v) 90 degree cutting |

Choose the correct answer

1. Cladding dia is -----(8 micro meters ,125micro meters ,250 125micro meters)
2. Typical Refractive index of core is -----(1.46 ,1.48 3.12)
3. Splice loss permitted is -----(0.2 dB,0.25 dB,0.02dB) or less
4. Normal OFC drum length is ----- (1 Km ,2 Km ,5 Km , 3 Km)
5. For total internal reflection , light should pass from ----- to -----
(Denser to rarer, Rarer to denser)

Answer in one sentence

1. Conditions of Total internal reflection
2. Type of OFC cable used in Railways
3. Primary coated fibre
4. Loose tube
5. Corrugated armor use

Answer in detail (any two)

- b) What are all the advantages of OFC
- c) Draw the construction of OFC cable and explain each part
- d) Explain the splicing procedure
- e) Test equipments in OFC

Fill in the blanks:

(10)

26. VHF frequency allotted for Railway communication is -----To -----
27. Wattage of base station VHF set is ----- watts
28. ----- Version of IP address system is using in India .
29. Railnet is ----- network of Indian Railways .

30. In IPDSLAM ----- modem is required at Users end
31. Most used LAN protocol is -----.
32. In MPLS network system ----- routers are used to make a to Make a MPLS cloud network
33. For providing VPN ----- type of a routing method is required
34. In VOIP system ----- unit is required to connect ordinary phone
35. In GSM ----- unit will keep the mobile equipment identity number

Match the following:

(6)

- | | |
|------------------|--|
| 36. NGN | Is a European based GSM system for railway working |
| 37. MSC | Router switching carried out by using label |
| 38. WLL | Is a integration of many telecom services |
| 39. MPLS | Group of cells |
| 40. GSM-R | Is a fixed mobile |
| 41. Cell cluster | controls entire working of one zone level cellular working |

best answer:

(6)

42. In NGN all information's are passed in . (packet switching / circuit switching)
43. In MPLS system the customer side uses ----- routers (Edge / Core)
44. Data can be send ----- meters through Cat 6 cable (100/1000)
45. -----MHz frequency is allotted for Driver to guard commn(159.1,161.150)
46. Quality of data channel connectivity is checked by using ----- equipment (BER meter/Level meter)
47. In MPLS IP is converted in to -----for routing (path ,Label)

Answer in detail

(10)

6. Draw the block diagram of GSM and briefly explain about working
7. Draw the block diagram of IPDSLAM and give small explanation

Expand (8)

1)NGN,MPLS,GSM,IPDSLAM,DHCP,MTRC,LSR,VPN

COMPUTER

Fill in the blanks :

1. The command save is available in the _____ menu.
2. The command undo is available in the _____ menu.
3. To provide numbering _____ is used.
4. To do calculations _____ is used in MS Office.
5. Keyboard is _____ unit.

Match the following:

- | | |
|------------|-------------------------|
| 1. Printer | Compact Disc |
| 2. Mouse | Central Processing Unit |
| 3. ROM | Output device |
| 4. RAM | Input device |
| 5. CD | Random access memory |
| 6. CPU | Read only memory |

Choose the best answer:

1. The short cut keys used to copy is _____(Ctrl+C, Ctrl+V)
2. The short cut keys used to undo is _____(Ctrl+S, Ctrl+Z)
3. The Operating system used in our office computers is ____ (Windows, Linux)
4. The icon used to add the contents of some cells in MS Excel is ____ (Σ , £)
5. The red line under a word indicates _____(Spelling mistake, formatting mistake)

Answer the following:

1. Draw the block diagram of a computer and explain.

VII. Fill in the blanks: -20 marks. (Each question carrying equal marks)

56. The end voltage of a fully charged cell is _____.
57. _____ mode of Fibre is used in Railways.
58. Maximum number of stations can be called using DTMF HQ equipment is _____.
59. One byte contains ____ bits.
60. Total internal reflection happens in an OFC cable when the light ray travels from ____ medium to _____ medium.
61. Optical fibre cable is made up of _____.
62. In a capacitor, the capacitive reactance is _____ proportional to frequency.

