Pearl Program (Std IX)

Dr Homi Bhabha Bal Vaidyanik Examination

Year 2017 Test Paper with Solutions

Q. 1. A man completes 10 turns / revolutions around the garden of 24 m diameter in 2 minutes. What will be its speed from the following?

A. 2.4 m/s B. 6.28 m/s

C. 24 m/s D. 3.14 m/s

Q. 2. Which is the correct statement from the following about the resistances connected in series?

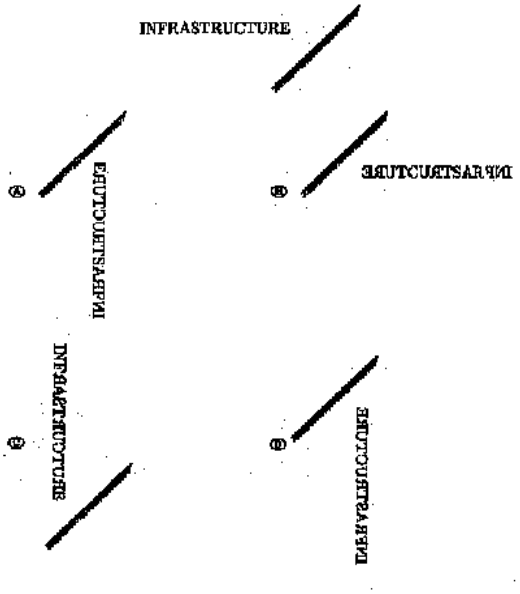
A. This connection decreases resistance in the circuit.

B. Same electric current passes through each resistor.

C. Resultant resistance is less than every resistor connected in series.

D. Electric current increases in this type of circuit.

Q. 3. From the following which will be the correct image of the word 'INFRASTRUCTURE' in the plane mirror in the shown position.



Q. 4. Complete the following analogs

Resistivity of conductor: Ωm

Electricity in houshold use : _____

A. kWhr B. keW /hr C. Whr D. W /hr

Q. 5. If the mass of the moving object is decreased $\frac{1}{4}$ of its mass and its velocity is increased to twice its previous velocity, what will be the kinetic energy of the object from the following?

A. $\frac{1}{2}$ of the previous kinetic energy

B. 4 times the previous kinetic energy

C. kinetic energy will remain unchanged

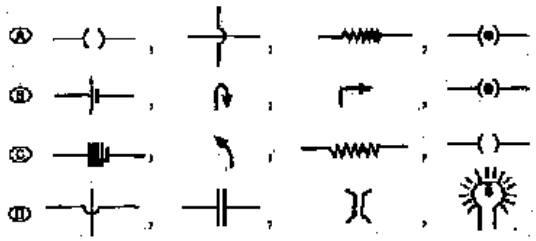
D. 2 times the previous kinetic energy

Q. 6. The velocity of the car becomes 5 *m/s* in first 10 seconds. In next two minutes, its velocity becomes 18 km/hr. Then what will be the acceleration of the car from the following?

A. 1 m/s^2 B. 0 m/s^2

C. 2 m/s^2 D. 0.2 m/s^2

Q. 7. Identify the proper group of component symbols used in electric circuit, from the following.



Q. 8. Which laws of motion from the following are applied in the game of pole vault?

P: Law of inertia,

Q : Newton's second law of motion,

R : Newton's third law of motion

A. Only P B. Q and R

C. P and R D. P, Q and R

Q. 9. Select the correct statement related to the reflection in the plane mirror and spherical mirror.

A. Image is always virtual in both mirrors.

B. Image is virtual in plane mirror and it is always real in the spherical mirror.

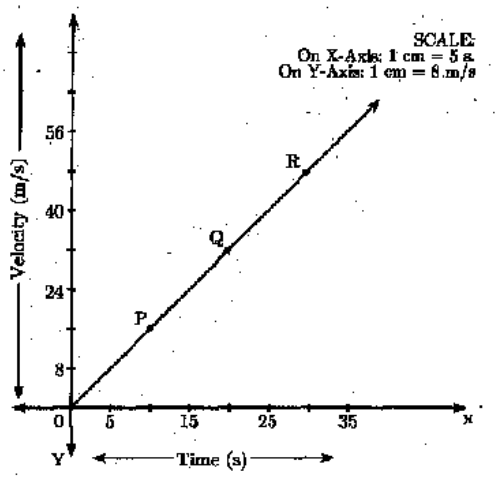
C. For both the mirrors, incident angle and angle of reflection are on the either sides of the normal.

D. Images are always behind in both types of mirrors.

Q. 10. R_1 and R_2 are two resistors in the circuit connected in parallel. If $R_1 = 2R_2$ and the resultant resistance of this circuit is $2\,\Omega$ then determine the correct value of R_1

A. $6\ \Omega$ B. $3\,\Omega$ C. $\frac{1}{6}\,\Omega$ D. $\frac{1}{3}\,\Omega$

Q. 11. Observe the adjoining graph of 'velocity — time' and choose the correct distance travelled by the object between the points P and 'R'.



