

seconds. What time take to cover half the distance?

- a. 1.414 s b. 2 s c. 2.828 s d. 3.414 s

10.) A 120 m long train is moving towards west at a speed of 10 m/s. A small bird flying towards east with a speed of 5 m/s crosses the train.

- a. 24 s b. 16 s c. 12 s d. 8 s

11.) An electron starting from rest has a velocity that increases linearly with time, i.e. $v = kt$ where $k = 2 \text{ m/sq. s}$. The distance covered in first three seconds will be

- a. 9 m b. 16 m c. 27 m d. 36 m

12.) The magnitude of resultant of two vectors will be minimum when they act at an angle of

- a. 0 deg b. 90 deg c. 180 deg d. 360 deg

13.) A man of weight mg is moving upwards in a rocket with acceleration $2g$. His apparent weight inside the rocket will be

- a. zero b. mg c. $2 mg$ d. $3 mg$

14.) Two racing cars of masses M and m are moving in circles of radii R and r respectively. Their speeds are such that they make a complete circle in the same length of time. The ratio of the angular speed of the first car to the second is

- a. $M : m$ b. $R : r$ c. $1 : 1$ d. $MR : mr$

15.) A ball of mass 1 kg moving horizontally due North at 8 m/s strikes a vertical wall and is repelled back with a speed of 6 m/s. The change in its momentum is

- a. 14 kg m/s b. 8 kg m/s c. 6 kg m/s d. 2 kg m/s

16.) If a hole is bored through the diameter of the earth and a stone is dropped into the hole

- a. the stone reaches the centre of the earth and stops there .
b. the stone reaches the other side of the earth and stops there.

- c. the stone executes simple harmonic motion about the centre.
d. the stone reaches the other side of the earth and escapes into space.
17.) The momentum of a body of mass 5 kg is 15 kg m/s. Its kinetic energy is
a. 10 J b. 20 J c. 22.5 J d. 25 J
18.) In order to know time an astronaut orbiting in a satellite should use
a. a pendulum clock b. a watch having a spring to keep it going
c. either a pendulum clock or a watch d. neither a pendulum clock nor a watch
19.) If earth stops rotating about its axis the value of g at the equator will
a. decrease by $w.w.R$
b. remain the same
c. increase by $w.w.R$
d. increase by $w.R$
20.) If earth suddenly loses its power of attraction, then the mass of a body lying on its surface
a. will become zero but its weight remains the same
b. will remain the same but its weight becomes zero
c. will become zero and its weight will also become zero
d. will change

Young Scientists - IX

Paper I - Mechanics

Time :40 min.

Marks : 50

Date : 2 / 09 / 96

1. Which of the following acids is used in a car battery ?
 a) Dilute HCl b) Dilute H_2SO_4 c) Conc. HCl d) Conc. H_2SO_4
2. In what form is music recorded on a tape recorder ?
 a) In the form of electrical energy on tape b) In the form of magnetic energy on tape
 c) In the form of variable resistance on tape d) In the form of sound waves on tape
3. What is the temperature of water at maximum density ?
 a) $0^\circ C$ b) $4^\circ C$ c) $80^\circ C$ d) $100^\circ C$
4. What is the focal length of a silver polished plane mirror ?
 a) infinite b) zero c) equal to the height of the mirror d) equal to half the height of the mirror.
5. Which one of the following has maximum thermal capacity ?
 a) wood b) copper c) water d) ice
6. A drop of ink can mix with a large amount of water. What is this due to ?
 a) Osmosis b) Diffusion c) Conduction d) Dispersion
7. When will the velocity of sound in air increase ?
 a) If temperature increases b) If pressure reduces c) If pollution increases d) If temperature reduces
8. What is the mass of one electron ?
 a) $9.1 \times 10^{-31} gm$ b) $1.67 \times 10^{-24} gm$ c) $1.67 \times 10^{-24} kg$ d) $9.1 \times 10^{-24} kg$
9. Which of the following is used in the manufacture of an electric bulb ?

a) Iron b) Nichrome c) Carbon d) Tungsten

10. Which is the easy method of finding the distance of a far-off object ?

a) Triangulation method b) Indirect method c) Direct method d) Circular method

11. The freezing point of water on a certain thermometer is marked as 20°C and the boiling point at sea level is marked as 150°C . What will be the reading on that thermometer when the temperature is 60°C ?

a) 45°C b) 65°C c) 85°C d) 110°C

12.

Young Scientists - IX

Paper III - General

Time : 30 min.

Marks : 25

Date : 30/07/ 96

Name :

- The phenomenon of radioactivity is associated with the
a) disintegration of the electrons b) emission of spectral lines c) fusion of nuclei
d) spontaneous disintegration of the nuclei of atoms
- Which of the following gas is called "marsh gas" ?
a) H_2 b) CH_4 c) C_2H_4 d) C_2H_2
- Indicate the only correct statement
3.
a) The image formed by a convex mirror can be taken on a screen.
b) A convex mirror can produce a parallel beam of light from a point source .
c) The image of an object placed at the focus of the convex mirror will be formed at infinity.
d) The concave mirror can never form a diminished virtual image.
- The refractive index of medium X w.r.t. medium Y is 1.5
a) X is denser w.r.t. Y b) Y is denser w.r.t. X c) X & Y are equally denser
d) both are rarer
- When white light enters a transparent medium such as glass
a) all wavelengths components travel with the same speed
b) the large wavelength component travels with maximum velocity
c) the short wavelength component travels with maximum velocity
d) there is no relation between wavelength and speed
- If there were no atmosphere on earth the duration of day-light will
a) decrease b) increase c) remain unchanged d) remain infinite
- Vinegar is a dilute solution of
a) acetic acid b) propanoic acid c) butanoic

acid d) formaldehyde

8. The general formula of alkyne is

- a) C_nH_n b) C_nH_{2n-2} c) C_nH_{2n} d) C_nH_{2n+2}

9. Rheumatoid arthritis is

- a) a swelling of the heart b) a disease involving swelling of the joints c) a disease of the kidneys
d) a disease of the spinal cords

10. Bacterial infection of food can be prevented by

- a) covering the food b) keeping the food very cold c) heating upto
70°C at least d) both b and c

11. City X needs 10 units and city Y needs 12 units of food everyday. Supply to city X is 14 units and to Y is 7 units. This is an example of

- a) surplus production b) wastage c) improper planning d) nothing
can be concluded from the statement

12. Bailey's beads are caused due to

- a) flares on the Sun b) atmospheric defects c) non-uniform lunar
surface d) bending of light

13. Which of the following statements is wrong ?

- a) Coronal temperature is higher than that of photosphere. b) Chromosphere is
green in colour.
b) Sunspots are low density regions. d) Magnetic field strength of the Sun
is 1 Gauss.

14. An object is placed at a distance equal to $2f$ from a concave lens, the image formed will be at

- a) $2f$ b) $2f/3$ c) f d) $f/3$

15. The nature of the u-v graph for a converging lens is a part of a

- a) circle b) parabola d) hyperbola d) straight line

16. A compound with the molecular formula C_2H_2 must contain

- a) all single bonds b) one double bond c) one triple bond d) none of the
above

17. The speed of light *in vacuo* is 3.0×10^8 m per sec. If the refractive index of a transparent liquid is $4/3$, then the speed of light in the liquid is
a) 2.25×10^8 m/s b) 3×10^8 m/s c) 4×10^8 m/s d) 4.33×10^8 m/s
18. When monochromatic light passes from vacuum to a material medium and vice versa, which of the characteristic of light does not change ?
a) wavelength b) velocity c) frequency d) intensity
19. The necessary condition for a total solar eclipse is
a) the angular size of the moon should be greater than that of the sun
b) the moon should move faster than usual.
c) the sun and the moon should have the same angular size
d) the moon should be at a special distance from the earth
20. The amount of calories a sheep should eat to give wool or meat is
a) the same b) more for meat c) less for meat d) depends on the climate
21. "Operation flood" is connected to raising of
a) food for animals b) agro-based products c) dairy-based products d) none of these
22. A woman eats an unclean and unwashed apple from the market. She may later develop
a) breast cancer b) tonsillitis c) gastro-intestinal problems d) heart ailments
23. The indication of foot and mouth disease of cattle is given by
a) excessive sweating b) excessive salivation c) excessive tiredness
d) their declining to eat
24. The sky is blue because
a) the solar radiation is predominantly blue. b) air absorbs all light except blue.
c) air emits blue light.
d) air scatters blue light.
25. A red rose is viewed in yellow light. It will appear
a) red b) orange c) yellow d) black

Young Scientists - IX

Paper III - General

Time : 30 min.

Marks : 25

Date : 30/07/ 96

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Young Scientists - IX

Paper IV - General

Time : 30 min. Marks : 30 Date : 1/08/ 96

Name :

1. The temperature of water at the bottom of a large waterfall is higher than that of the water at the top because
 - a) the falling water absorbs heat from the sun
 - b) the water at the bottom has greater potential energy
 - c) the kinetic energy of the falling water is converted into heat
 - d) the falling water has larger area for the sun to heat

2. Food inside a pressure cooker is cooked faster because
 - a) no material is allowed to spill out
 - b) pressure inside is kept constant
 - c) boiling starts at a lower temperature
 - d) boiling starts at a higher temperature

3. In case of an astronomical telescope
 - i) the focal length of the objective lens is greater
 - ii) the focus of the objective and the eye-piece coincide at the time of normal adjustment
 - iii) the distance between the lenses cannot be adjusted
 - a) i and ii only
 - b) i and iii only
 - c) ii and iii only
 - d) i only

4. Through a soap film different colours are seen by white light because of the phenomenon of
 - a) interference
 - b) dispersion
 - c) diffraction
 - d) reflection

5. Which of the following does not corrode when exposed to the atmosphere
 - a) iron
 - b) gold
 - c) copper
 - d) silver

6. Biogas is obtained from
 - a) charcoal
 - b) wood
 - c) dung
 - d) petrol

7. Which of the following is not obtained in the destructive distillation of coal ?
 - a) coal gas
 - b) coal tar
 - c) ammonia
 - d) nitrogen

8. Which of the following is not an example of zero-gravity ?

- a) A spaceship flying past Jupiter. b) A spaceship in deep inter-planetary space.
c) A lift falling freely. d) A satellite orbiting Earth.

9. An underwater explosion is caused near the sea-shore. There are two observers, X under water and Y on land, each at a distance of 1 km from the point of explosion.

- a) X will not hear the sound earlier. b) Y will hear the sound earlier.
c) Both will hear the sound at the same time. d) Y will not hear the sound at all.

10. A radio station broadcasts at 30 metre band. The frequency of electromagnetic waves transmitted from the station could be

- a) 10 MHz b) 10 KHz c) 3×10^{10} Hz d) 30 Hz

11. Which of the following is not the correct about two parallel conductors carrying equal currents in the same direction ?