63. _____ converts acoustic energy in to electrical energy.
64. The barrier potential of Silicon diode is _____ volts.
65. Full wave rectifier circuit requires 2 diodes and requires _____ type transformers.
66. GPS stands for _____
67. In a 2 Mb digital transmission, the number of speech channel will be _____.
68. EMC sockets are provided at every _____ Km.
69. The value of earth resistance of telecommunication installations shall be less than _____ ohms.
70. ISDN stands for _____.

Write the Hindi equivalent of the following:

71. Approved
72. urgent
73. Telecommunication.
74. Consideration
75. Order

VIII. Choose the correct answer: - 10 marks. (Each question carrying equal marks)

76. Loop resistance of 0.5 mm copper wire is ___ ohms.(56, 114, 172)
77. Interspacing between loading coil joint is _____Km. (one, two, three)
78. Optic Fibre Cable used in Railways contains ----- numbers of loose tubes.(2, 4, 6)
79. _____ Number of E1's can be transmitted in STM1. (63, 21, 42)
80. Standard splice loss is _____ (0.2 dB, 2.0 dB, 0.02 dB)
81. The prime advantage of OFC over copper cable is it eliminates _____ (Electromagnetic interference, power loss)
82. Henry is the unit of _____ (resistance, capacitance, inductance)
83. When resistors are connected in parallel the resultant value of the parallel resistance will be _____ (more, less, no change in value)
84. The instrument used for measuring cable insulation is _____ (Insulation megger, Multimeter, Voltmeter)
85. Ammeter is always connected in _____ (series/parallel) with the circuit.

IX. Match the following: 10 marks. (Each question carrying equal marks)

86. VF transformer	192Kbps
87. VHF band	AC to DC
88. Invertors	30 – 300MHz
89. Hybrid	1120:1120
90. UTP cable	Sine wave oscillator
91. Electrolyte of Lead Acid cell	Optical Reciever
92. Tank circuit	4W to 2W
93. Rectifiers	Sulphuric acid
94. BRI	RJ 45
95. Avalanche Photo Diode	DC to AC

X. State True or False: 10 marks. (Each question carrying equal marks)

96. To protect the electrical equipment from high voltage MOVs are to be connected in parallel with the circuit.
97. Cable Huts are provided at every 15 Km in RE/Non RE area.
98. For Platform announcement in Rly. Stations loudspeakers are connected in voltage matching method.
99. One PRI of ISDN contains 30 Base band circuits and one data channel.
100. Always last Quad of 6Quad cable is used for Block Instrument circuit.
101. The transmission loss of OFC cable is 0.63 dB per Km when 1550nm wavelength is used.
102. The positive terminal of the power supply is connected to earth terminal in Electronic Exchanges.
103. The bit rate of STM16 is 155.52 Mbps.
104. The nominal ringing voltage of Magneto telephone is 230 Volts AC.
105. V. 35 modem is connected at the data communication equipment end.

XI. Answer the following: 20 marks. (Each question carrying equal marks)

11. Write the allocation of 6Quad cable.
12. List out the advantages of ISDN exchange.
13. Write short notes on Router.
14. Explain in brief the various control circuits available in RE area.
15. What are the Passenger Amenities available in Railway station?
16. Draw the symbol of a NPN Transistor, SCR, Zener diode and NAND gate.

17. Define critical angle in OFC.
18. Give three cases where Hindi, regional language and English should be used?
19. List out the various process involved in PCM.
20. Draw the block diagram of EMC phone.

XII. Answer any five of the following: 30 marks. (Each question carrying equal marks)

8. Write the color codes of 6Quad cable and explain the various tests conducted in 6quad cable?
9. Explain the method of jointing OFC and list out materials required for the above jointing.
10. List out the telecom items that are maintained in ART/BD special & its periodicity of Maintenance.
11. Draw a neat sketch showing mid section radio patching arrangement and explain its working.
12. Write short notes on any two of the following:
PRS OTDR VSAT DTMF Encoder
13. What are the advantages of OFC cable? What are the services offered by ISDN exchange?
14. What is meant by SDH? Draw the multiplexing structure of STM1.
15. List out the items required for extending UTS circuit from CBE to PTJ and draw the connectivity of the items used.