1. What are the small blood vessels under our skin called?

1) Capillaries 2). Caterpillars 3). Nerves 4). Veins

Ans:1

2. The spectrum of the sun is a

1) Line spectrum 2). Band spectrum

3). Continuous spectrum 4). None ofthe above

Ans:3

The spectrum of the Sun appears as a continuous spectrum and is frequently represented as shown below. This type of spectrum is called an emission spectrum because what you are seeing is the direct radiation emitted by the source. In the case of the Sun, light is emitted at almost all energies in the visible spectrum, which is why you see all of the colors in the Sun's spectrum.

Spectrum of white light

https://imagine.gsfc.nasa.gov/features/yba/M31_velocity/spectrum/spectra_more.html

3. Half life of radium is 1600 years. After how many years will 1000 atoms of radium reduce to 125 atom?

1)6400 years 2) 4800 years 3). 3200 years 4). 800 years

Ans:1

4. How many 4-letter words with or without meaning, can be formed out of the letters of the word, 'LOGARITHMS'? (Repetition of letters is not allowed)

1). 40 2). 400 3). 5040 4). 2520

Ans:3

There are 10 letters in the word LOGARITHMS. So, the number of 4-letter words is equal to the number of arrangements of 10 letters, taken 4 at a time, i.e., .10P4=5040.10P4=5040.

5. The ratio of the velocity of body to the velocity of sound is called as

1) Mach number 2). Bell number 3). Fidelity 4). None of these

Ans:1

6. A spherical liquid drop has a ……..surface.

1). Convex 2). Concave 3). Flat 4). None of these

Ans:1

7. Rain gauges are used to

1). Measure volume of precipitation 2). Measure depth of rainfall

3). Both the above 4). None of these

Ans: 2

Rain Gauge is a meteorological instrument that is used by meteorologists and hydrologists to **measure the rain precipitation in a given amount of time per unit area**. ... While collecting the rain in this small container is assumed that the same amount of rain precipitation is occurring all around the container.

8. With which sport is the Ranji Trophy associated?

1) Foot ball 2). National Cricket Championship

3). Athletics 4). Hockey

Ans:2

9. A rope is tied to the top of a pillar of height 10m at an angle of 30° to the horizontal. Then its length will be -

1). 15 m 2). 10 m 3) 20 m 4). 12.5 m

Ans:3. (let L be the length of rope. $\sin 30^{o} = 10/L = 1/2$. therefor L = 20)

10. As a result of refraction -

1) A sick partially immersed in water appears bent

2). The image of a fisherman on the bank of a river appears inverted

Ans: Both are correct

Refraction is the bending of a wave when it enters a medium where its speed is different. ... The bending of refraction can be visualized in terms of **Huygens' principle**. As the speed of light is reduced in the slower medium, the wavelength is shortened proportionately.

Water: 4/3 (or 1.333)
Air: 1.000277
Glass: 1.666
Diamond: 2.417

11. The line of earth's magnetic field runs

1). from east to west. 2). from west to east.

3), from south to north. 4). from north to south.

Ans:3

Magnetic field lines outside of a permanent magnet always run from the north magnetic pole to the south magnetic pole. Therefore, the magnetic field lines of the earth run from **the southern geographic hemisphere towards the northern geographic hemisphere**.

12. Which country uses its old name 'Helvetia' on its stamps?

1). Poland 2). Holland 3). Norway 4). Switzerland

Ans:4

13. The active component of dynamite is

1). Keiselghur 2). Nitro glycerin

3). Nitro benzene 4). Trinitron toluene

Ans:2

Nitroglycerin, also called **glyceryl trinitrate**, a powerful explosive and an important ingredient of most forms of dynamite. It is also used with nitrocellulose in some propellants, especially for rockets and missiles, and it is employed as a vasodilator in the easing of cardiac pain.

14. Which city is considered the centre of banking and finance?

1). New York 2). London 3). Geneva 4). Zurich

Ans:1. Other two leding cities are London and Shangai.

15. Based on the relationship of the two given words, find out the correct pair of the word

Falcon is to Bird as frog is to:

1). Pond 2). Larva 3). Toad 4). Croak

Ans:3

16. The unit of illuminance is....

1). Lumen 2). Lumen/m^2 3). Candela 4). Lumen / m

Ans: 2. **Lux** (abbreviation lx): The SI unit of illumination value; it is equal to one lumen per square metre.