A. 32 m B. 320 m C. 64 m D. 640 m

Q. 12. On which factor from the following, the speed of sound does not depend when it propagates through the gas at constant temperature?

A. Molecular weight B. Density

C. Pressure of gas D. Atomic weight

60 °C

Q.13. Select the proper temperature at which the resistance of conductor reaches near zero.

A. 0 °K B. 0 °C C 212 °F D. 32 °F

Q. 14. Select the improper step from the following which should be avoided while doing 'data entry"?

A. To put '=' sign at the end while using formula.

B. To do various ways of formating after entering data.

C. Do not use special characters and unnecessary space.

D. Keep data in tabular form.

Q. 15. If Gamma rays, visible light rays, x-rays and ultraviolet rays are arranged in ascending order of their wavelength, then select the accurate arrangement from the following:

A. Gamma rays, visible light rays, x-rays, ultraviolet rays

B. Gamma rays, x-rays, ultraviolet rays, visible light rays

C. x-rays', Gamma rays, ultraviolet rays, visible light rays

D. Ultraviolet rays, x-rays, Gamma rays, visible light rays

Q. 16. Selected the proper option describing the motions-of the bullet fired from the gun.

A. Vibrational motion, linear motion

B. Linear motion, rotational motion

C. Non linear motion, vibrational motion

D. Non linear motion, rotational motion

Q. 17. Using Ohm's Law, determine the value of 'x' in the following table.

Sr. No.	Voltage (V)	Current (I)
1.	1 V	50 mA
2.	x V	75 mA

A. 1.5 V B. 15 V C. 75 V D. 150 V

Q. 18. Which formula from the following, is used to get the number of images of an object kept between two plane mirrors?

Ⓐ $\theta = \frac{360}{n} - 1$ Ⓑ $n - \theta = \frac{360}{\theta}$ Ⓒ $n = \frac{360}{\theta} + 1$ Ⓓ $n = \frac{360 - \theta}{\theta}$

Q. 19. Select the proper (true) statement about the forces acting on the body,' when it is either stationary or in uniform motion.

A. No kind of force will act on the body.

B. Only the gravitational force will act on the body.

C. The various forces acting on the body will nullify each other.

D. Various type of forces will act on the body in the same direction.

Q. 20. Complete the following analogy: Microphone: Conversion of sound energy into electrical energy Electronic stethoscope: _____.

A. Conversion of mechanical energy into sound energy

B. Conversion of sound energy into electrical energy

C. Conversion of electrical energy into sound energy

D. Conversion of sound-energy into mechanical energy

Q. 21. Choose the correct statement from the following, when the magnification due to the concave mirror is (— 2).

A. The image is inverted and its height is twice the height of the object.

B. The image is non inverted, virtual and its height is equal to twice the height of object.

C. The image is inverted and the object is twice the height of its image.

D. The height of an object is half the height of its image which is non inverted and virtual.

Q. 22. When a body is in the circular motion the work done by gravitational force is zero. Which of the following is the correct reason for this?

A. The gravitational force acting on the body and the displacement of the body are in opposite direction.

B. The radius of the circular path is constant.

C. The displacement due to the gravitational force is very less.

D. The gravitational force acting on the body and the displacement of the body are perpendicular to each other.

Q. 23. A tuning fork creates the sound waves of the wavelength 0.5 m. Determine the frequency of tuning fork if the speed of sound in air is 330 m/s.

A. 66 Hz B. 1650 Hz

C. 16.5 Hz C. 660 Hz

Q. 24. Select the proper set of optical components used in Cassegrain Telescope.

A. Concave mirror and plane mirror

B. Concave mirror, convex mirror and convex lens .

C. Two convex lenses of different radii .

D. Concave mirror, plane mirror and convex mirror

Q. 25. Which is the incorrect statement from the following about the magnetic lines of force?

A. The magnetic lines of force always start from south pole and end at north pole. . '

B. The magnetic lines of force are.always like the stretched spring.

C. The magnetic lines of force repel each other.

D. The number of magnetic lines of force at any point determine the strength of magnetic field at that point.

Q. 26. Select proper group of properties of electric charge due to which sometimes we see the lightening in rainy season.

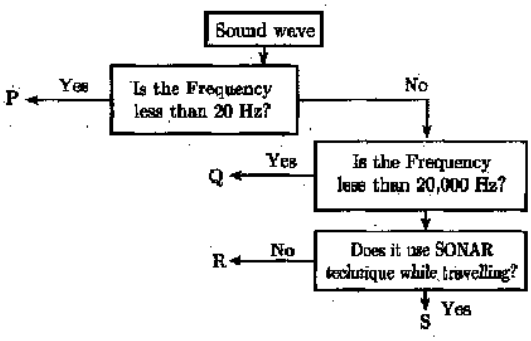
A. Static electricity and electric induction

B. Electric induction and repulsion in like charges

C. Static electricity, electric induction and repulsion in like charges

D. Static electricity, electric induction and attraction in unlike charges

Q. 27. In the following flow chart of sound wave, choose the proper animal from human, rat, bat and elephant in place of P, Q, R and S.