- a) Each of the conductors will experience a force. b) The two conductors will attract each other.
c) There are concentric lines of force around each conductor.
d) Each of the conductors will move if not prevented from doing so.

12. When a ball spins, the velocity of air at its top is

- a) equal to that at its bottom b) greater than that at its bottom c) less than that at its bottom
d) independent of spin

13. Bleeding starts from the nose when we climb a high mountain because of

- a) decrease in temperature b) decrease in pressure c) increase in pressure
d) increase in solar radiation

14. Which of the following statements is not correct ?

- a) Diamond can be made in the laboratory. b) Gem-quality diamond can be made in the laboratory.
c) Titanium dioxide and strontium titanate are examples of diamond-like synthetic gems.
d) Graphite is the black ingredient in pencils.

15. On the moon we cannot drink water using a straw . Why ?

- a) The straw will not remain open due to high pressure.
- b) There is no atmospheric pressure.
- c) We will not have as much breath.
- d) The force of gravity is too small.

16. What should be the height of a plane mirror for seeing the complete image of a man in it?

- a) One fourth of the height of the man.
- b) One half the height of the man.
- c) Of any height.
- d) Equal to the height of the man.

17. What is Sonar used for ?

- a) location and ranging of submarine.
- b) Location and ranging of aircraft.
- c) producing a musical note of high frequency.
- d) Measuring the frequency of musical notes.

18. What does a pyrometer measure ?

- a) High altitude
- b) Pressures
- c) High temperature
- d) The radiant energy

19. It is easy to produce large volume of sound while singing in a bathroom. Why ?

- a) Water vapour increases speed of sound in air.
- b) Water vapour reflects and amplifies sound.
- c) As we are alone, we feel less inhibited to sing more loudly.
- d) Sound is confined to a small space with reflecting surfaces.

20. In which of the following instruments vibrations are set up in a diaphragm?

- a) Violin
- b) Flute
- c) Trumpet
- d) Bell

21. Who is the author of the book "Philosophia Naturalis Principia Mathematica"?

- a) James Watt
- b) Albert Einstein
- c) Isaac Newton
- d) Humphrey Davy

22. An echo from the bed of the sea is recieved 0.5 sec after an echo sounder pulse is transmitted. What is the depth of the sea bed ? (speed of sound in wtaer is 1500 m/s)

- a) 375 m
- b) 700 m
- c) 1500 m
- d) 3000 m

23. Select the correct sequence in an ascending order of wavelength in the following

radiation ?

- a) UV, IR, V b) V, IR, UV c) UV, V, IR d) IR, V, UV

24. Which of the following astronomy's needs to be conducted from space ?

- a) IR b) Gamma-ray c) Radio d) Cosmic-ray

25. How will the surrounding temperature affect the Brownian motion ?

- a) It will increase with rise in temperature b) It will decrease with rise in temperature
c) It will remain constant
d) Normally it will increase with rise in temperature but in exceptional cases it would decrease

26. Which of the following changes in an animal can lead to their inheritance to the next generation?

- a) change caused by an accident b) change made by a medical operation (eg. removal of a kidney, etc.)
c) change in chromosome d) change that animal would like very much to happen

27. Number of tigers in a forest decreased. Then slowly the no. of deer in the forest started increasing. This is related to which of the following ?

- a) Evolution b) Balance in nature c) Heredity d) Natural selection

28. What is the pulse rate in a young healthy man?

- a) 18 b) 36 c) 72 d) 90

29. Satellites can be useful in identifying mineral resources, water resources situated deep underground. Name the technique used in getting required data for this purpose.

- a) Remote sensing b) Radiology c) Distribution system d) Telecommunication

30. Which of the following is called the epicenter of an earth-quake ?

- a) The important city in the area where the tremors are felt b) The worst affected town or village
c) The place where the siesmograph is situated d) The point underground where the rocks actually moved and caused the earth-quake

18. An example of an occupational disease is

- a) hydrophobia b) pneumonia c) pneumoconiosis d) AIDS

19. An effect of excessive nuclear radiation exposure is

- a) unwanted cell division b) hormonal disorders c) immunological disorders
d) cardiovascular diseases

20. What property of sound is used to quantify sound pollution ?

- a) Frequency b) Amplitude c) Pitch d)
Time period

21. One of the steps of proper healthcare is to keep the body clean. This will

- a) prevent skin diseases b) prevent heart diseases c) increase stamina
d) increase the water content of the body

22. First aid is

- a) medication first given by a doctor b) monetary aid obtained for the first time
to cure a patient
c) medication till the doctor comes d) all of these

23. A disease due to large consumption of alcohol is

- a) hyper vitaminosis b) cerebral haemorrhage c) cirrhosis of the
liver d) none of these

24. A narcotics addicted person goes through a state of excessive physical disorder when the effect of the narcotic is removed from him. This symptom is called _____ symptom.

- a) addiction b) de-addiction c) withdrawal d)
attachment

25. Noise pollution can be prevented by

- a) stopping the blowing of all horns b) banning all commercial loudspeakers
c) strict vigilance on noise limits d) cleaning noise emitting parts of automobiles

26. Which of the following is not an SHM ?

- a) pendulum b) sound-waves c) yo-yo d) spring tied at one
end and pulled from another

27. Which of the following apply to an artificial satellite revolving around the earth ?

- 1) It requires no energy to stay up there 2) It uses the earth's gravity to keep on revolving
3) It requires very less amounts of energy to stay up there 4) The earth's gravity slows it down
a) 1 & 4 b) 2 & 3 c) 1 & 2 d) 3 & 4

28. A ball rotating in a dense fluid is subjected to a drag due to
a) viscosity b) it's mass c) rotational inertia d) both a) and c)

29. A satellite in an orbit at 1000 km above the earth's surface, changes orbit to 2000 km. Which of the following is not true ?
a) It has to use up energy in doing so b) It's Kinetic energy is converted to Potential energy
c) The centripetal force on it is reduced d) It's velocity is reduced

30. Which of the following are true for a quasi stellar source (quasar)
1) It's a huge compact star-like object emitting the light equal to that of a galaxy
2) It's a huge black hole far away from us 3) This is the farthest known class of objects to man
4) It is the basic constituent of all matter
a) 4 alone b) 2 and 3 c) 1 and 3 d) 3 and 4

31. Doppler effect for stars states that
a) light coming form a star moving away from us is shifted towards the red end of the spectrum
b) light coming to us from a star coming towards us is shifted towards the blue end of the spectrum
c) light coming to us from a star coming towards us is shifted towards the red end of the spectrum
d) both a) and b)

32. Tea cups are usually made of ceramics or clay because
a) they can break very easily b) they absorb heat from the surrounding and keep the tea warm
c) they give heat away from the tea and cool it faster d) they don't allow heat to pass in any way

33. We use a spoon made of steel to stir a hot liquid in a vessel, because
a) the spoon helps remove any unwanted particles floating in the liquid b) it's a fashion

b) steel does not remove any heat form the liquid
liquid

d) steel helps cool the liquid

34. An astronaut cannot walk in space as he can on earth because

- a) space does not provide a floor to walk on b) he is in seventh heaven
c) the low density of space does not provide enough normal reaction d) he is weight-less

35. When you turn on a TV set it takes some time to show a picture. Why ?

- a) because the tube needs to heat up to excite the electrons
b) time is needed to develop a high potential
c) time is needed for the flourescent screen to react to the incoming electron
d) none of the above

36. In a computer the microprocessor basically,

- a) allots work to the other components b) performs complicated logical and operations
c) perfoms simple calculations d) all of the above

37. Rain-carrying clouds appear dark because,

- a) They contain high amounts of dust b) they contain water vapour
c) they contain high amounts of water vapour d) they are denser than other clouds

38. An eagle can soar high up in the sky for quite some time, without flapping its wings because

- a) it doesn't feel much gravity b) it's wings give it a lift c) it uses thermal currents
d) it just likes to be that way

39. A soap bubble is spherical in shape because,

- a) all molecules on the surface are performing UCM around the centre
b) that way the gravity is minimum c) that way the surface tension is minimum
d) none of these

40. The book " A brief history of time " was written by

- a) Einstein b) Newscroft c) Hawking d) Narlikar

41. An important discovery which opened the doors to Astrophysics from Astronomy

was

- a) Einstein's theory of relativity
- b) Saha's ionisation formula
- c) Hubble's observation that the galaxies are going away from us
- d) Narlikar's theory of gravitation

42. Which of the following is the most important for management ?

- a) Technology
- b) Planning
- c) Finance
- d) none of these

43. Milk gets spoilt more quickly in summer because

- a) the milk supplied has already started getting spoilt
- b) bacteria is present in milk in summer only
- c) the optimum temperature for spoiling is reached easily in summer
- d) milk is not pasteurised in summer

44. Which one of the following is false about a pesticide ?

- a) It must be sprayed in a liquid form
- b) It should be sprayed only in the necessary amounts
- c) It should always be kept in a closed container
- d) It should be stored away from children

45. Mountains are a part of the

- a) Hydrosphere
- b) Lithosphere
- c) Atmosphere
- d) Alti-sphere

46. Part of the universe which supports life is

- a) ecosystem
- b) biosphere
- c) solar system
- d) photosphere

47. Which of the following is correct about ribosomes ?

- a) They are made of DNA
- b) They help in respiration
- c) They are sites for protein synthesis
- d) They help in cell division

48. Muscle cells engaged in vigorous activity build up a high concentration of

- a) lactic acid
- b) pyruvic acid
- c) alcohol
- d) cholesterol

49. Bio-concentration of pesticides causes

- a) global warming
- b) biological degradation
- c) biological magnification
- d) decrease in production of clouds

50. _____ is a factor in deciding the size of the population in an area.

- a) size of the earth b) weight of non-living beings c) climate d) atmospheric pressure

the temperature is 60°C ?

