

CAT I
TELECOMMUNICATION
SYSTEMS MODEL ANSWERS

CAT I – QUESTION 4
OCTOBER 2016

4.1. The fixed telephone set is powered by the central office at

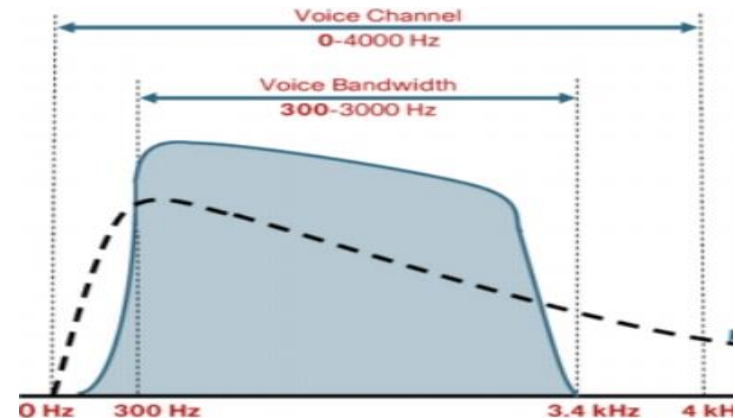
- 42 to 52 Vdc
- 42 to -52 Vdc
- 24 to 64 Vdc
- 24 to - 64 Vdc

4.2. What is an Erlang?

- It is a unit of magnetic field intensity measured around a conductor
- It is the number of erroneous bits received per unit of time
- It a unit of electrical energy radiated in space.
- It is equal to the number of simultaneous calls originated during a specific hourly period.

4.3. The telephone voice band frequency is from

- 300 to 4 kHz
- 400 to 3400 Hz
- 300 to 3400 Hz



4.4. The physical connection between the telephone set and the switching equipment is called the

- Trunk line
- Link
- Subscriber loop
- Leased line

4.5. What is the local loop of a telephone system?

- It is a two-wire or four-wire communication circuit between the customer's premise and the central office
- It is a group of wires connecting a telephone set to a modem
- It is a four-wire circuit connecting a facsimile machine to a computer
- It is a single piece of wire connecting the subscriber's telephone set to another set in an adjacent room.

4.6. 1 mW is equal to

- 90 dBm
- 0 dBm
- 30 dBm
- 120 dBm

SOLUTION

Connection between the telephone switching equipment and a telephone set is called a subscriber loop because the subscriber could signal his/her intention to make a call by lifting the handset which allowed DC current to flow.

SOLUTION

In the fixed telephone system, connection between telephone equipment and the telephone system is 2-wire for analogue connection and 4-wire for digital connection (PCM or ISDN)

SOLUTION

Measurement in DBms are referenced to 1 mW.

$$P_{dbm} = 10 \log_{10} \left(\frac{P_{mW}}{1 \text{ mW}} \right)$$

4.7. Which of the following responds to the request of a subscriber by sending a dial tone?

- Line finder
- First selector
- Connector
- Line equipment

4.8. _____ is a voice operated device that inserts a high loss in the opposite direction of transmission of the talking party.