A. P → human, Q → elephant, R→ rat, S→ bat

B. P→ elephant, Q→ rat, R→ human, S→ bat

C. P→ elephant, Q→ human, R→ rat, S→ bat

D. P→ elephant, Q→ human, R→ bat, S→ rat

Q. 28. The velocity of a car becomes twice the previous velocity after every two seconds. If the average velocity of car after 6 seconds is 14 m/s, determine the distance travelled by the car in first 4 seconds.

A. 12 m B. 36 m C. 48 m D. 56 m

Q. 29. What will be the correct alternative of the ascending speed of sound at 25°C in given media if,

P — Hydrogen, Q — Air, R — Sulphurdioxide, T — Helium.

A. Q, P, T, R B. P, R, Q, T

C. T, P, Q, R D. R, Q, T, P

Q. 30. Select an incorrect statement from the following:

If a coolie lifted a bag of mass 100 kg through the height of 5 m

A. The work done by coolie is positive.

B. The work done by gravitational force is positive.

C. The work done by coolie is 4900 J.

D. The potential energy of the bag is 4900 J.

Q. 31. What is the pH of 1 M NaOH?

A. 12 B. 14 C. 11 D. 13

Q. 32. Which of the following is / are weak bases?

Ammonia, Ammonium hydroxide, Methyl amine

A. Ammonia

B. Methyl amine

C. Ammonia and Ammonium hydroxide

D. Ammonia, Ammonium hydroxide, Methyl amine

Q. 33. When 10 ml of an acid is slowly added in 10 ml of water then what will be volume of solution?

A. Volume of solution is less than 20 ml.

B. Volume of solution is greater than 20 ml.

C. Volume of solution is equal to 20 ml.

D. At the start, volume is more than 20 ml and slowly becomes less than 20 ml.

Q. 34. Which of the following compound is affected by light?

A. Calcium sulphate B. Potassium nitrate

C. Silver nitrate D. Copper sulphate

Q. 35. Water pipes of iron are coated with layer of zinc to prevent corrosion. What is the name of this process?

A. Vulcanisation B. Galvanisation

C. Anodizing D. Tinning

Q. 36. What is the freezing point of Hg?

A. - 357 °C B. -37^{o} C

C. - 39 °C D. - 49 °C

Q. 37. Which of the following statements is wrong?

A. Washing soda is used for refining petroleum.

B. Gypsum is used as an antiseptic.

C. Blue vitriol is used as a fungicide.

D. Nitre is used to make gunpowder.

Q. 38. Why tea becomes lighter in colour on adding lemon juice?

A. Lemon juice absorbs the colour pigments in tea.

B. Lemon juice dilutes the tea.

C. Lemon juice lowers the pH of the tea.

D. Lemon juice increases the pH of the tea.

Q. 39. Due to which process, colour of pages of old books turns to yellow?

A. Oxidation B. Reduction

C. Neutralization D. Decomposition

Q. 40. A student weighs 44 kg. Suppose his entire body is made up of electrons; how many electrons are their in his body?

(Mass of one electron = 88×10^{29} g)

A. 2×10^{32} B. 0.5×10^{32}

C. 2×10^{29} D. $\frac{1}{2} \times 10^{29}$

Q. 41. Which of the following is most harmful chemical for human being in the deodrants?

(Mass of one electron = 88×10^{29} g)

A. Aluminium chlorohydrate compounds

B. Aluminium zirconium compounds

C. Parabens

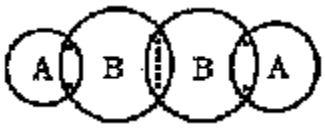
D. Triclosams

Q. 42. Find odd one out, according to occurance of carbon?

A. Graphite B. Natural gas

C. Proteins D. Calcium carbonate

Q. 43. A compound B_2A_2 has the following arrangement of electrons then the elements A and B are respectively.



A. C, Cl B. C, H C. H, C D. Cl, C

Q. 44. Which of the following isotopes is used in a deflection of small turners in the body?

A. Boron-10 B. Iodine-131

C. Cobalt-60 D. Arsenic-74

Q. 45. Find the odd one out related to catalyst.

A. Raney Nickel B. Sodium

C. Iron D. Manganese dioxide

Q. 46. Which of the following is not' tribasic acid?

A. Phosphoric acid B. Citric acid

C. Humic acid D. Acetic acid

Q. 47. Which of the following reaction/s is / are correct?

(i) $CaSO_4 + 2NaCl \rightarrow Na_2SO_4 + CaCl_2$

(ii) $Na_2SO_4 + CaCl_2 \rightarrow CaSO_4 + NaCl$

(iii) $CaSO_4 + NaCl \rightarrow Na_2SO_4 + CaCl_2$

(iv) $Na_2SO_4 + CaCl_2 \rightarrow CaSO_4 + 2NaCl$

A. iv B. ii and iii C. i and iv D. i

Q. 48. A compound of Carbon, Hydrogen and Nitrogen contains these elements in the ratio 9: 1: 35 by weight. If the molecular mass is 108, what is the molecular formula of that compound. (Atomic weight: C = 12, H = 1, N = 14