- a) 45°C b) 65°C
c) 85°C d) 110°C

12. Which of the following is not a fundamental physical quantity ?

- a) length b) pressure
c) time d) mass

13. Which is the correct sequence of measuring instruments according to their least counts ?

- a) meter scale, vernier callipers, screw gauge
b) screw gauge, vernier callipers, meter scale
c) vernier callipers, screw gauge, meter scale
d) screw gauge, meter scale, vernier callipers

14. What is a " Plimsol " line ?

- a) It indicates the capacity of a boat for loading in water.
b) It indicates the danger level of a river in spate
c) The line observed on the lateral side of a fish indicating pressure
d) The line discovered by Plimsol

15. What was the basic experimental specimen used for Robert Brown's theory of Brownian motion?

- a) drops of water b) dust particles in air
c) pollen grains in water
d) molecules of Hydrogen

16. Which of the following is used for dry cleaning ?

- a) kerosene b) water
c) turpentine d) petrol

17. Which of the following is not balanced ?

- a) $\text{CaCO}_3 \Rightarrow \text{CaO} + \text{CO}_2$
b) $\text{Fe}_2\text{O}_3 + 3\text{CO} \Rightarrow 2\text{Fe} + 2\text{CO}_2$
c) $2\text{Al}_2\text{O}_3 \Rightarrow 4\text{Al} + 3\text{O}_2$
d) $2\text{Pb}_3\text{O}_4 \Rightarrow 6\text{PbO} + 2\text{O}_2$

18. Which of the following compounds on treatment with Iodine soln. turns blue ?

- a) fats b) protein
c) starch d) mineral

19. Where is the National Chemical Laboratory located ?

- a) Mumbai b) Pune
c) Delhi d) Calcutta

20. What material is used for making rayon ?

- a) petroleum b) coal
c) cellulose d) phosphorous

21. What is the chemical formula of heavy water ?

a) H_2O_2 b) H_2O c) T_2O d) D_2O

22. Which is the odd-man-out ?

- a) petrol b) water
c) phosphorous d) gunpowder

23. What is dilute acetic acid known as ?

- a) Soda b) Vinegar
c) Spirit of salts d) Sal Volatile

24. Which of the following is a good conductor of electricity ?

- a) Chlorine b) Phosphorous
c) Sulphur d) Carbon

25. What type of reaction occurs when hydrogen is passed over heated copper oxide ?

- a) evaporation b) oxidation
c) distillation d) reduction

26. Which of the following atoms has the M orbit ? (p-proton, n-neutron)

- a) 1p, 1n b) 2p, 2n
c) 8p, 8n d) 11p, 12n

27. Which of the following pairs of gases when combine produce vapours of reddish brown color ?

- a) Nitric oxide & Oxygen
b) Ammonia & Oxygen
c) Nitrous oxide & Oxygen
d) Chlorine & Oxygen

28. Which method will you adopt for dilution of sulphuric acid ?

- a) Pour water into acid b) Pour acid into water
c) Hold acid under water tap
d) Mix ice with acid

29. Which of the following elements is in liquid form at room temperature ?

- a) Fluorine b) Chlorine
c) Bromine d) Iodine

30. Cool boiled water cannot be used in an aquarium. Why ?

- a) It does not contain dissolved air
b) In this water hydrogen doesn't combine with water
c) It may contain traces of steam
d) It has no minerals in it

31. Which substance will you apply at the site of a sting by a honey bee ?

- a) Lime water b) Iodine
c) Burnol d) Dettol

32. Where is Entamoeba Histolyca found normally in the human host ?

- a) small intestine b) small & large intestines
c) muscles d) gaps between teeth

Young Scientists - IX

Paper 7

Time : 40 min

Marks : 50

Date : 3 / 09 / 96

- Which of the following is correct about ribosomes ?
 - They are made of DNA
 - They help in respiration
 - They are sites for protein synthesis
 - They help in cell division
- The significant figures in the product of 1231.2, 7.25, and 0.1 will be
 - one
 - two
 - three
 - four
- The phenomenon of radioactivity is associated mainly with the
 - disintegration of the electrons
 - fission of nuclei
 - fusion of nuclei
 - spontaneous disintegration of the nuclei of atoms
- The length, breadth and height of a rectangular solid are 2.5m, 0.5m and 0.6m respectively. The volume of the solid in proper significant figures is
 - 0.95 cu.m.
 - 0.75 cu.m.
 - .78 cu.m.
 - none of the above
- An electron starting from rest has a velocity that increases linearly with time, i.e. $v = kt$ where $k = 3 \text{ m/s/s}$. The distance covered in first three seconds will be
 - 27.5 m
 - 12.5 m
 - 27 m
 - 13.5 m
- If there were no atmosphere on earth the duration of day-light will
 - decrease
 - increase
 - remain unchanged
 - remain infinite
- What is the role of a catalyst ?
 - to start the reaction
 - to stop the reaction
 - to provide energy to the reaction
 - to alter the rate of the reaction
- The magnitude of resultant of two vectors will be minimum when they act at an angle of
 - 0 deg
 - 90 deg
 - 180 deg
 - 360 deg
- If a hole is bored through the diameter of the earth and a stone is dropped into the hole
 - the stone reaches the centre of the earth and stops there .
 - the stone reaches the other side of the earth and stops there.
 - the stone executes simple harmonic motion about the centre.
 - the stone reaches the other side of the earth and escapes into space.

10. The angular velocity of earth's rotation around its own axis is
a. $\pi /6$ rad/h b. $\pi/12$ rad/h c. $\pi/24$ rad/h d. 15 rad/h
11. Bio-concentration of pesticides causes
a) global warming b) biological degradation
c) biological magnification
d) decrease in production of clouds
12. Which of the following statements is wrong ?
a) Coronal temperature is higher than that of photosphere.
b) Chromosphere is green in colour.
c) Sunspots are low density regions.
d) Magnetic field strength of the Sun is 1 Gauss.
13. Which of the following is not the correct about two parallel conductors carrying equal currents in the same direction ?
a) Each of the conductors will experience a force.
b) The two conductors will attract each other.
c) There are concentric lines of force around each conductor.
d) Each of the conductors will move if not prevented from doing so.
14. In an electrolytic cell, electrons enter the cell through
a) cathode b) anode c) positive terminal d) both electrodes
15. Mental stress due to environmental factors leads to
a) haemorrhage b) cerebritis c) peptic ulcers
d) gastro-entritis
16. If earth stops rotating about its axis the value of g at the equator will
a. decrease by $w.w.R$ b. remain the same
c. increase by $w.w.R$ d. increase by $w.R$
17. Indicate the only correct statement
a) The image formed by a convex mirror can be taken on a screen.
b) A convex mirror can produce a parallel beam of light from a point source .
c) The image of an object placed at the focus of the convex mirror will be formed at infinity.
d) The concave mirror can never form a diminished virtual image.
18. The general formula of alkyne is
a) C_nH_n b) C_nH_{2n-2} c) C_nH_{2n}
d) C_nH_{2n+2}

19. Bacterial infection of food can be prevented by
a) covering the food b) keeping the food very cold c) heating upto 70°C at least
d) both b and c
20. When monochromatic light passes from vacuum to a material medium and vice versa, which of the characteristic of light does not change ?
a) wavelength b) velocity c) frequency
d) intensity
21. In which of the following cases, PAH's cannot be formed ?
a) During the formation of the solar system
b) During space-flight c) In life processes
d) In decomposing bacteria
22. The indication of foot and mouth disease of cattle is given by
a) excessive sweating b) excessive salivation
c) excessive tiredness d) their declining to eat
23. Which of the following is not found naturally on earth ?
a) Magnesite b) Magnetite c) Mascelnite
d) Kaolinite
24. The temperature of water at the bottom of a large waterfall is higher than that of the water at the top because
a) the falling water absorbs heat from the sun
b) the water at the bottom has greater potential energy
c) the kinetic energy of the falling water is converted into heat
d) the falling water has larger area for the sun to heat
25. Muscle cells engaged in vigorous activity build up a high concentration of
a) lactic acid b) pyruvic acid
c) alcohol d) cholesterol
26. Which of the following is not an example of zero-gravity ?
a) A spaceship flying past Jupiter. b) A spaceship in deep inter-planetary space.
c) A lift falling freely. d) A satellite orbiting Earth.
27. A radio station broadcasts at 30 metre band. The frequency of electromagnetic waves transmitted from the station could be
a) 10 MHz b) 10 KHz c) 3×10^{10} Hz d) 30 Hz
18. Bleeding starts from the nose when we climb a high mountain because of

- a) decrease in temperature b) decrease in pressure
- c) increase in pressure d) increase in solar radiation

29. Which of the following changes in an animal can lead to their inheritance to the next generation?

- a) change caused by an accident b) change made by a medical operation (eg. removal of a kidney, etc.)
- c) change in chromosome d) change that animal would like very much to happen

30. Number of tigers in a forest decreased. Then slowly the no. of deer in the forest started increasing. This is related to which of the following ?

- a) Evolution b) Balance in nature
- c) Heredity d) Natural selection

31. Which of the following factors is not essential for clotting of blood ?

- a) Magnesium b) Platelets
- c) Calcium d) Fibrinogen

32. What is digestion ?

- a) absorption of food b) assimilation of food
- c) conversion of food into its constituent
- d) conversion of complex insoluble food into simple and soluble form

33. Why is smoke produced when candle burns ?

- a) combustion of candle produce blackish substance
- b) wax is changed into smoke b) carbon in wax comes out without combustion
- d) incomplete combustion of carbon leads to smoke

34. Which of the following is taken in to reduce acidity in stomach ?

- a) $Mg(OH)_2$ b) $Ca(OH)_2$ c) NaOH
- d) KOH

35. A graph between current and potential difference of a circuit is plotted. What will be the nature of the plot ?

- a) straight line having negative slope
- b) curved line c) straight line parallel to x-axis
- d) straight line having positive slope

36. During winter, sound is heard from a larger distance. What is the reason for this ?

- a) Moisture content of the air is low. b) Air temperature is low. c) Exact reason is not known.
- d) Dews help in the transmission of sound waves.

37. In which of the following instruments vibrations are set up in a diaphragm?

- a) Violin b) Flute c) Trumpet d) Bell

38. The value of Avogadro constant is

- a) $6.023 \times 10^{-23} \text{ mol}^{-1}$ b) $6.023 \times 10^{23} \text{ mol}^{-1}$ c) 6.023 mol^{-1} d) 10^{23} mol^{-1}

39. Which of the following is an application of analog electronics ?

- a) computers b) calculator
c) ceiling fan d) satellites

40. An effect of excessive nuclear radiation exposure is

- a) unwanted cell division b) hormonal disorders
c) immunological disorders d) cardiovascular diseases

41. A disease due to large consumption of alcohol is

- a) hyper vitaminosis b) cerebral haemorrhage
c) cirrhosis of the liver d) none of these

42. Which of the following apply to an artificial satellite revolving around the earth ?

- 1) It requires no energy to stay up there 2) It uses the earth's gravity to keep on revolving
3) It requires very less amounts of energy to stay up there 4) The earth's gravity slows it down
a) 1 & 4 b) 2 & 3 c) 1 & 2 d) 3 & 4

43. Tea cups are usually made of ceramics or clay because

- a) they can break very easily b) they absorb heat from the surrounding and keep the tea warm
c) they give heat away from the tea and cool it faster
d) they don't allow heat to pass in any way

44. An eagle can soar high up in the sky for quite some time, without flapping its wings because

- a) it doesn't feel much gravity b) it's wings give it a lift c) it uses thermal currents
d) it just likes to be that way

45. A soap bubble is spherical in shape because,

- a) all molecules on the surface are performing UCM around the centre b) that way the gravity is minimum c) that way the surface tension is minimum d) none of these