- Hybrid
- 2-wire circuit
- Echo suppressor
- VNL

4.9. Typical speech power

- 10 to 1000 μ W
- 100 to 1000 mW
- 10 to 1000 nW
- 100 to 1000 pW

4.10. The maximum intelligibility for voice frequency is located between

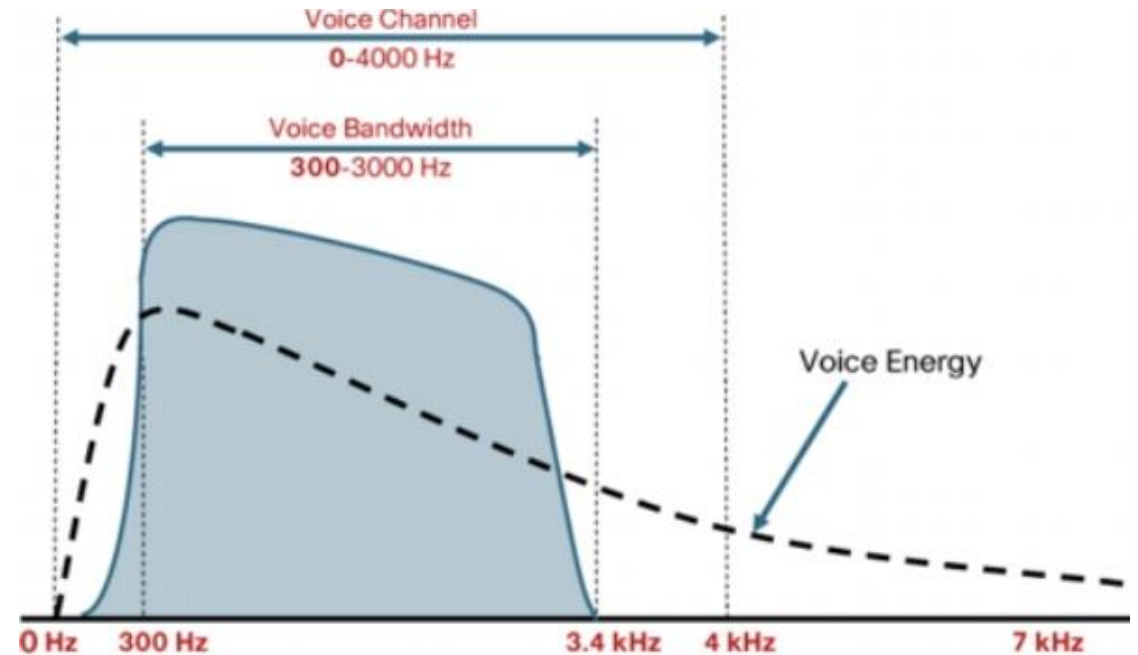
- 250 and 500 Hz
- 1000 and 3000 Hz
- 500 and 1000 Hz
- 3000 and 5000 Hz

4.11. The maximum voice energy is located between

- 250 and 500 Hz
- 1000 and 3000 Hz
- 500 and 1000 Hz
- 3000 and 5000 Hz

4.12. Presently, this is the “standard” frequency bandwidth for voice transmission.

- 0 to 4000 Hz
- 100 to 3400 Hz
- 300 to 3400 Hz
- 300 to 3000 Hz



4.13. What is the standard telephone voice channel spacing?

44 MHz

40 kHz

4 kHz

40 MHz

4.14. Which tester is used to measure SWR?

Multimeter

Oscilloscope

Spectrum analyzer

Reflectometer

4.15. To least the fault of the given line, a signal is fed to the line, $30 \mu\text{s}$ later the signal returned. What is the distance of the fault?

9000 m

300 m

100 m

4500 m

SOLUTION

Let the distance to the fault be d .

Then

$$2d = 3 \times 10^8 \times 30 \times 10^{-6}$$

$$d = \frac{90 \times 10^2}{2} = 4,500$$

4.16. Which stage increases the selectivity of the circuit in an AM receiver?

Detector

IF stage

Modulator

Mixer

4.17. What is a multidrop line?

A piece of wire with a thick insulating material that serves to protect the conductive materials from damage in the event the wire is dropped.

A line designed to withstand high pressure.

A line or circuit interconnecting several situations.