A. C_2H_2N B. C_3H_4N

C. C_2HN_2 D. $C_6H_8N_2$

Q. 49. Which of the following do not contain water of crystallization?

A. Alum B. Barium chloride

C. Bleaching powder D. Sodium sulphate

Q. 50. Which of the following ions form the Calcium phosphate?

A. Ca^{+}, PO_4^{-} B. Ca^{3}+, PO_4^{2-}

C. Ca^{2+}, PO_4^{3-} D. 3 Ca,2 (PO_4)

Q. 51. What do you mean by ‘quark’?

A. quartz B. hadrons C. leptons

D. fundamental constituents of matter

Q. 52. Complete the following analogy.

Glass cutting: Diamond : : Arc lamp : _____.

A. Fullerence B. Neon

C. Argon D. Graphite

Q. 53. Which of the following statements is wrong with respect to the statement 'Carbon forms very large number of compounds?'

A. The atomic number of Carbon is 6

B. Valency of Carbon is 6

C. Carbon has the property of catenation

D. Carbon shares electrons with other atoms to form covalent bond

Q. 54. Find the odd one out

A. pm B. A° C. u D. nm

Q. 55. What is the chemical formula of Polytetrafluoroethelene?

A. $(C_3H_3)_n$ B. $(C_2F_4)_n$

C. $(C_2H_4)_n$ D. $(C_3F_3)_n$

Q. 56. Which of the following harmful chemical are contained in food colours?

A. Barium, Lead B. Lead, Cobalt

C. Strantium, Mercury D. Lead, Mercury

Q. 57. Which of the following works was done by the German scientist Friedrich Wohler?

A. Verified the law of constant proportion

B. Discovered Carbon allotrope, Fullerence C_{60},

C. Synthesized urea from Ammonium cyanate

D. Discovered Methane gas between 1776 and 1778

Q. 58. Which of the following acids are in solid state at room temperature?

(i) Carbonic acid (ii) Sulfamic acid

(iii) Boric acid (iv) Hydrochloric acid

(v) Oxalic acid

A. i, iii B. ii, iii, v C. i, ii, iv, v D. i, ii, iv

Q. 59. Read the following statements about atmosphere and select the correct option.

Statement I: The atmosphere acts as protective blanket for the Earth

Statement II: It absorbs most of the harmful radiations coming from the sun

A. Both the statements I and H are true and statement II is the correct explanation of I.

B. Both the statements I and II are true and statement I is the correct explanation of II.

C. Statement I is true but statement II is false.

D. Statement II is true but statement I is false.

Q. 60. Find out a pair which is not correct?

A. Thorium: In atomic energy

B. Sodium: In production of glass and fertilizers

C. Magnesium: In flash bulb of camera

D. Potassium: In cloth and paper industry

Q. 61. What is the pH of fresh yoghurt (curd)?

A. 4.5 to 5.5 B. 6.4 to 6.8

C. 7.0 to 7.4 D. 2.5 to 3.5

Q. 62. Complete the following analogs

Rosa galica : Rose : : Bos taurus : _____

A. Dog B. Cow C. Tulsi D. Hibiscus

Q. 63. Odd one out

A. Venus flytrap B. Dodder plant

C. Pitcher plant D. Sundew

Q. 64. Identify the correct pair belongs to division Pteridophyta

A. Ulva, Lycopodium

B. Selaginella, Lycopodium

C. Anthoceros, Selaginella

D. Marchantia, Chara

Q. 65. _____ is an example of layers chicken.

A. Minorca B. Aseel C. Long D. Brahma

Q. 66. Which of the following disease is caused by protozoa?

A. Scabies B. Pneumonia

C. Influenza D. Malaria

Q. 67. Cartilage is _____ type of tissue.

A. epithelial B. muscular

C. connective D. nervous

Q. 68. Loss of water as droplet from hydathode is called _____.

A. Photosynthesis B. Transpiration

C. Excretion D. Guttation

Q. 69. Identify the Acrocentric chromosome from the following:

Q. 70. Which of the following statements explain the meaning of synapse.

A. Junction of two nerve cells.

B. Junction of two muscle cells.

C. Junction of two bone cells.

D. Junction of two sperm cells.

Q. 71. Identify the correct pair of 'Pyrimidines' from the given alternatives.

A. Adenine and Guanine

B. Cytosine and Thymine

C. Guanine and Cytosine

D. Thymine and Adenine

Q. 72. Which of the following options shows the klinefelter syndrome condition of chromosomes

A. 44 + XXY B. 44 + XX

C. 44 + X D. 44 + YYX

Q. 73. Find the odd one out on the basis of narrow spectrum antibiotics.

A. Ampicillin B. Amoxicillin

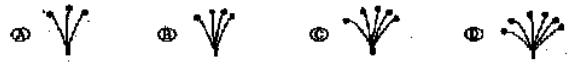
C. Penicillin D. Tetracycline

Q. 74. Who of the following was contracted the infection of "Typhus" during the research?

A. Dr. Alexander Fleming B. Ida Bangston

C. Van Ermengem D. Robert Hook