46. Which of the following is the most important for management ?

- a) Technology b) Planning c) Finance
d) none of these

47. What does a pyrometer measure ?

- a) High altitude b) Pressures c) High temperature d) The radiant energy

48. Part of the universe which supports life is

- a) ecosystem b) biosphere c) solar system
d) photosphere

49. What is the nature of fire ?

- a) Luminous Plasma b) Dense hot plumes of surrounding air heated by the burning substance
c) incandescent gases d) none of these

50. Who built the first telescope ?

- a) Galileo b) Newton c) Copernicus
d) Lepersche

Young Scientists - IX

Paper 8

Time : 40 min

Marks : 50

Date : 4 / 09 / 96

1. Which quantity does not vary, irrespective of the amount of substance taken ?
a) density b) mass
c) volume d) weight
2. Where will a freely suspended magnet be perfectly horizontal ?
a) at poles b) everywhere
c) at equator d) everywhere on the moon
3. Which of the following is used in a transistor ?
a) Uranium b) Nichrome
c) Germanium c) Carbon
4. A girl of mass 20 kg and a boy of mass 30 kg are sitting on a see-saw at a distance of 4m and 2m respectively, from the fulcrum. Where should a of mass 5 kg be placed on the see-saw to keep it in a perfectly balanced position?
a) 4m from the fulcrum on side of the boy
b) 2m from the fulcrum on side of the girl
c) 3m from the fulcrum on side of the boy
d) 3m from the fulcrum on side of the girl
5. In which of the cases total internal reflection cannot be obtained ?
a) a ray going from glass to air
b) a ray going from glass to water
c) a ray going from water to air
d) a ray going from water to glass
6. Some white crystals are placed in a test tube and the tube is strongly heated. The crystals disappear from the lower part and white powder is deposited near the top of the tube. What is this phenomenon called ?
a) Hygroscopic action b) Cappillarity
c) Sublimation d) Vapourisation
7. What device is used to measure temperature above 357 deg C ?
a) Thermometer with alcohol
b) Thermocouple c) Thermograph
d) Thermometer with mercury and alcohol
8. "The image formed in a pin-hole camera is inverted." Which fact given below explains the above statement ?
a) Light travels in a straight line
b) The velocity of light is very high
c) Light consists of transverse waves
d) Light waves can be polarised
9. What is the function of a nuclear power plant?
a) To transform nuclear energy directly into electricity

- b) To convert water into steam which in turn rotates the turbines
c) To use the kinetic energy of high speed nuclei to induce electric current
d) To transform chemical energy into electrical energy
10. If each centimeter on a meter scale is equally divided into 20 parts, what is the least count of that meter scale ?
a) 0.001m b) 0.0005m
c) 0.05m d) 0.0001m
11. If water, air and soil are arranged in the ascending order of the velocity of sound, which of the following is correct ?
a) soil, air, water b) soil, water, air
c) air, water, soil d) air, soil, water
12. A mean solar day comprises of how many seconds ?
a) 64,400 s b) 46,400 s
c) 86,400 s d) 36,000 s
13. Which is the correct ascending sequence according to the density of substances ?
a) water, gold, iron b) iron, gold, water
c) gold, iron, water d) water, iron, gold
14. Which is the correct statement regarding intermolecular space ?
a) It exists in all three states of matter
b) It exists only in gases and liquids
c) It exists only in gases
d) It exists in some solids as an exception
15. What is one A.U. equal to ?
a) 1 light year b) 6.023×10^{23} km
c) 1.44×10^{11} m d) 10^8 km
16. Which constituents of air chemically combine during thundering ?
a) O_2 , N_2 b) O_2 , H_2
c) O_2 , CO_2 d) O_2 , SO_2
17. Which of the compounds turns yellow when heated ?
a) Sodium oxide b) Alum
c) Magnesium sulphate d) Zinc oxide
18. Which of the following is table sugar ?
a) Glucose b) Sucrose
c) Fructose d) Maltose
19. Which chemicals are used in a fire extinguisher ?
a) Na_2CO_3 and HCl b) $NaHCO_3$ and HCl
c) $CaCO_3$ and H_2SO_4 d) $CaCO_3$ and HCl
20. Who is called as the father of chemistry ?

- a) J. Priestley b) Mendeleeff
c) Madam Curie d) Robert Boyle

21. On touching the inner part of the lid of a container, if your fingers turn yellow, which acid must be in the container ?

- a) Conc. HCl b) Conc. H_2SO_4
c) Conc. nitric acid d) phosphoric acid

22. What is the colour of the gas, when potassium chlorate is strongly heated ?

- a) Yellowish green b) White
c) Yellow d) Colorless

23. What is the effect of increase in temperature over the solubility of the solute?

- a) It decreases b) Remains constant
c) It increases d) either increases or decreases

24. What is the formula for the compound of Ca^{+2} and PO_4^{-3} ?

- a) $2\text{Ca}_3(\text{PO}_4)$ b) $3\text{C}_2(\text{PO}_4)$
c) $\text{Ca}_2(\text{PO}_4)_3$ d) $\text{Ca}_3(\text{PO}_4)_2$

25. What is the type of the following reaction ?



- a) reduction b) oxidation
c) decomposition d) combination

26. Which constituent of air varies in percentage maximally?

- a) CO_2 b) N_2 c) H_2O d) O_2

27. Which of the following substances catch fire easily at room temperature?

- a) red phosphorous b) yellow phosphorous
c) sulphur d) oxygen

28. Who discovered radioactivity?

- a) Becquerel b) Curie
c) Rontgen d) Mendeleeff

29. What is the proportion of hydrogen and oxygen in water by weight ?

- a) 1 : 2 b) 1 : 4 c) 1 : 16 d) 1 : 8

30. Which mixture's components can be separated by sublimation?

- a) camphor + iodine b) sand + camphor
c) ammonium chloride + camphor
d) sand + iron fillings

31. How many chromosomes are contained in the nucleus of the reproductive cells of a human being ?

- a) 32 b) 46 c) 23 d) 64

32. In which virus did Wendell Stanley achieve crystallisation?

- a) tobacco mosaic b) tobacco mould
c) yellow-vein mosaic d) polio

- a) I-NET
- b) ERNET
- c) INTERNET
- d) Novell Net

47. Which of the following is not a satellite used for astronomy ?

- a) IRAS
- b) HST
- c) COBE
- d) IRS-1B

48. Which satellite of jupiter is known to have plenty of water ?

- a) Io
- b) Europa
- c) Ganymede
- d) Callisto

49. Which of the following is not a computer language ?

- a) Fortran
- b) LISP
- c) BASIC
- d) Windows

50. Which of the following devices does not need a modem for communication ?

- a) telephone
- b) Computer
- c) Fax
- d) answering machine

Young Scientists - IX**Paper 9****Time : 65 min****Marks : 70****Date : 5/ 09 / 96**

1. What does tuning an instrument mean ?
 - a) Playing it with another instrument
 - b) Adding a hollow box to the instrument
 - c) Adding the tension and length of the wire for certain vibrations
 - d) Playing the instrument
2. An ingenious science student wants to create a separate north pole. What method should he use?
 - a) Rub only North pole of a magnet on a piece of steel for a long time.
 - b) Keep a very powerful south pole near the piece of steel for a long time and then withdraw it.
 - c) Pass electric current through a piece of wire wound around a piece of iron.
 - d) He just can't do it.
3. Which of the statements is incorrect about water at 4 deg C ?
 - a) Raise the temp. and the water spills out
 - b) Lower the temp. and the water spills out
 - c) It behaves anomalously
 - d) Lower the temp and water decreases in volume.
4. What type of motion is brownian motion?
 - a) translational b) circular
 - c) vibrational c) rotational
5. Which of the following phenomena takes place in the thermal expansion of a substance, along with increase of inter-molecular spaces?
 - a) adhesive forces between the molecules are reduced
 - b) adhesive forces are increased
 - c) cohesive forces are decreased
 - d) cohesive forces are increased
6. How much is a light year ?
 - a) 9.6×10^{12} km b) 6.9×10^{12} km
 - c) 9.6×10^{12} cm d) 6.9×10^{12} cm
7. Which is a cold source of light?
 - a) petromax b) neon signs
 - c) tube light d) Phosphorous flame
8. What is measured in the unit lux?
 - a) distance between an object and the source of light
 - b) speed of light c) illumination
 - d) washing capacity of soap
9. What type of mirror is fitted at the right hand side of a car driver?
 - a) convex b) concave

c) plane d) cylindrical

10. Which type of magnet attracts more iron fillings at its central parts than its tips?

a) bar magnet b) magnetic needle c) horse-shoe magnet d) none

11. What convention is used by opticians to denote the convexity of a lens?

a) - b) + c) 0 d) C

12. What type of lenses are fitted in a telescope ?

a) one concave, one convex
b) two concave c) two convex
d) one concave, two convex

13. What is the minimum no. of frames required to be moved to show a movie?

a) 2 b) 6 c) 10 d) 16

14. When do we observe high tides ?

a) In spring season
b) when earth is nearest to the moon
c) when earth is nearest to the sun
d) when earth, moon and sun are in a straight line

15. One square inch is roughly equal to how much square cm.

a) 6.25 sq.cm. b) 5.25 sq.cm.
c) 52.5 sq.cm. d) 3.37 sq.cm.

16. You are facing a bimetallic strip with metal A to your left, and metal B to your right. If both metals expand at the same rate, what will you notice if the strip is heated?

a) the strip bends to the left
b) the strip bends to the right
c) the strip does not bend at all
d) the strip contracts

17. Why is a pressure cooker essential for cooking food at a hill station?

a) air is cool b) water is hard
c) oxygen percentage is less
d) air is rarified

18. mass of an object on earth is 30 kg. What will be its mass on the moon?

a) 30 kg b) 5 kg
c) 6 kg d) 25 kg

19. If two objects each of mass 50 kg are kept at a distance of 5 m apart, what will be the magnitude of force of attraction acting between them?