17. Which work was translated by Gandhiji into Gujarati with the title 'Sarvoday'?

1). Anna Karenina by Leo Tolstoy 2). Drain of Wealth by Dadabhai Naoroj

3). Mother by Mxim Gorky 4). 'Unto The Last' by John Ruskin

Ans: . 'Unto The Last' by John Ruskin

18. An electron moves with constant velocity V parallel to the direction of uniform magnetic field B. The experienced by the electron is.....

1). BeV 2). eV/B 3). b/eV 4). Zero

Ans:4

19. Value of (sin 30° cos 60° + cos 30° sin 60°)

1). 1 2). 0 3). 1/2 4). $1/\sqrt{2}$

Ans:1

(sin 30° = sin 60° and cos 30° =sin 60° and the given sum is $\cos^2 60 + \sin^2 60° = 1$)

20. The Pfund series of lines are corresponding to the transition from

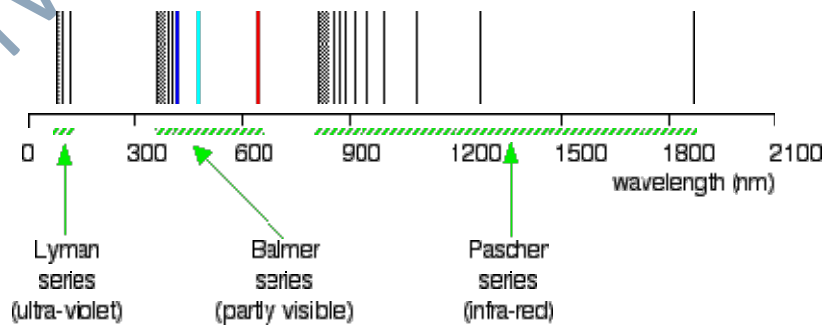
1). Higher orbits to the fifth orbit 2). Higher orbits to the third orbit

3). Higher orbits to the fourth orbit 4). Lower orbits to the third orbit

Ans:1

The spectral lines are grouped into series according to n1n1 values. Lines are named sequentially starting from the longest wavelength/lowest frequency of the series, using Greek letters within each series. For example, the (n1=1/n2=2n1=1/n2=2) line is called "Lyman-alpha" (Ly-α), while the (n1=3/n2=7n1=3/n2=7) line is called "Paschen-delta" (Pa-δ). The first six series have specific names:

- Lyman series with n1=1n1=1
- Balmer series with n1=2n1=2
- Paschen series (or Bohr series) with n1=3n1=3
- Brackett series with n1=4n1=4
- Pfund series with n1=5n1=5
- Humphreys series with n1=6n1=6
-



ectral series of hydrogen based of the Rydberg Equation (on a logarithmic scale). (Jim

.

n series of lines in the emission spectrum of hydrogen corresponds to transitions from s excited states to the ***n*** = 1 orbit.

fund series of lines in the emission spectrum of hydrogen corresponds to transitions igher excited states to the n1=5n1=5.

- Michael Fowler (Beams Professor, Department of Physics, University of Virginia)
- Chung (Peter) Chieh (Professor Emeritus, Chemistry @ University of Waterloo)

/chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Ma /sical_Chemistry_(McQuarrie_and_Simon)/01%3A_The_Dawn_of_the_Quantum_The)5%3A_The_Rydberg_Formula_and_the_Hydrogen_Atomic_Spectrum#:~:text=The% nd%20series%20of%20lines,to%20the%20n1%3D5.

21. While a man orbits round the earth in a satellite, his -

1).Mass becomes zero but weight remains constant

2). Mass remains constant but weight becomes zero

3). Mass and weight both remains constant

4) None

Ans:2

22. Across which river is the Manimuthar Dam built?

1). Mahanadi River
2). Kodayar River
3). Manimuthar River
4). Parappalar River

Ans:3 (a tributary of Tamirabarani)

23. Stars radiate light of their own because of...

1). Fission reaction
2). Chemical reaction
3). Mechanical contraction
4) Fusion reaction

Ans:4

24. In a thermos flask, a warm substance remains warm because

1. no heat either enters into or leaves the inside of the thermos flask by any of the three methods of conductors of heat

