Answers
Telecommunications revision questions

1. we see lightning before we hear thunder.
   we see the flash from a firework rocket before we hear the bang.

2. distance & time

3. metre stick & stopwatch

4. metres & seconds

5. $V = {}^{d}/_{t}$ speed = distance divided by time

6. 340 $^{m}/_{s}$

7. electronic timer, 2 microphone, metre stick

8. 324 $^{m}/_{s}$

9. 1500 $^{m}/_{s}$ & 5000 $^{m}/_{s}$

10. the distance from as point on a wave to the same point on the next wave
    -- unit metres (m)

11. the number of waves passing a point in one second-- unit hertz (Hz)

12. the distance from the centre of a eave to its peak or trough -- unit metres (m)

13. the distance an object travels in one second – unit metres
    – unit metres per second ($^{m}/_{s}$)

14. 5 Hz

15. f

16. λ

17. $v=f\lambda$

18. 0.4m

19. dividing the distance something moves for by the time it moves gives the distance travelled each second ----metres per second
    multiplying the number of waves in a second by the length of each wave also gives the distance travelled each second--- metres per second

20. wires & optical fibres

21. 3×10^{8} $^{m}/_{s}$

22. glass

23. pulses of light

24. 3×10^8 $^{m}/_{s}$

25. many different signals can be transmitted at the same time, cheaper, fewer booster stations required, less interference (better quality signals)

26. it is reflected

27. a ray of light will travel back along exactly the same path if it is pointed in the opposite direction

28. they are the same size

29. because of total internal reflection internal

30. 0.02s

31. aerial, tuner, decoder, amplifier, loudspeaker (power supply)

32. aerial – picks up many radio signals and changes the to electrical signals
tuner – selects one particular frequency
decoder – separates out the audio signal from carrier (radio) signal
amplifier – increases the size of the electrical signal
loudspeaker- changes the electrical signal to a sound signal
power supply – supplies energy to the amplifier

33. when the radio wave has its amplitude changed so that it can carry the audio wave

34. aerial, tuner, sound decoder, sound amplifier, loudspeaker,
vision decoder, vision amplifier, picture tube (power supply)

35. aerial – picks up many radio signals and changes the to electrical signals
tuner – selects one particular frequency
sound decoder – separates out the audio signal from carrier (radio) signal
sound amplifier – increases the size of the audio electrical signal
loudspeaker- changes the audio electrical signal to a sound signal
vision decoder – separates out the vision signal from carrier (radio) signal
vision amplifier - increases the size of the vision electrical signal
picture tube - changes the vision electrical signal to a light signal
power supply – supplies energy to the amplifiers

36. 625

37. 25

38. the number of electrons fired from the electron gun is increased

39. The separate images produced on the screen appear too quickly for the brain separate them. Each new image is merged with the previous one.

40. each separate picture is made up by scanning 625 lines across the page

41. electro magnets

42. 3

43. to ensure that the electron from each electron gun can only hit one of the colours of paint on the screen

44. by having both the red and green paints on the screen being hit by electrons at the sane time

45. by having both the blue and green paints on the screen being hit by electrons at the same time

46. by having both the red and blue paints on the screen being hit by electrons at the sane time

47. all the electron guns are fired so that the red, green and blue paints all give light out at the same time

48. all the electron guns are turned off so that no light is given out by the screen

49. the number of electron fired by **<u>one</u>** of the guns is increased or decreased

50. radio, T.V., mobile phones

51. energy

52. $3x10^{8\ m}/_{s}$

53. its frequency

54. 72 000km

55. 121MHz

56. the reflect of the earths atmosphere

57. they can pass through the earths atmosphere

58. when waves bend to reach areas behind obstacles

59. they have longer wavelengths

60. to make the signal stronger

61. the reflector has a larger surface area so collects more energy and reflects it to a focal point where the aerial is placed

62. satellite television, microwave phone links

63. they concentrate the transmitted signal in a narrow been so less energy is lost

64. it increases -- the greater the height the more time it takes to go round the earth

65. above the same point on the surface of the earth

66. The ground station transmits a signal up to the satellite using a curved reflector. The collecting dish on the satellite collects this signal. The satellite amplifies the signal and retransmits the signal back to earth.