($G = 6.6734 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$)

a) $6.6734 \times 10^{-11} \text{ N}$
b) $6.6734 \times 10^{-9} \text{ N}$
c) $1.66835 \times 10^{-9} \text{ N}$
d) $2.66936 \times 10^{-12} \text{ N}$

20. On which of the following does the time of oscillation of the pendulum depend?

a) thickness of the thread

- b) mass of the pendulum
c) volume of the pendulum
d) length of the thread
21. In which of the following gases the candle flame is red and sooty?
a) Nitrogen b) carbon dioxide
c) chlorine d) oxygen
22. Which of the following is an electrovalent compound?
a) MgO b) HCl
c) CH₄ d) H₂O
23. What is lime-water?
a) Ca(OH)₂ b) CaCO₃
c) CaO d) Mg(OH)₂
24. What is the proportion of the constituents of aqua-regia by volume?
a) 2 parts of conc. HNO₃ and 2 parts of conc. HCl
b) 2 parts of conc. HNO₃ and 1 part of HCl
c) 1 part of conc. HNO₃ and 2 parts of conc. HCl
d) 1 part of conc. HNO₃ and 3 parts of conc. HCl
25. What gas will be evolved when hot H₂SO₄ is added to zinc?
a) H₂ b) ZnSO₄
c) SO₂ d) SO₃
26. Which of the following gives an unpleasant smell of rotten eggs?
a) SO₂ b) H₂S c) Cl₂ d) CO
27. Who proposed the existence of neutral particles in an atom?
a) E. Rutherford b) Dr. Rutherford
c) Maharishi Kanad d) Chadwick
28. Which of the following substances when dissolved lower the temperature of water?
a) potassium nitrate
b) carbon dioxide
c) sugar d) copper sulphate
29. Which of the following mixture is called "thermite"?
a) ferric oxide + aluminium powder
b) ferric oxide +magnesium powder
c) magnesium + aluminium powder
d) magnesium + aluminium + iron
30. Which substance will you add to make acidic soil fertile?
a) lime b) chemical fertilizer
c) bio-fertilizer d) dung

31. Which gas is liberated when caustic soda reacts with sal-ammoniac?
a) carbon dioxide b) ammonia
c) hydrogen chloride
d) hydrogen sulphide
32. What is the molecular formula of Calamine?
a) Hg_2Cl_2 b) FeSO_4
c) ZnSO_4 d) KOH
33. What is the symbol for Stannum?
a) S b) Sn c) Zn d) Tn
34. Which element is used for making types for printing?
a) iron b) chromium
c) lead d) carbon
35. Which of the following is used for tinning cooking utensils?
a) ammonium sulphate
b) potassium chloride
c) potassium sulphate
d) ammonium chloride
36. Which is the purest form of calcium carbonate?
a) bituminous b) anthracite
c) calcite d) marble
37. On electrolysis of acidulated water 8 gm of oxygen was liberated. What was the amount of water electrolysed?
a) 10 gm b) 8 gm
c) 9 gm d) 16 gm
38. Water pipes of iron are coated with a layer of zinc to prevent corrosion. What is this process called?
a) vulcanisation b) galvanisation
c) alloy formation d) tinning
39. A substance turns red when soap is added to it, and turns pale yellow if lime juice is added to it. What is it?
a) litmus soln. b) phenolphthaline
c) turmeric d) methyl orange
40. What is the effect of Hydrogen on litmus paper?
a) nothing
b) color changes form red to blue
c) color changes form blue to red
d) color varies according to temp.
41. From which of the following vitamin B is prepared?
a) algae b) mushroom
c) penicillin d) yeast

42. Which of the following pairs of vitamin deficiency diseases is wrong?
 a) vitamin A- nightblindness
 b) vitamin C- scurvy
 c) vitamin D-pellagra
 d) vitamin E-sterility
43. What are the organs of locomotion in paramecium?
 a) flagella b) pseudopodia
 c) cilia d) tube feet
44. To which of the following factors of a chemical factory can the chloroplast be compared?
 a) fuel b) raw material
 c) process d) machinery
45. Which of the following is a complete parasite?
 a) Loranthus b) Cuscuta
 c) Viscum d) Orchid
46. Which of the following animals does not live in the Thar desert?
 a) leech b) reptiles
 c) insects d) rodents
47. By which process is the depleted no. of chromosomes restored?
 a) fertilisation b) maturation
 c) reduction division d) spermatogenesis
48. Which of the elements causes damage to the brain of young children?
 a) carbon b) lead
 c) cadmium d) iron
49. Which disease is caused by malfunction of pancreas?
 a) jaundice b) diabetes
 c) rickets d) anaemia
50. What happens when we take excess of vitamins in our body?
 a) fats increase in our body
 b) excess of energy is produced
 c) they are excreted out
 d) more blood is produced
51. The relation of amino acid to protein is similar to that of :
 a) brick and wall b) wall and roof
 c) brick and cement d) brick and plaster
52. In which type of cells meiosis takes place?
 a) somatic b) reproductive
 c) plant d) animal
53. Which of the following is not a viral disease?
 a) small pox b) chicken pox
 c) leprosy d) polio

54. What is not a social insect?
a) ant b) locust c) bug d) honey bee
55. Which plant shows leaf with parallel venation?
a) lentil b) shoe-flower
c) mango d) bamboo
56. Which is the correct sequence of the corpuscles in the descending order of their size?
a) RBC, WBC, platelets
b) WBC, RBC, platelets
c) platelets, RBC, WBC
d) RBC, platelets, WBC
57. Plants growing in which region develop breathing roots?
a) desert b) marshy c) sea d) arctic
58. Which is the most important function of Erythrocytes? (RBC)
a) digest food b) carry hormones
c) carry oxygen d) carry antibodies
59. Which is the most important contribution by Mendel?
a) cell division b) structure of DNA
c) principles of heredity d) hybridization
60. Where is the "Bison sanctuary "in Maharashtra?
a) Dajipur b) Karnataka
c) Tadoba d) Melghat
61. Who was the pioneer of rocket-sciences?
a) Robert Goddard
b) Robert Oppenheimer
c) Einstein d) Sikorsky
62. The first electronic computer was?
a) Abacus b) ENIAC
c) MARC-I d) Analytical Machine
63. Which of the following theories is the latest?
a) Newton's Electrodynamics
b) Maxwell's Electrodynamics
c) Einstein's Electrodynamics
d) Quantum Electrodynamics
64. The first company to manufacture a microprocessor was ?
a) IBM b) Compaq
c) Intel d) Dell
65. Following is not directly related to the origin of the universe ?
a) Big bang b) Inflation
c) Super strings d) Kepler's laws
66. Which of the following is not a device used to observe the tiny?
a) compound microscope

- b) electron microscope
- c) STM d) none of these

67. Which of the following particles has no rest mass?

- a) photon b) electron
- c) top quark d) beauty quark

68. Which of the following particles was discovered recently?

- a) top quark b) bottom quark
- c) strange quark d) charm quark

69. What is a super conductor?

- a) it conducts under any pressure
- b) it does not melt at high temperatures
- c) it conducts at very low temperatures
- d) it conducts better at normal temperatures

70. What is the Bose-Einstein condensate?

- a) a new state of matter
- b) a new element
- c) a new compound
- d) none of these

Young Scientists - IX**Paper 10****Time : 45 min****Marks : 50****Date : 6/ 09 / 96**

1. Which of the following equipment is not based on the magnetic effect of electric current ?
a) Door bell b) Loud speaker
c) Telephone d) Geyser
2. Which of the following is a vector ?
a) length of a footscale
b) temperature of a room
c) resistance of a wire
d) displacement of a vehicle
3. Which of the following needs medium for transmission?
a) alpha rays b) sound waves
c) light rays d) X-rays
4. Which of the following statements is true, if the speed-time graph is linear?
a) acceleration is uniform
b) speed remains constant
c) acceleration and time are proportional
d) displacement of an object is linear
5. What will be the speed of a stone, dropped from 100 m, when it reaches the ground?
a) 9.8 m/s b) 44.2 m/s
c) 19.6 m/s d) 98 m/s
6. In which forms do the light waves travel?
a) longitudinal waves b) transverse waves
c) longitudinal in rare medium and transverse in denser medium.
d) sometimes longitudinal and sometimes transverse
7. Which of the following materials has highest specific heat?
a) mercury b) glass
c) copper d) water
8. What would you use to correct far sightedness?
a) convex lens b) concave lens
c) convex lens near the eye then concave lens
d) concave lens near the eye , then convex lens
9. What is the mainin of 1 watt?
a) 1 joule/sec b) 1 ohm/sec
c) 1 volt/sec d) 1 coulomb/sec
10. -40 deg C is equivalent to which of the following at in Fahrenheit?
a) 40 deg F b) 80 deg F
c) -80 deg F d) -40 deg F
11. What length of mercury coloumn is balanced by atmospheric pressure at sea shore?

- a) 0.076m b) 7.6m
c) 76m d) 0.76m
12. Which of the following chemicals is used in dry cells?
a) copper b) sulphuric acid
c) lead oxide d) ammonium chloride
13. Which of the colours is bent most when light passes through a prism?
a) violet b) blue c) yellow d) red
14. Which of the following is true about acceleration due to gravity?
a) It is same all over
b) It is max. at the poles and min. at the equator
c) it is max. at the equator and min. at the poles
d) It varies seasonally
15. A man applies a force of 100 N on a stone for 2 sec. If the stone is not displaced at all, what is the work done by the man?
a) 200 J b) 50 J c) 0 J d) 0 watt
16. Which of the following is a polyoxide?
a) NO b) Na₂O₂
c) MnO₂ d) Fe₃O₄
17. What is the unit of measuring an atom?
a) micron b) millimeter
c) angstrom d) millimicron
18. Which of the following is amphoteric?
a) sodium b) copper
c) iron d) zinc
19. Who called Hydrogen gas as "inflammable air"?
a) Henry Cavendish b) Lavoisier
c) Karl Scheele d) Joseph Priestley
20. Who is the chemist, who is credited for the discovery of largest no. of man-made elements?
a) Seaborg b) Pauling
c) Rutherford d) Fermi
21. Which of the following electronic configurations indicates alkali metals?
a) 2,8,7 b) 2,8,8
c) 2,8,8,1 d) 2,8,8,2
22. Which of the following is true?
a) no. of metals is about four times that of non-metals
b) no. of metals and non-metals are the same
c) no. of non-metals is about four times that of metals
d) no. of metals is twice that of non-metals

23. In the notation $^{14}\text{N}_7$, what does figure 14 indicate?
- a) no. of electrons b) no. of protons
c) sum of electrons and protons
d) sum of protons and neutrons
24. Which is the approximate no. of molecules in 1 gram of water?
- a) 6.023×10^{24} b) 60.23×10^{22}
c) 6.023×10^{22} d) 3.346×10^{23}
25. Which of the following oxides is acidic?
- a) CO b) MgO c) HgO d) SO_2
26. Which salt makes water hard?
- a) ammonium chloride
b) sodium chloride
c) potassium chloride
d) calcium chloride
27. What are components of stainless steel?
- a) iron, chromium, nickel
b) iron, zinc, nickel
c) iron, silver, chromium
d) iron, aluminium, nickel
28. Plants prepare food from water and carbon dioxide and release oxygen in the process. From which compound is this oxygen released?
- a) from water b) from carbon dioxide
c) from both carbon dioxide and water
d) from water in intense sunlight and from carbon dioxide on other occasions
29. Which of the following chemicals is used in gun powder?
- a) ammonium nitrate
b) potassium nitrate
c) copper nitrate
d) silver nitrate
30. No. of carbon compounds is large, because...
- a) carbon combines with all other chemicals
b) carbon is abundant in nature
c) carbon forms bonds with itself and forms chains
d) carbon has a large no. of unpaired electrons
31. Why water is provided to the crop if it is treated with fertilisers ?
- a) this gives food yield
b) to prevent exo-osmosis
c) fertilisers get dissolved in water
d) crops get destroyed
32. Which of the following is not a cell organelle?
- a) nucleous b) vacoule

Young Scientists - IX**Paper 2****Time : 90 min Marks : 100 Date : 10/09/97**

Which materials can be used in a primary cell?