2. The vacuum flask consists of two vessels, one placed within the other and joined at the neck. The gap between the two vessels is partially evacuated of air, creating a partial-vacuum which reduces heat conduction or convection. Heat transfer by thermal radiation may be minimized by silvering flask surfaces facing the gap

25. Sky appears to be bluish because ... …..of light

1). Sky absorbs all colours in the visible light other than' blue

2)The intensity of blue colour in the visible light is much more than other colours

Ans:1

The sky is blue due to a phenomenon called Raleigh scattering. This scattering refers to the scattering of electromagnetic radiation (of which light is a form) by particles of a much smaller wavelength. Sunlight is scattered by the particles of the atmosphere, and what comes through down to earth is called diffuse sky radiation, and though only about 1/3rd of light is scattered, the smallest wavelengths of light tend to scatter easier. These shorter wavelengths correspond to blue hues, hence why when we look at the sky, we see it as blue. At sunset and sunrise, the angle at which sunlight enters the atmosphere is significantly changed, and most of the blue and green (shorter) wavelengths of light are scattered even before reaching the lower atmosphere, so we see more of the orange and red colours in the sky.

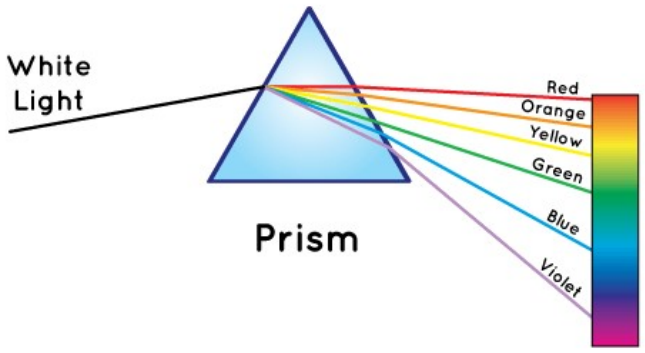
https://www.mcgill.ca/oss/article/environment-general-science-you-asked/why-sky-blue-or-better-yet-why-ocean-blue

In deeper waters however, not all the wavelengths of light can fully penetrate the liquid, as there are too many water molecules in the way of the photons. The water molecules absorb all the red wavelengths from the light, making it reflect blue. This is also why shallower waters appear 'less' or lighter blue than deeper ones- less absorption means less reflection.

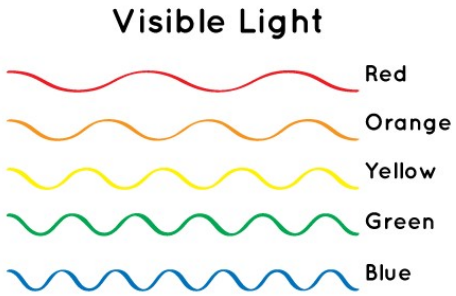
2. Sunlight reaches Earth's atmosphere and is scattered in all directions by all the gases and particles in the air. Blue light is scattered more than the other colors because it travels as shorter, smaller waves. This is why we see a blue sky most of the time.

https://spaceplace.nasa.gov/blue-sky/en/

The light from the Sun looks white. But it is really made up of all the colors of the rainbow.



When white light shines through a prism, the light is separated into all its colors. A prism is a specially shaped crystal.



All light travels in a straight line unless something gets in the way and does one of these things:—

- reflect it (like a mirror)
- bend it (like a prism)
- or scatter it (like *molecules* of the gases in the atmosphere)

Sunlight reaches Earth's atmosphere and is **scattered** in all directions by all the gases and particles in the air. Blue light is scattered in all directions by the tiny molecules of air in Earth's atmosphere. Blue is scattered more than other colors because it travels as shorter, smaller waves. This is why we see a blue sky most of the time.

https://spaceplace.nasa.gov/blue-sky/en/

26. Pituitary' glands are -

1). In the intestine
2). At the base of the brain
3). On the top of kidneys
4). None of these

Ans:2

Pituitary gland

The pituitary gland is a small pea-sized gland that plays a major role in regulating vital body functions and general wellbeing. It is referred to as the body's 'master gland' because it controls the activity of most other hormone-secreting glands.