Q. 75. Identify the correct diagram of stigma of Hibiscus.



Q. 76. Which of the following pair of muscles have involuntary movement?

A. Skeletal muscles and cardiac muscles

B. Cardiac muscles and smooth muscles

C. Smooth muscles and skeletal muscles

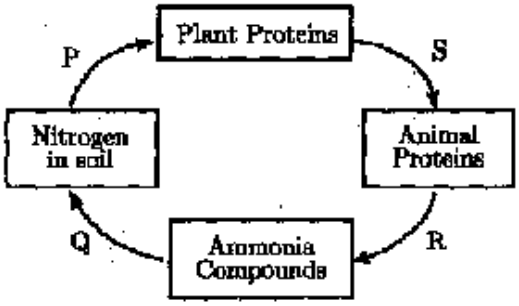
D. All of these

Q. 77. At which of the following temperature the enzymes are most active?

A. 37.6 °F B. 39.6 °C

C. 98.6 °P D. 29.6 °C

Q. 78. The diagram shows some stages in the Nitrogen cycle. Which of the following stages involve the role of bacteria.



A. P and Q B. P and R

C. R and S D. P, R and S

Q. 79. What is the main aim of 'Harit Sena' at school level project?

A. Water conservation B. Soil conservation

C. Swachhata Abhiyan D. Social forestry

Q. 80. The excreta of _____ contain more amount of nitrogen, phosphorus, potash as compared to other animals.

A. Sheep B. Cow C. Buffalo D. Ox

Q. 81. Identify the pair of scavenger animals.

A. Hyena, Crow B. Dog, Cat

C. Human, Kite D. Monkey, Squirrel

Q. 82. In which of the following situations we have to use R.I.C.E. remedy?

A. Fracture B. Sunstroke

C. Contusion D. Epilepsy

Q. 83. What is the function of thyroid gland?

A. Sugar control in blood

B. Calcium control in blood

C. Cholesterol control in blood

D. Proteins control in blood

Q. 84. Which of the following methods of waste management produce energy?

A. Biomedical waste management

B. Safe landfil sites

C. Industrial solid waste management

D. Pyrolysis

Q. 85. How many cranial nerves are their in our peripheral nervous system?

A. 23 B. 46 C. 48 D. 24

Q. 86. Which of the following statements is correct about dicotyledons plants?

A. Their root system consists of fibrous roots.

B. Their leaves have parallel venation.

C. The vascular bundles in their stem are arranged in the rings.

D. The flowers are trimerous.

Q. 87. In which process the Ammonia is converted in to nitrite

A. Denitrification B. Nitrification

C. Ammonification D. Nitrogen fixation

Q. 88. Which of the following productions is related to Biotechnology?

A. Production of cash crop

B. To make cartilage

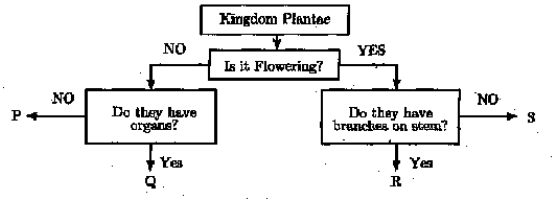
C. Vaccine production

D. All above

Q. 89. Select the plant from the following in which the reproduction occures by the spores-

A. Funaria B. Spirogyra C. Chara D. Cycas

Q. 90. Observe the given flow chart and identify the correct plants in place of P, Q, R and S



A. P - Ulva, Q — Fern, R - Catharanthus, S - Betelnut

B. P — Fern, Q — Ulva, R — Catharanthus, S — Betelnut

C. P - Fern, Q - Ulva, R — Betelnut, S - Catharanthus

D. P - Catharanthus, Q - Betelnut, R - Ulva, S – Fern

Q. 91. Which of the following chemical present in the wood gives flavour of clove to the food cooked on it.

A. Acetaldehyde B. Isoeugenol

C. Diacetyl D. Lignin

Q. 92. Which of the following Indian / Indian origin scientist was the Nobel prize awardee in Chemistry?

A. Hargobind Khurana

B. Subramanyam Chandrashekhar

C. Venkatraman Ramkrishnan

D. C. V. Raman

Q. 93. Who of the following is called the father of 'Cell Phone'?

A. Dr. Martin Cooper B. Dr. Joel S. Engel

C. John F. Mitchell , D. Douglas H. Ring

Q. 94. Which of the following country has launched Chandra-X-ray telescope in the space?

A. India B. Russia

C. America D. China

Q. 95. Which of the following electronic component was used in the third generation computer (1964 - 71)?

A. Integrated circuit. B. Vaccume tubes

C. Transistor D. Microprocessors

[Note] For Q. No. 96 to 100 paragraph is given. Read it and answer the questions:

MRI the Boon

Magnetic Resonance Imaging (MRI) also known as nuclear magnetic resonance imaging, is a scanning technique for creating detailed images of the human body. During MRI, a person will be asked to lie on a movable table that slides into doughnut shaped opening of the machine to scan a specific portion of your body. The machine itself will generates a strong magnetic field around the person and radio waves are directed at the body. It generate images of parts of body that can't be seen with X-rays, CT scans or ultrasound. It can help doctors to see inside joints, cartilage, ligaments, muscles and tendons, which makes it helpful for detecting various sports injuries.