- 1) ebonite, glass, HCl 2) Al, Zn, HCl
 3) glass, Cu, NaCl soln. 4) Cu, Zn, sugar soln.

Internal and external surfaces of a calorimeter are polished. Why?

- 1) It looks attractive
 2) It prevents rusting by losing contact with air
 3) It prevents transfer of heat due to conduction
 4) It prevents transfer of heat due to radiation

In the following figure what is the measurement upto the point of the arrow, if the instrument is to measure in CGS units?

- 1) 40.6 cm 2) 46 cm 3) 52 cm 4) 50.2 cm

In _____ vibrations are set up in a diaphragm ?

- 1) Violin 2) Flute 3) Trumpet 4) Bell

Who is the author of "Philosophia Naturalis Principia Mathematica" ?

- 1) James Watt 2) Albert Einstein
 3) Isaac Newton 4) Humphrey Davy

Temperature of water at its maximum density is

- 1) 0°C 2) 4°C 3) 80°C 4) 100°C

Music is recorded in a tape recorder in form of _____ on a tape

- 1) electrical energy 2) magnetic field
 3) variable resistance 4) sound waves

It is easy to produce large volume of sound while singing in the bathroom. Why ?

- 1) Its speed increases due to water vapour in air
 2) Water vapour reflects and amplifies sound
 3) As we are alone we feel less inhibited to sing loudly
 4) Sound is confined to a small space with reflecting surfaces

_____ acid is used in the car battery ?

- 1) Dil. HCl 2) Dil. H₂SO₄
 3) Conc. HCl 4) Conc. H₂SO₄

An echo from the bed of the sea is received 0.5 s after an echo sounder pulse is transmitted. What is the depth of the sea ? (speed of sound in water is 1500 m/s)

- 1) 375 m 2) 750 m 3) 1500 m 4) 3000 m

What is the name of the belt of small heavenly bodies moving around the sun ?

- 1) asteroid 2) comet 3) meteor 4) galaxy

Focal length of a silver-polished plane mirror is

- 1) infinite
- 2) zero
- 3) equal to the height of the mirror
- 4) equal to half the height of the mirror

The temperatures of wires of equal length and diameter of Cu, glass, Fe and Zn are raised through equal range. Which wire will expand most ?

- 1) Fe
- 2) Zn
- 3) Cu
- 4) Glass

A drop of blue ink can mix with a large amount of water. What is this due to ?

- 1) Osmosis
- 2) Diffusion
- 3) Conduction
- 4) Dispersion

The minimum height of a plane mirror for seeing the complete image of a man in it should be _____ the height of the man

- 1) one-fourth
- 2) half
- 3) equal to
- 4) any height will do

Where will a freely suspended magnet be perfectly horizontal ?

- 1) at poles
- 2) at equator
- 3) everywhere
- 4) everywhere on the moon

Mass of an electron is

- 1) 9.1×10^{-31} gm
- 2) 1.67×10^{-24} gm
- 3) 1.67×10^{-24} kg
- 4) 9.1×10^{-31} kg

Which of the following is used to manufacture the filament of an electric bulb ?

- 1) Fe
- 2) Nichrome
- 3) C
- 4) Tungsten

Why the radiator of a petrol engine is always filled with water ?

- 1) Steam from this water gives energy to the engine
- 2) Circulation of this water cools the engine
- 3) Less petrol is consumed
- 4) Water lubricates the wheels of the car

Observe the following and mention which liquid is mercury ?

- 1)
- 2)
- 3)
- 4)

Mass of a cube is 0.24 kg and density of material is 3 gm/cu.cm. Then what is the length of each side?

- 1) 2m
- 2) 0.8m
- 3) 2cm
- 4) 8cm

What is one micron ?

- 1) 10^{-6} m
- 2) 10^{-3} m
- 3) 10^{-10} m
- 4) 10^{-4} m

The least count of the protractor that you use is

- 1) 0° 2) 1° 3) 10° 4) 180°

Water in a beaker was heated from 20°C to 60°C . Which of the following statements will be true in case of this water ?

- 1) Its volume and density, both increases
- 2) Its volume and density both decreases
- 3) Its volume increases, but density decreases
- 4) Its volume decreases but density increases

The velocity of sound in air increases, when

- 1) temperature increases
- 2) pressure reduces
- 3) pollution increases
- 4) temperature reduces

Which physical quantity does not vary irrespective of the amount of substance taken?

- 1) Density
- 2) Mass
- 3) Weight
- 4) Volume

Some white crystals are placed in a test tube and the tube is strongly heated. The crystals disappear from the lower part and white powder is deposited near the top of the tube. What is this phenomena called ?

- 1) Hygroscopic action
- 2) Capillarity
- 3) Sublimation
- 4) Vapourisation

Why do the space travellers in an artificial satellite get the feeling of weightlessness ?

- 1) It is acted upon by the buoyancy of the air
- 2) The earth's gravitational pull is zero
- 3) They are acted upon by equal attractions from the sun, the moon and the earth.
- 4) The pressure due to the air enclosed in the satellite vessel is equal to the atmospheric pressure

_____ is used to measure temperatures above 357°C .

- 1) Thermometer with alcohol
- 2) Thermocouple
- 3) Thermometer with mercury and alcohol
- 4) Thermograph

What does a pyrometer measure ?

- 1) high altitude
- 2) pressure
- 3) high temperature
- 4) radiant energy

Which of the following is used for dry cleaning ?

- 1) Kerosene
- 2) Water
- 3) Turpentine
- 4) Petrol

Which of the following is not a balanced equation ?

- 1) $\text{CaCO}_3 \Rightarrow \text{CaO} + \text{CO}_2$
- 2) $\text{Fe}_2\text{O}_3 + 3\text{CO} \Rightarrow 2\text{Fe} + 2\text{CO}_2$
- 3) $\text{Al}_2\text{O}_3 \Rightarrow 4\text{Al} + 3\text{O}_2$
- 4) $2\text{Pb}_3\text{O}_4 \Rightarrow 6\text{PbO} + 2\text{O}_2$

On treatment with Iodine soln. _____ turns blue ?

- 1) fats
- 2) protein
- 3) starch
- 4) mineral

Which element is present in substantial quantities in sea algae ?

- 1) Cl 2) Na 3) starch 4) mineral

Which material is used for making rayon ?

- 1) petroleum 2) coal
3) cellulose 4) phosphorous

What is the chemical formula for heavy water ?

- 1) H_2O_2 2) H_2O 3) T_2O 4) D_2O

Which is the odd-man out ?

- 1) petrol 2) water 3) phosphorous 4) gunpowder

Which gas is not collected over water ?

- 1) CO_2 2) O_2 3) N_2 4) CO

What is dil. acetic acid known as?

- 1) soda 2) vinegar
3) spirit of salts 4) sal of soda

Where is National Chemical Laboratory located ?

- 1) Bombay 2) Pune 3) Delhi 4) Calcutta

Which substance is used as coolant in refrigerators ?

- 1) non-volatile liquids 2) gases easy to liquefy
3) gases with boiling point below $180^{\circ}C$
4) solids with low melting point

What is taken to reduce the acidity in the stomach?

- 1) $Mg(OH)_2$ 2) $Ca(OH)_2$
3) NaOH 4) KOH

Which constituents of air chemically combine during thundering ?

- 1) O_2 , N_2 2) O_2 , H_2
3) O_2 , CO_2 4) O_2 , SO_2

What type of reaction occurs when H-gas is passed over heated Cu-oxide?

- 1) Evaporation 2) Oxidation
3) Distillation 4) Reduction

_____ turns yellow when heated ?

- 1) Na-oxide 2) Alum
3) Magnesium Sulphate 4) Zn-oxide

Which of the following pairs of gases combine to produce reddish brown vapours?

- 1) Nitric Oxide & O_2 2) NH_3 & O_2
3) Nitrous Oxide & O_2 4) Cl_2 & O_2

Which of the following atoms has M orbit ?

- 1) 2)

3)

4)

A piece of white cloth is dipped in turmeric soln. What color will it have when it is put in soap ?

- 1) blue 2) red 3) yellow 4) colorless

Ganesh, when touched the inner part of the lid of an acid bottle. found that his fingers turned yellow. What should be the acid ?

- 1) conc. HCl 2) conc. H_2SO_4
3) conc. HNO_3 4) phosphoric acid

Cool boiled water cannot be used in an aquarium. Why ?

- 1) It does not contain dissolved air
2) In this water H doesn't combine with O
3) It may contain traces of steam
4) It has no minerals in it

Which method will you adopt for the dilution of conc. H_2SO_4 ?

- 1) pour water into acid 2) pour acid into water
3) hold acid under water tap
4) mix ice with acid

_____ has no water of crystallisation.

- 1) alum 2) green vitriol
3) common salt 4) epsom salt

_____ is a good conductor of electricity.

- 1) Cl 2) P 3) S 4) C

_____ is in liquid form at room temperature.

- 1) F 2) Cl 3) Br 4) I

Color of gas produced when potassium chlorate is strongly heated is _____.

- 1) yellowish green 2) violet
3) white 4) colorless

When the temperature of a solute is increased, its solubility ...

- 1) decreases 2) increases
3) is constant 4) either increases or decreases

What is the formula of a compound made of Ca^{+2} & PO_4^{-3} ?

- 1) $2Ca_3(PO_4)$ 2) $3Ca_2(PO_4)$
3) $Ca_2(PO_4)_3$ 4) $Ca_3(PO_4)_2$

What is the type of the following reaction ?



- 1) reduction 2) oxidation
3) decomposition 4) combination

_____ is an electrovalent compound ?

- 1) MgO 2) HCl 3) CH₄ 4) H₂O

Table sugar is _____.

- 1) Glucose 2) Sucrose 3) Fructose 4) Maltose

_____ is applied at the site of a sting by a honey bee

- 1) lime water 2) iodine 3) burnol 4) dettol

Where is Entamoeba histolytica found normally in a human host ?

- 1) small intestine 2) small and large intestine
3) muscles 4) gaps between teeth

What is the shape of the red blood corpuscles ?

- 1) irregular and continuously changing
2) disc like 3) round 4) ovoid

Who made significant contribution to understanding the language of honey bees ?

- 1) Charles Darwin 2) William Harvey
3) Karl von Frisch 4) Carolus Linnaeus

Photosynthesis in plants is conversion of _____ molecules into _____ molecules.