A bus line

4.18. The signal quality of the calls is constantly monitored by the base station, when the quality of the calls drops below a certain specified level. The base request the Mobile Telephone Switch Office (MTSO) to try and find a better cell site through a process known as _____

Hand-off

Cell splitting

Roaming

4.19. A type of distortion a facsimile produce when it becomes out of synchronization?

- Pincushion
- Barrel
- Skewing
- Fattening

4.20. What is the most commonly used light sensor in a modern fax machine?

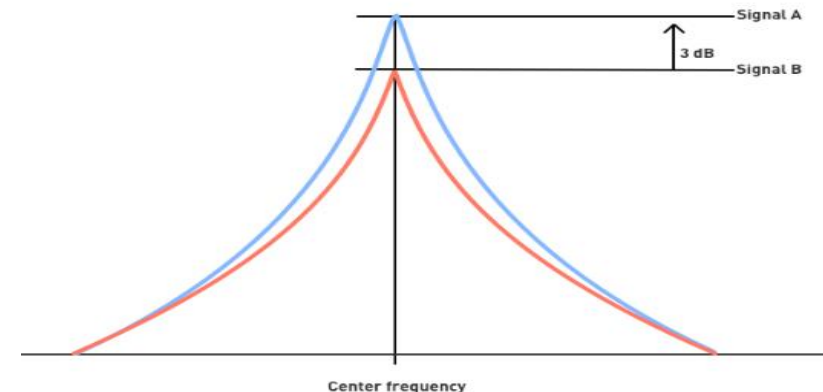
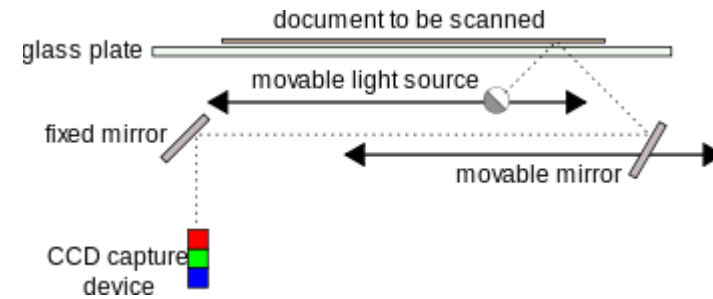
- Phototube
- Phototransistor
- Liquid-crystal display
- Charge couple device

4.21. The _____ in an FM receiver causes a stronger signal to dominate over a weaker signal on the same frequency.

- Capture effect
- Flywheel effect
- Hall effect

SOLUTION

In fax systems, skew is the angular deviation of the received frame from rectangularity caused by asynchronism between the scanner and the recorder.



4.22. A device that converts a 2-wire circuit to a 4-wire circuit.

- RS-232 interface
- Hybrid circuit
- Balun
- Stub

4.23. What is the frequency band of CT2 telephone?

- 890 – 915 MHz
- 824 – 849 MHz
- 1.48 – 1.50 GHz
- 864 – 868 MHz

4.24. How many simultaneous calls does each CT2 system can support?

- 96
- 20
- 24
- 49

4.25. How many simultaneous calls does a CT2 radio transceiver can assess at any given time?

40

80

32

8

4.26. The AGC voltage of a radio receiver is always _____.

Present before adjustments can be made

DC, but may have either polarity positive DC

Positive DC

Negative

4.27. What is a concentrator?

- A system that improves the signal-to-noise ratio by compressing the volume range of a signal.
- A device that varies the characteristics of a carrier signal in accordance with the waveform of a modulating signal which contains useful information
- A switching system that lets a large number of telephone or data processing subscribers use a lesser number of transmission lines or a narrow bandwidth
- Equipment in the central office.

4.28. What is a leased line?

- A piece of wire used in a local area network in one building
- A piece of wire connecting a telephone set to a PABX
- A temporary connection of one computer to a mainframe via a modem and a telephone line
- A permanent circuit for a private use within a communication network

4.29. Analogue radio communications between points using a single share frequency is _____

- Simplex
- Full duplex
- Half-duplex
- Full/full duplex

4.30. What is the number of channels of a cellular system with an allocated spectrum of 25 MHz and with a channel of 30 kHz bandwidth?

- 833
- 240
- 1000
- 666

SOLUTION

$$\text{Number of channels} = \frac{25}{0.030} = 833 \text{ channels}$$

This is the number of channels in the Digital Advanced Mobile Systems (DAMPS) developed in the USA.