MRI is also used to examine internal body structures and diagnose a variety of disorders, such as strokes, tumors, spinal cord injuries and eye or inner ear problems. It is also widely used in research to measure brain structure and function. It doesn't emit any harmful radiations.

Q. 96. Which is the biggest benefit of MRI compared with other imaging techniques?

A. It can help doctors to see inside joints.

B. It used to examine internal body structure.

C. No risk of being exposed to radiation.

D. It diagnose varity of disorders.

Q. 97. What is the disadvantage of MRI?

A. It is harmful for pregnant women and babies.

B. It doesn't detect features of diseases such as osteoporosis.

C. They cannot provide information about blood circulation and blockages.

D. It cannot diagnose disorders in eye and inner ear problems.

Q. 98. Which of the following cannot-be used for bone imaging?

A. X-ray B. MRI

C. CT scan D. Bone densitometry

Q. 99. Which of the following technique is used in MRI? ,

A. Ultrasonography technique

B. CT scans imaging

C. Ultrasonic technique .

D. Nuclear magnetic resonance imaging

Q. 100. Who invented the MRI technique?

A. Mathew Samuel Kalarickal

B. Forrest Morton Bird

C. Dr. Raymond Damadian

D. Godfrey Hounsfield

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Solutions

A. 1. (B) Explanation: Diameter of garden

d = 24 m

Time taken for 10 turns = t = 2 min. = 120 s

No. of turns = n = 10

Now,

$$Speed = \frac{Dis\tan ce}{Time}$$

$$= \frac{\text{Circumference x No. of turns}}{\text{Time}}$$

$$= \frac{\pi d \times 10}{120}$$

$$= \frac{3.14 \times 24 \times 10}{120}$$

= 3.14 × 2

= 6.28 m/s

A. 2. (B) Explanation: Same electric current passes through each resistor.

A. 3. (D)

A. 4. (A)

A. 5. (C) Explanation: Kinetic energy will remain unchanged.

Kinetic Energy = $\frac{1}{2}$ mv^2 (Formula)…….. (I)

Now,

Changed Mass = $\frac{m}{4}$ and

New Velocity = 2v

Kinetic Energy of the object = $\frac{1}{2} \times \frac{m}{4} \times (2v^2)$

$$= \frac{1}{2} \times \frac{m}{4} \times 4v^2$$

$$= \frac{1}{2} mv^2$$ ……..(II)

From (I) and (II)

There is no change in kinetic energy of the object.

A. 6. (B) Explanation:

V_1 = 5 m/s ... (Initial Velocity)

V_2 = 18 km/hr

V_2 = 18000/3600 m/s = 5 m/s ... (Final Velocity)

$V_2 – V_1$- 5 - 5 = 0 m/s

∴ Acceleration of the car = 0 m/s^2

A. 7. (A)

A. 8. (D) Explanation: P: Law of inertia

Q: Newton's second law of motion R: Newton's third law of motion

A. 9. (C) Explanation: For both mirrors, incident angle and angle of reflection are on the either side of the normal. This is the law of reflection.

A. 10. (A) Explanation: Resistors R_1 and R_2 are in parallel connection.

Resultant resistance, $R_p = 2\Omega$ and $R_1 = 2R_2$

Now, according to the formula,

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\therefore \frac{1}{2} = \frac{1}{2R_2} + \frac{1}{R_2}$$

$$\therefore \frac{1}{2} = \frac{1+2}{2R_2} = \frac{3}{2R_2}$$

$$\therefore R_2 = 3\Omega$$

Now,

$R_1 = 2R_2$

$\therefore$ $R_1 = 2 \times 3 = 6\Omega$

A. 11. (D) Explanation: At point P,

$V_1 = 16$ m/s

$t_1 = 10$ s

And at point R,

$V_2 = 48$ m/s

$t_2 = 30$ s

$V = V_2 - V_1$

$\therefore$ $V = 48 - 16$

$V = 32$ m/s

And $t = t_2 - t_1$

$\therefore$ $t = 30 - 10$

$\therefore$ $t = 20$ s

Now, distance travelled by the object

$d = 32$ m/s $\times$ 20 s = 640 m.

A. 12. (C) Explanation: Other three affect the speed of the sound when they propagate through the gas.

A. 13. (A)

A. 14. (A) Explanation: To put '=' sign at the end while using the formula.

A. 15. (B) Explanation: Ascending order of wavelength

Gamma Rays=10^{-12} m.

X Rays = 10^{10} m.

Ultraviolet Rays $\rightarrow$ 10^{-8} m.

Visible Light Rays $\rightarrow$ 10^{-6} m.