- 1) simple inorganic, complex organic
2) simple organic, complex inorganic
3) complex inorganic, simple inorganic
4) complex organic, simple organic

Which acid induces tallness, unusual growth and sometimes beneficial growth in plants ?

- 1) sulphuric 2) citric 3) lactic 4) gibberellic

_____ is evolved when denitrifying bacteria decompose compost and manure ?

- 1) N₂ 2) NH₃ 3) Cl₂ 4) O₂

What part of an egg supplies food to the embryo?

- 1) cytoplasm 2) deutoplasm
3) ectoplasm 4) germoplasm

Substances produced in some human glands and released directly into the blood stream are called

- 1) cells 2) enzymes 3) RBC 4) hormones

_____ has the biggest leaf from the following.

- 1) Lotus 2) Water lily 3) Coconut 4) Pea

Which of the following animals is stationary ?

- 1) Amoeba 2) Earthworm 3) Lobster 4) Sponge

The color of blood plasma collected in a beaker is

- 1) pale yellow 2) red 3) white 4) no color

How many chromosomes are contained in the nucleus of reproductive cells of Man ?

- 1) 32 2) 46 3) 23 4) 64

Match the picture from column A with statement from column B.

- | A | B |
|------|----------------------------|
| I) | a) Production of vitamin B |
| II) | b) Decaying fruits |
| III) | c) Bread Mould |
| IV) | d) An important antibiotic |

- 1) I-a, II-b, III-c, IV-d 2) I-c, II-a, III-d, IV-b
 3) I-c, II-d, III-a, IV-b 4) I-c, II-a, III-b, IV-d

In the diagram of Amoeba, what structure is X ?

- 1) Food vacuole
 2) Nucleus
 3) Contractile vacuole
 4) Granular endoplasm

Which component is mainly required to build new tissues for growth of a human body ?

- 1) fat 2) protein 3) carbohydrate 4) water

Which process is related to the mitochondrion ?

- 1) Enzyme production 2) Cellular reproduction
 3) Cellular respiration 4) Calcium formation

Wendell Stanley achieved crystallisation of

- 1) tobacco mosaic virus 2) tobacco mould virus
 3) yellow vein mosaic 4) polio causing virus

Germination testing was carried on cotton and germination percentages obtained in 4 samples are as : A - 50%, B - 56%, C - 58%, D - 48%

Out of these which are unsuitable?

- 1) All are suitable 2) A & B are unsuitable
 3) B & C are unsuitable 4) All are unsuitable

What is the correct sequence of the figures ?

- A) B) C) D)

- 1) D-C-A-B 2) B-C-A-D
3) A-C-B-D 4) D-B-A-C

Which food component can be absorbed in the alimentary canal without undergoing digestion ?

- 1) proteins 2) lipids 3) cane sugar 4) vitamins

The two end products of aerobic respiration are

- 1) H₂O & O 2) CO₂ & lactic acid
3) CO₂ & alcohol 4) H₂O & CO₂

What is the nature of human blood ?

- 1) acidic 2) alkaline
3) neutral 4) acidic or alkaline

_____ is not a function of the root ?

- 1) manufacturing carbohydrates
2) acting as food storage
3) absorbing water 4) absorbing mineral salts

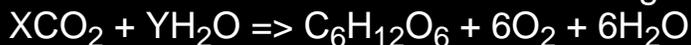
Absence of which organelle in its cells compels *Cuscuta* to be a parasite ?

- 1) chloroplast 2) chromoplast
3) endoplast 4) leucoplast

Which of the following is a cryptogram ?

- 1) Thuja 2) Tuberose 3) Riccia 4) Ipomoea

The value of X & Y in the following reaction is :



- 1) X=6; Y=6 2) X=12; Y=6
3) X=6; Y=12 4) X=12; Y=12

What is Hill Reaction ?

- 1) Photosynthesis
2) Phosphoglyceric acid production in leaves
3) Diffusion of CO₂ in plant cell
4) Photolysis of water

Which factor isn't essential for clotting of blood?

- 1) Mg 2) platelets 3) Ca 4) fibrinogen

Which blood vessel supplies blood to the heart ?

- 1) Aorta 2) Coronary artery 3) Pulmonary Artery
4) Inferior & Superior vena cava

LPG consists of

- 1) Biogas 2) O₂ 3) CH₄ 4) C₂H₆

Which of the following helps trace the position & speed of aeroplanes flying far off in

the sky ?

- 1) missile
- 2) radar
- 3) radio telescope
- 4) metal detectors

_____ uses deisel as fuel.

- 1) scooter
- 2) auto-rickshaw
- 3) aeroplane
- 4) trucks & buses

Where was the recent test (June 1994) of missile "Pruthvi" conducted ?

- 1) Arabian sea
- 2) Bay of Bengal
- 3) Indian Ocean
- 4) Deserts of Rajasthan

Nowadays lamps giving yellow light are used for street lighting. What are they known as?

- 1) Mercury lamps
- 2) Tungsten lamps
- 3) Sodium vapor lamps
- 4) Ultra violet lamps

_____ is the major component of bronze.

- 1) Fe
- 2) Ag
- 3) Hg
- 4) Cu

Proportion of which group will be highest in the population of a big city ?

- 1) children age < 5 yrs.
- 2) youth - 10 to 20 yrs.
- 3) adults - 20 to 50 yrs.
- 4) old people >70 yrs.

_____ is a contageous disease ?

- 1) cancer
- 2) malaria
- 3) cholera
- 4) scabies

Satellites can be used in identifying mineral resources, water resources situated deep underground. Name the technique used for getting required data for this purpose ?

- 1) Remote sensing
- 2) Radiology
- 3) Distribution system
- 4) Telecommunication

The epicentre of an earthquake is the

- 1) important city in the area in which the tremors are felt
- 2) worst affected town or village
- 3) place where the seismograph is situated
- 4) point underground, where the rocks actually moved and cause the quake.

Which statement is true in the case of a jet aircraft?

- 1) Can travel in empty space.
- 2) Can travel only through thin atmosphere.
- 3) Can travel only through thin atmosphere and empty space
- 4) Can travel in thin atmosphere and empty space.

Which of the following is not a fundamental physical quantity ?

- 1) Length
- 2) Pressure
- 3) Time
- 4) Mass

Which is the correct descending sequence of measuring instruments according to their least counts ?

- 1) meter scale, vernier callipers, screw gauge
- 2) screw gauge, vernier callipers, meter scale
- 3) vernier callipers, screw gauge, meter scale
- 4) screw gauge, meter scale, vernier callipers

Which of the following is not a physical quantity ?

- 1) Pressure
- 2) Density
- 3) Mass
- 4) Area

A mean solar day comprises of _____ seconds.

- 1) 64,400
- 2) 46,400
- 3) 86,400
- 4) 36,000

What type of motion is Brownian motion?

- 1) translational
- 2) rotational
- 3) vibrational
- 4) circular

Two mirrors are kept inclined making angles of 30 degrees with each other. A ball is kept between the mirrors. How many images of the ball will you see ?

- 1) 16
- 2) 15
- 3) 12
- 4) 11

The fig. depicts a periscope. Where will the image of an object appear ?

- 1) O
- 2) A
- 3) B
- 4) C

Which is the correct ascending sequence according to the density of the substance?

- 1) H₂O, Au, Fe
- 2) Fe, Au, H₂O
- 3) Au, Fe, H₂O
- 4) H₂O, Fe, Au

Which of the following is an incorrect equation for density ?

- 1) $1/D = V/M$
- 2) $D \cdot V = M$
- 3) $D/1 = M/V$
- 4) $D = V/M$

Which statement is correct regarding the existence of intermolecular space ?

- 1) It exists in all three states of matter
- 2) It exists in only gases and liquids
- 3) It exists in only gases
- 4) It exists in some solids as an exception

What was the experimental arrangement underlying Robert Brown's theory of Brownian motion ?

- 1) Drops of H_2O
- 2) Dust particles in air
- 3) Pollen grains in H_2O
- 4) molecules of H_2

The masses of metallic spheres A & B are 3 kg and 5 kg respectively. They are released from the top of a tower, 490 m in height. When will they reach ground ?

- 1) A reaches five times earlier than B
- 2) A & B reach simultaneously
- 3) A reaches five times later than B
- 4) B reaches earlier than A

What is one Astronomical unit equal to ?

- 1) 1 L. yr.
- 2) 6.023×10^{23} km
- 3) 1.44×10^{11} m
- 4) 10^8 km

What does tuning a string instrument mean ?

- 1) Playing it with another instrument
- 2) Adding a hollow box to the instrument
- 3) Adjusting the tension and wire-length of the instrument for certain vibrations
- 4) Playing a string instrument

How does temperature of medium affect Brownian motion ?

- 1) It increases with rise in temperature
- 2) It decreases with rise in temperature
- 3) It remains constant whether the temperature rises or falls
- 4) Normally increases with rise in temperature, but in exceptional cases it will decrease.

Which statement is incorrect regarding a beaker full of water at 4 deg C?

- 1) raise the temperature and the water spills out
- 2) lower the temperature and the water spills out
- 3) water at 40 deg C shows anomalous behaviour
- 4) lower the temperature and water decreases in volume

In what range of temperature can mercury be used as a thermometric substance ?

- 1) -39°C to 357°C
- 2) -117°C to 273°C
- 3) -39°C to 273°C
- 4) -117°C to 36.9°C

What will be the maximum no. of electrons in the nth orbit of an atom?

- 1) n
- 2) 2n
- 3) n/2
- 4) $2n^2$

In which of the following cases total internal reflection can never be achieved?

- 1) a ray going from glass to air
- 2) a ray going from glass to water
- 3) a ray going from water to air
- 4) a ray going from water to glass

The freezing point of water on a certain thermometer is marked as 20 and the boiling point at sea level is marked as 150. What will be the reading on that thermometer when the temperature is 60 deg. C ?

- 1) 45 2) 65 3) 85 4) 110

Which of the following substance is used in the manufacture of a transistor ?

- 1) U 2) Ge 3) Ni-Cr 4) C

_____ are used in a fire extinguisher.

- 1) Na_2CO_3 & HCl 2) NaHCO_3 & HCl
3) CaCO_3 & H_2SO_4 4) CaCO_3 & HCl

_____ is a neutral oxide.

- 1) CO 2) MgO 3) CaO 4) CO_2

Who is called as the "Father of Chemistry"?

- 1) Joseph Priestley 2) Mendeleeff
3) Madam Curie 4) Robert Boyle

A element with atomic number 14 needs how many electrons more so as to make the outermost orbit of its atom saturated?

- 1) 2 2) 4 3) 6 4) 8

What is lime water ?

- 1) $\text{Ca}(\text{OH})_2$ 2) CaCO_3 3) CaO 4) $\text{Mg}(\text{OH})_2$

The proportion by volume of constituents of aqua regia is...