27. Cutaneous respiration takes place in :

1). Man 2). Insect 3). Fish 4). Earthworm

Ans:

eous respiration, or cutaneous gas exchange, is a form of respiration in which gas exchange occurs **across the skin or outer integument of an organism** rather than gills or lungs. Cutaneous respiration may be the sole method of gas exchange, or may accompany other forms, such as ventilation. Cutaneous respiration occurs in a wide variety of organisms, including insects, amphibians, fish, sea snakes, turtles, and to a lesser extent in mammals.

https://artsandculture.google.com/entity/cutaneous-respiration/g121258jn?hl=en

28. The wave length of gamma rays is of the order

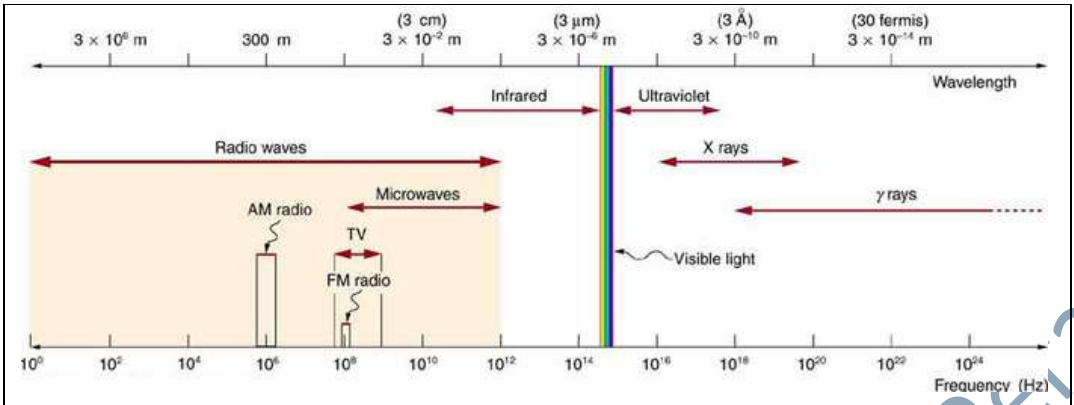
1. 10^{-4} cm 2. 10^{-8} cm 3. 10^{-11} cm 4. 10^{-18} cm

Ans:3 (Less than 100 pm, i.e., less than 100×10^{-10} m Note: pm = 10^{-12} m = 10^{-10} m)

EM spectrum

Gamma ray, electromagnetic radiation of the shortest wavelength and highest energy.

Gamma rays are produced in the disintegration of radioactive atomic nuclei and in the decay of certain subatomic particles. The commonly accepted definitions of the gamma-ray and X-ray regions of the electromagnetic spectrum include some wavelength overlap, with gamma-ray radiation having wavelengths



https://courses.lumenlearning.com/boundless-physics/chapter/the-electromagnetic-spectrum/

29. Tonga is also known as the

1). Friendly Island 2). Christian Island

3). Tokelan Island 4). Haapai

Ans:1

Tonga, also called **Friendly Islands**, country in the southwestern Pacific Ocean. It consists of some 170 islands divided into three main island groups

30. Who made the famous gardens of Kashmir?

1). Akbar 2). Shahjahan 3). Babar 4). Jahangir

Ans:4

The garden was constructed by **Mirza Haider**, an engineer of the Mughal Court at the behest of Emperor Jahangir. Moghal gardens include Nishat Bagh, Shalimar Bagh, Achabal Bag, Chashma, Shahi,, Pari Mahal, Verinag, etc.

31. Vijay Merchant was associated with the game of –

1).Hockey 2). Volley Ball 3). Lawn Tennis 4). Cricket

Ans:4 (**Yasin Merchant**, born 17 December 1966 is India's first professional snooker player. He won the National Snooker championships on 3 occasions, in 2001, 2000 and 1991. [1] He was honoured by Khar Gymkhana which has named its snooker hall after him as Yasin Merchant Snooker hall)

32. With which sport is the Canada Cup associated?

1). Mountaineering 2). Golf (World Championship)