A. 16. (B)

A. 17. (A) Explanation:

$V_1 = 1$ v = 1000 mv

$I_1 = 50$ mA

and

$V_2 = {}_xV = 1000x$ mv

I, = 75 mA

According to Ohm's law

$$\frac{V_1}{I_1} = \frac{V_2}{I_2}$$

$$\frac{1000}{50} = \frac{1000x}{75}$$

$$\therefore 50x = 75$$

$$\therefore x = \frac{75}{50} = \frac{3}{2} = 1.5v$$

A. 18. (D) Explanation:

Original Formula,

$$n = \frac{360}{\theta} - 1$$

$$\therefore n = \frac{360 - 1 \times \theta}{\theta}$$

A. 19. (C) Explanation: The various forces acting on the object will nullify each other. Because of this, the resultant force will become zero and the object will remain in the motion acquired at that time. This is related to the Newton's first law of motion.

A. 20. (B)

A. 21. (A) Explanation: According to the sign conventions, for inverted images, h_2 is negative and height of the object, h_t is positive. Magnification = M = — 2

Height of the image

$\therefore$ M = $\dfrac{\text{Height of the image}}{\text{Height of the object}}$

$= \dfrac{h_2}{h_1}$

$\therefore -2 = \dfrac{-h_2}{h_1}$

$\therefore 2h_1 = h_2$

$\therefore h_2 = 2h_1$

$\therefore$ Height of the image = 2x Height of the object

A. 22. (D) Explanation: The gravitational force acting on the body and the displacement of the body are perpendicular to each other.

A. 23. (D) Explanation: For the sound wave,

$v = 330$ m/s

$\lambda = 0.5$ m (Wavelength)

$\nu = ?$

$v = \nu\lambda$

$\therefore \nu = \dfrac{v}{\lambda}$

$\therefore \nu = \dfrac{330}{0.5} = \dfrac{3300}{5}$

$\therefore \nu = 660$ Hz

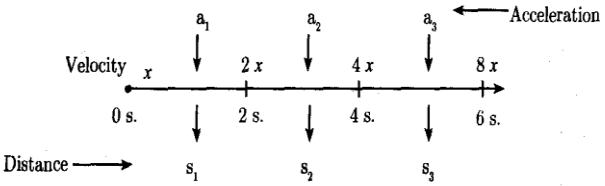
A. 24. (B)

A. 25. (A) Explanation: The magnetic lines of force always start from the south pole and end at the north pole.

A. 26. (D) Explanation: The given options are the properties of the electric charge due to which sometimes we see lightening in rainy season. Static electricity, electric induction and attraction are unlike charges.

A. 27. (C) Explanation: P is elephant, Q is human, R is rat and S is bat.

A. 28. (B) Explanation:



i) Acceleration in first 2 seconds $= \dfrac{2x - x}{2} = \dfrac{x}{2}$

$\therefore$ Distance travelled in first 2 seconds,

$S_1 = (ut + \dfrac{1}{2}at^2)$

$= 2x \text{ x } 2 + \dfrac{1}{2} \text{x } \dfrac{x}{2} \text{ x } 2^2$

$= 2x + \dfrac{1}{2} \text{ x} \dfrac{x}{2} \text{ x } 4$

$= 3x$

ii) Acceleration in next 2 seconds $= \dfrac{4x - 2x}{2} = \dfrac{2x}{2} = x$

$\therefore$ Distance travelled in second 2 seconds,

$S_2 = 2x \text{ x } 2 + \dfrac{1}{2} \text{ x } x \text{ x } 2^2$

$= 4x + 2x$

$= 6x$

iii) Acceleration in the next 2 seconds $= \dfrac{8x - 4x}{2} = \dfrac{4x}{2} = 2x$

$\therefore$ Distance travelled in the third 2 seconds,

$S_3 = 4x \text{ x } 2 + \dfrac{1}{2} \text{ x } 2x \text{ x } 2^2$

$= 8x + \dfrac{1}{2} \text{x } 2x \text{ x } 4$

$= 8x + 4x$

$= 12x$

Now, average speed in 6 seconds = 14 m/s

$\therefore \dfrac{\text{Total distance travelled}}{\text{Time}} = 14$

$\therefore \dfrac{S_1 + S_2 + S_3}{6} = 14$

$\therefore \dfrac{3x + 6x + 12x}{6} = 14$

$\therefore 21x = 14 \text{ x } 6$

$\therefore x = \dfrac{84}{21} = 4$

Now, the distance travelled in first 4 seconds,

$= S_1 + S_2$

$= 3x + 6x$

$= 9x$

$= 9 \text{ x } 4 = 36 \text{ m}$

A. 29. (D) Explanation: Ascending speed of sound at 25 °C in the given media is given below:

R → Sulphur Dioxide: 213 m/s

Q → Air: 346 m/s

T → Helium: 965 m/s

P → Hydrogen: 1284 m/s

A. 30. (B) Explanation: The gravitational force acts on a body in downward direction and the displacement occurs in the upward direction. Hence, the work done by the gravitational force is negative. Except the statement (B), all other statements are correct.

A. 31. (B) Explanation: pH of 1 mole of NaOH is 14.

A. 32. (D) Explanation: Ammonia, Ammonium hydroxide and Methylamine are weak bases.

A. 33. (A) Explanation: Volume of the solution is less than 20 ml.

A. 34. (C) Explanation: Silver nitrate is affected by light.

A. 35. (C)

A. 36. (C) Explanation: Freezing point of Mercury (Hg) is — 39 °C.

A. 37. (B) Explanation: Gypsum is used as an antiseptic is a wrong statement.

Gypsum is widely used as a fertilizer and as the main constituent in many forms of plaster, blackboard chalk and wallboard.

A. 38. (C) Explanation: Lemon juice increases the acidity of tea, thereby lowering the pH.

A. 39. (A) Explanation: Lignin gets oxidised by the air and light.

A. 40. (B) Explanation: Mass of

$e^{-1} = 88 \text{ x } 10^{-29} \text{ g} = 88 \text{ x } 10^{-32} \text{ kg}$

$$\therefore \frac{44}{88 \text{ x } 10^{-32}} = 0.5 \text{ x } 10^{32} \text{electrons}$$

A. 41. (B) Explanation: Aluminium zirconium compounds are most harmful.

A. 42. (A) Explanation: Graphite is an allotrope; while other are compounds.

A. 43. (C) Explanation: Compound $B_2A_2 \equiv C_2H_2$

∴ A is H and B is C (Order is important)

A. 44. (D) Explanation: Arsenic — 74 is used for detecting small tumours in the human body. Others are used for detecting tumours in human brain.

A. 45. (B) Explanation: Sodium is not a catalyst; others are catalysts.

A. 46. (D) Explanation: Acetic acid is a monobasic acid; others are tribasic acids.

A. 47. (A)

A. 48. (D) Explanation: The ratio should be 9:1:3.5

The common multiple be x = 8.

C = 9 x 8 = 72 and molecular mass of C is 12 (Approx.)

H = 1 x 8 = 8 and molecular mass of H is 1 (Approx.)

N = 3.5 x 8 = 28 and molecular mass of N is 14 (Approx.)

∴ The molecular formula is $C_6H_8N_2$

A. 49. (C) Explanation: Bleaching powder do not contain water of crystallization.

A. 50. (C) Explanation: Ca^{2+} and PO^{3-}_4

A. 51. (B) Explanation: Quark means hadron.

A. 52. (D)

A. 53. (B) Explanation: Valency of Carbon is 4 and not 6.

A. 54. (C) Explanation: u is the unit of atomic mass; other are units of length.

A. 55. (B) Explanation: $(C_2F_4)_n$ is the chemical formula of Polytetrafluoroethylene.

A. 56. (D) Explanation: Lead and mercury are harmful chemicals.

A. 57. (C) Explanation: German scientist Friedrich Wohler synthesized urea from Ammonium cyanate.

A. 58. (B)

A. 59. (A) Explanation: Both the statements are true and II is the explanation of I.

A. 60. (D) Explanation: Potassium is not used in cloth and paper industry.

A. 61. (A) Explanation: pH of milk is in the range of 6.4 to 6.8 and is slightly acidic.

A. 62. (B) Explanation: Bos taurus is the scientific name of cow.

A. 63. (B) Explanation: Other options are examples of insectivorous plants.

A. 64. (B)

A. 65. (A) Explanation: Other options are examples of broilers.

A. 66. (D) Explanation: Malerial parasite Plasmodium histolytica is protozoa.

A. 67. (C)

A. 68. (D)

A. 69. (D)

A. 70. (A) Explanation: The minute space between two nerve cells is called synapse.

A. 71. (B)

A. 72. (A)

A. 73. (C) Explanation: Other three options are examples of broad spectrum antibiotics.

A. 74. (B)

A. 75. (C) Explanation: Stigma of Hibiscus has five lobes.

A. 76. (B)

A. 77. (C) Explanation: Enzymes are most active at normal body temperature.

A. 78. (D)

A. 79. (D)

A. 80. (A)

A. 81. (A)

A. 82. (C)

A. 83. (B)

A. 84. (D)

A. 85. (D) Explanation: There are 12 pairs of cranial nerves.

A. 86. (C) Explanation: Other three options are the characteristics of monocot plants.

A. 87. (B)

A. 88. (D)

A. 89. (A)

A. 90. (A)

A. 91. (B)

A. 92. (C) Explanation: Dr. Hargobind Khurana won the Nobel Prize for Physiology (Medicine) in 1968. Dr. C. V. Raman and Dr. Subramanyam Chandrashekhar won the Nobel Prize for Physics in 1930 and 1983, respectively. Dr. Venkatraman Ramakrishnan won the the Nobel Prize for Chemistry in 2009.

A. 93. (A) Explanation: Motorola was the first company to produce a handheld
mobile phone in April 1973. Martin Cooper, the researcher at Motorola, made the first mobile phone (cell phone). That is why Dr. Martin Cooper is called the father of cell phone.

A. 94. (C) **A. 95. (A)**

A. 96. (C) **A. 97. (B)**

A. 98. (B) **A. 99. (D) A. 100. (C) ****