3). Lawn Tennis 4). Ice Hockey

Ans:4

33. How many times are the hands of a clock at right angles in a day?

1). 22 times 2). 11 times 3). 44 times 4). None of these

Ans:3

34. The council of ministers in a state is collectively responsible to

1). The Governor 2). The Legislative Assembly

3). The President of India 4). The Chief Minister

Ans:2

Central Government Act
Article 75 in The Constitution Of India 1949

75. Other provisions as to Ministers

1. The Prime Minister shall be appointed by the President and the other Ministers shall be appointed by the President on the advice of the Prime Minister
2. The Minister shall hold office during the pleasure of the President
3. The Council of Ministers shall be collectively responsible to the House of the People
4. Before a Minister enters upon his office, the President shall administer to him the oaths of office and of secrecy according to the forms set out for the purpose in the Third Schedule
5. A Minister who for any period of six consecutive months is not a member of either House of Parliament shall at the expiration of that period cease to be a Minister
6. The salaries and allowances of Ministers shall be such as Parliament may from time to time by law determine and, until Parliament so determines, shall be as specified in the Second Schedule The Attorney General for India

https://indiankanoon.org/doc/1324537/

35. Cathode rays are...

1). Fast moving protons 2) Fast moving electrons

3). Fast moving neutrons 4). Electromagnetic of light

Ans:2

36. Flat panel monitor is of the type -

1). Shadow mask CRT 2). Beam penetration type

3). Plasma panel

4). None of these

Ans:3

A flat panel display (FPD) is a television, monitor or other display **appliance** that uses a thin panel design instead of a traditional cathode ray tube (CRT) design. These screens are much lighter and thinner, and can be much more portable than traditional televisions and monitors, making them ideal for hanging on walls or brackets.

Types

Two of the most common types of flat panel displays incorporate separate technologies: the liquid crystal display, or LCD, and plasma display panel (PDP). A more recent version of flat panel incorporates light-emitting diodes (LEDs) as a backlight. These forms of flat panel displays have begun to replace the long-used CRT or cathode ray tube display found in older monitors and televisions for their ability to produce better quality images.

37. Which one of the following is a micro nutrient?

1). Nitrogen 2). Chlorine 3). Hydrogen 4). Oxygen

Ans:2

Macronutrients are generally present in plant tissues in large amounts (in excess of 10 mmole Kg –1 of dry matter). The macronutrients include carbon, hydrogen, oxygen, nitrogen, phosphorous, sulphur, potassium, calcium and magnesium. Of these, carbon, hydrogen and oxygen are mainly obtained from CO2 and H2O, while the others are absorbed from the soil as mineral nutrition.

Micronutrients or trace elements, are needed in very small amounts (less than 10 mmole Kg –1 of dry matter). These include iron, manganese, copper, molybdenum, zinc, boron, chlorine and nickel. In addition to the 17 essential elements named above, there are some beneficial elements such as sodium, silicon, cobalt and selenium. They are required by higher plants.

https://ncert.nic.in/textbook/pdf/kebo112.pdf

Technique of growing plants in a nutrient solution is known as hydroponics.

38. According to Oswald's theory, indictors are

1) Lewis acids or bases 2) Ionic compounds

3) Strong acids or strong bases 4) Weak acids or bases

Ans:4

An indicator is a substance which is used to determine the end point in a titration. In acid base titrations, organic substances (weak acids or weak bases) are generally used as indicators. They change their colour within a certain pH range.
Ostwald's theory: According to this theory: (a) The colour change is due to ionisation of the acid-base indicator. The unionised form has different colour than the ionised form. (b) The ionisation of the indicator is largely affected in acids and bases as it is either a weak acid or a weak base.

Source : http://ciseche10.files.wordpress.com/2013/12/ionic-equilibrium.pdf

http://www.idc-online.com/technical_references/pdfs/chemical_engineering/Theory_of_indicators_Ostwalds_theory.pdf

39. Bohr's model fails because.....

1). it explains only the continuous spectrum

2). it explains only the line spectrum

3). it explains only the spectral lines of hydrogen

Ans:3

Bohr theory was very successful in predicting and accounting the energies of line spectra of hydrogen, i.e., one electron system. It could **not explain the line spectra of atoms containing more than one electron**. (ii) This theory could not explain the presence of multiple spectral lines.

40. The formation of a chemical bond is associated with -

1). A decrease in potential energy

2). An increase in potential energy

3). No change in potential energy

4). First a decrease, then an increase in potential

Ans:1

Covalent Bonds

Covalent bonding involves two atoms, typically nonmetals, sharing valence electrons.

IONIC BONDS

Ionic bonds are a subset of chemical bonds that result from the transfer of valence electrons, typically between a metal and a nonmetal.

41. A convex lens -

1). Is a diverging lens

2). Is thinner in the middle than at the edges

3). Can produce a diminished initial image

4). Is a converging lens

Ans:4

42. For all the positions of the object, a concave lens produces an image that is

1). Erect and magnified

2). Erect and diminished

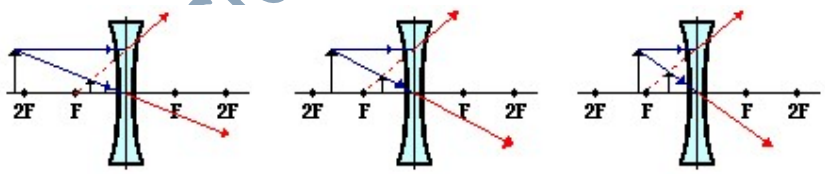
3). Inverted and magnified

4). Inverted and diminished

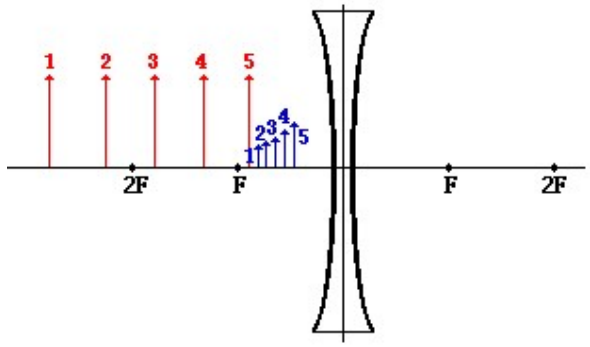
Ans:2

For a concave lens, the image is

- located on the object' side of the lens
- a virtual image
- an upright image
- reduced in size (i.e., smaller than the object)



Another characteristic of the images of objects formed by diverging lenses pertains to how a variation in object distance affects the image distance and size. The diagram below shows five different object locations (drawn and labeled in red) and their corresponding image locations (drawn and labeled in blue).



The diagram shows that as the object distance is decreased, the image distance is decreased and the image size is increased. So as an object approaches the lens, its virtual image on the same side of the lens approaches the lens as well; and at the same time, the image becomes larg

https://www.physicsclassroom.com/class/refrn/Lesson-5/Diverging-Lenses-Object-Image-Relations

43. The L.C.M. of $2^3\times 3^2\times 5\times 11$, $2^4\times 3^4\times 5^2\times 7$ and $2^5\times 3^3\times 5^3\times 7^2\times 11$ is:

1). $2^3\times 3^2\times 5$ 2). $2^5\times 3^4\times 5^3$

3). $2^3\times 3^2\times 5\ 7\times 11$ 4). $2^5\times 3^4\times 5^3\times 7^2\times 11$

Ans:4

44. International date line is located along

1). Standard meridian 2). Greenwich meridian

3). Equator 4). 180° longitude

Ans:4

The International Date Line, established in 1884, passes through the mid-Pacific Ocean and roughly follows a **180 degrees longitude north-south line** on the Earth. It is located halfway round the world from the prime meridian—the zero degrees longitude established in Greenwich, England, in 1852.

https://oceanservice.noaa.gov/facts/international-date-line

45. The health hazard of ozone is through

1). Impairment of lung function 2). Acute illness

3). Sensory illness 4). None of these

Ans:1

46. DDT is used by

1). Spray 2). Painting

3). Mixing with water 4). None of these

Ans:4 (Dichlorodiphenyltrichloroethane (DDT) is an **insecticide used in agriculture**. Some countries outside the United States still use DDT to control of mosquitoes that spread malaria)

47. Which of the following is not hardware?

1). Magnetic tape 2). Printer 3). Assembler 4). None of the above

Ans:4

48. One square kilometre is equal to –

1). 10 acres. 2). 10 hectares. 3). 100 acres, 4). 100 hectares.

Ans:4

49. If a + b = 5 and 3a + 2b = 20, then (3a + b) will be:

1). 10 2). 15 3). 20 4). 25

Ans:4

Let a+b=5 ...(1) and 3a+2b=20 ...(2)

Multiplying Eqn. (1) by 2 and subtracting from Eqn (2), we get : a=10.

Putting a=10 in Eqn (1), we get : b=-5

Therefore, (3a+b) = 3 x 10+(-5)=30-5=25.

50. Whales, elephants and giraffes are known to use _____ for communication.

1). Low frequency radio waves 2). Infrasonic waves

3). Microwaves 4). Ultrasonic waves

Ans:2