- 1) 2 parts of conc. HNO_3 & 2 parts of conc. HCl
2) 3 parts of conc. HNO_3 & 1 parts of conc. HCl
1) 1 parts of conc. HCl & 2 parts of conc. HNO_3
1) 3 parts of conc. HCl & 1 parts of conc. HNO_3

Hot H_2SO_4 when added to Zn gives

- 1) H_2 2) ZnSO_4 3) SO_2 4) SO_3

In a sample of 10000 molecules of air the molecules of CO_2 would be

- 1) 4 2) 40 3) 30 4) 300

Which constituent of air varies in percentage maximally?

- 1) CO_2 2) N_2 3) H_2O 4) O_2

___ catches fire in air, easily at room temperature

- 1) (red) P 2) (yellow) P 3) S 4) O

Who discovered radioactivity?

- 1) Becquerel 2) Curie
3) Roentgen 4) Mendeleeff

Proportion of H & O in water by weight is

- 1) 1 : 2 2) 1 : 4 3) 1 : 16 4) 1 : 8

Which of these metals is amphoteric ?

- 1) Na 2) Cu 3) Fe 4) Zn

Who predicted the existence of neutral particles in atoms?

- 1) E. Rutherford 2) Dr. Rutherford
3) Maharshi Kanad 4) Chadwick

_____ when dissolved lowers the temperature of H_2O .

- 1) sugar 2) K-nitrate 3) CO_2 4) Cu-sulphate

Thermite is _____

- 1) $Fe_2O_3 + Al$ powder 2) $Fe_2O_3 + Mg$ powder
3) $Mg + Al$ powder 4) $Mg + Al + Fe$

Components of _____ can be separated by sublimation?

- 1) Camphor + I 2) $NH_4Cl + Camphor$
3) Sand + Fe filings 4) Sand + Camphor

_____ cannot yield Oxygen by mere heating.

- 1) $KClO_3$ 2) H_2O 3) $KMnO_4$ 4) Pb_3O_4

Which of the following isn't a property of H ?

- 1) reducing agent 2) combustion
3) supports combustion 4) on burning gives H_2O

The main constituent of natural gas is

- 1) methane 2) butane 3) hydrogen 4) propane

Which is not a liquid fuel ?

- 1) petrol 2) deisel 3) kerosene 4) coke

Which gas smells like rotten eggs?

- 1) SO_2 2) H_2S 3) Cl_2 4) CO_2

Which of the following is a polyoxide ?

- 1) NO 2) Na_2O_2 3) MnO_2 4) Fe_3O_4

What is added to make acidic soil fertile ?

- 1) lime 2) dung
3) chemical fertilizer 4) bio-fertilizer

Sal ammonia reacts with caustic soda to give

- 1) CO_2 2) NH_3 3) HCl 4) H_2S

Unit used to measure dimensions of atoms is

- 1) micron 2) mm 3) angstrom 4) millimicron

If mass of a proton is 1, mass of an electron is

- 1) 1/1836 2) 1/1386 3) 1 4) 1.836

Electrical charge on an electron is

- 1) 0 2) -1 3) +1 4) -1 or +1

Which component may be ignored when considering the atomic mass approximately?

- 1) neutron 2) proton 3) electron 4) positron

_____ is not an alloy.

- 1) brass 2) bronze 3) steel 4) zinc

As monsoon begins a number of winged ants crawl near lamps. Why?

- 1) they have no place to live in the rain
2) they are attracted to the light of the lamp
3) their mating takes place in air
4) they have wings in rainy season

Individuals of which blood group are known as universal recipients ?

- 1) A 2) B 3) AB 4) O

What is the main constituent of bone ?

- 1) Ca-chloride 2) Ca-sulphate
3) Ca-carbonate 4) Ca-phosphate

What contains C, H, O & N ?

- 1) cellulose 2) starch 3) protein 4) fat

Which of the following food substances has little or no proteins ?

- 1) eggs 2) oranges 3) fish 4) milk

Of which crop is IR-8 and improved variety ?

- 1) wheat 2) maize 3) jowar 4) paddy

Whose milk is claimed as easier for digestion?

- 1) cow 2) goat 3) camel 4) buffalo

From which of the following is vitamin B prepared?

- 1) Algae 2) Mushroom
3) Penicillium 4) Yeast

Which acid is produced by souring of milk?

- 1) Oxalic 2) Tataric 3) Lactic 4) Acetic

What is Cancer ?

- 1) cells divide mitotically
2) abnormal, unlimited & uncontrolled cell growth
3) extra fat gets deposited in cell
4) develops high fever

The main constituent of chlorophyll is

- 1) Mg 2) Cu 3) Fe 4) Co

Which vitamin is related to blood-clotting?

- 1) A 2) B 3) C 4) K

The basic raw materials for photosynthesis are

- 1) $\text{CO}_2 + \text{H}_2\text{O}$ 2) $\text{CO}_2 + \text{O}_2$
3) $\text{PGA} + \text{CO}_2$ 4) $\text{ATP} + \text{CO}_2$

Which organ is not used for excretion ?

- 1) kidneys 2) lungs 3) skin 4) spleen

I am small & coiled. I walk very slowly. My body is soft. I carry my house wherever I go.

Who am I ?

- 1) tortoise 2) snail 3) crab 4) lobster

What is digestion ?

- 1) absorption of food 2) assimilation of food
3) converting food to constituents of protoplasm
4) converting complex, insoluble food into simple & soluble form

Which of the following is not true about respiration?

- 1) it requires chlorophyll
2) it takes place day & night in animals
3) it takes place day & night in plants
4) it does not require chlorophyll

What are the organs of locomotion in paramacium ?

- 1) flagella 2) cilia 3) pseudopodia 4) tube feet

What is the process by which the food taken by the cell becomes protoplasm ?

- 1) assimilation 2) absorption
3) digestion 4) ingestion

A chloroplast can be compared to which factors in a chemical factory ?

- 1) fuel 2) raw material
3) process 4) machinery

Which of the following is a complete parasite?

- 1) Loranthus 2) Cuscuta
3) Viscum 4) Orchid

Who cannot survive in the Thar desert?

- 1) Leech 2) Reptiles 3) Insects 4) Rodents

How many pairs of chromosomes are present in the somatic cells of the human body?

- 1) 48 2) 46 3) 24 4) 23

Which of the following pairs, indicating vitamin deficiency disease, is wrong?

- 1) A - night blindness 2) C - scurvy
3) D - pellagra 4) E - sterility

Malfunction of pancreas causes

- 1) jaundice 2) diabetes 3) rickets 4) anaemia

What happens if we take excess of vitamins?

- 1) fats increase in body
2) excess of energy is produced

- 3) they are excreted out of our body
- 4) more blood is produced

The relation of amino acids and protein is similar to that of ...

- 1) brick & wall 2) brick & cement
- 3) wall & roof 4) brick & plaster

By which of the following processes the deployed no. of chromosomes is restored?

- 1) fertilization 2) maturation
- 3) reduction division 4) spermatogenesis

Which juice contains the enzyme trypsin?

- 1) saliva 2) gastric 3) pancreatic 4) intestinal

Which of the following elements cause damage to the brain of young children?

- 1) C 2) Pb 3) Cd 4) Fe

The mechanism which allows bats to see in the dark is used in which device ?

- 1) Radar & Sonar 2) Radar & Laser
- 3) Laser & Maser 4) Maser & Sonar

What is a "singularity" in physics?

- 1) a method of doing maths
- 2) deeper study of a single subject
- 3) a mass without existance
- 4) a mass with point existance

What basically, is a Pulsar?

- 1) black hole 2) neutron star
- 3) Quasar 4) pulsating radio star

Einstein recieved the Nobel prize for

- 1) theory of relativity 2) idea of "quanta"
- 3) photoelectric effect 4) he never got one

RDX (Research & Development Explosive) is called as plastic explosive, because

- 1) it is made from plastic
- 2) it has to be carried in plastic bags only
- 3) it can be moulded into any shape
- 4) none of these

If all vegetation on the planet suddenly vanishes, which factor of the ecosystem will be most affected?

- 1) atmosphere 2) producers
- 3) decomposers 4) abiotic components

Which famous scientists is associated with the use of X-rays in genetic mutation?

- 1) T.H.Morgan 2) H.J.Mueller
- 3) Frederick Mekel 4) D. E. Moore

For which research did H. Govind Khurana get the Nobel Prize ?

- 1) plant breeding
- 2) chemistry of nerve transmission

- 3) genetic code
- 4) mechanism of origin of life

Which of the following is not a pollutant?

- 1) Hydro-electric power plant
- 2) Nuclear power plant
- 3) Automobiles
- 4) Thermal power plant

Which is the process most essential for life on earth?

- 1) photosynthesis
- 2) reproduction
- 3) respiration
- 4) communication

On the main scale of a Vernier Calipers, each cm length is divided into 10 divisions. If the Vernier has to have a least count of 0.005cm, the Vernier scale should have

- 1) 10 div. 2) 20 div. 3) 50 div. 4) 25 div.

When an apple from a tree falls down freely, it acquires an acceleration of 9.8 m/s^2 . During the fall of the apple, the earth

- 1) too acquires an acceleration of a very small magnitude
 2) too acquires an acceleration of 9.8 m/s^2
 3) acquires no acceleration
 4) none of the above

An ice-cube containing a large bubble of air is floating in water, contained in a large beaker. When the ice melts completely, the level of water will

- 1) remain unchanged 2) go down
 3) rise 4) first rise and then go down

Two identical bodies move on two concentric circular paths the speed and the radius of the path of the outer one being double to those of the inner one. The force experienced by them will be

- 1) zero for both 2) same but not zero
 3) greater for outer body 4) greater for inner body

The surface of water in a lake is just going to freeze. What is the temperature of water at the bottom?

- 1) 0°C 2) $< 4^\circ \text{C}$ 3) $> 4^\circ \text{C}$ 4) 4°C

A double convex air bubble in water, will act like a

- 1) convex lens 2) concave lens
 3) plain slab 4) concave mirror

Ethyl alcohol is completely miscible with water. It can be separated from a mixture of the two, by

- 1) separating funnel 2) evaporation
 3) fractional distillation 4) allowing the water to evaporate

In a chemical equation $2\text{Mg} + \text{O}_2 \Rightarrow 2\text{MgO}$

O_2 represents two

- 1) atoms of oxygen joined together in a molecule
 2) molecules of oxygen
 3) grams of oxygen 4) moles of oxygen

If equal weights of hydrogen and oxygen are placed in separate containers of equal volume, at the same temperature,

- 1) both containers have the same no. of molecules
 2) oxygen container has a larger no. of molecules
 3) the pressure in the oxygen container is less than the pressure in the hydrogen container
 4) the pressure in the hydrogen container is less than the pressure in the oxygen container

The atomic no. of the element signifies the no. of

- 1) electrons in an atom of it 2) protons in an atom of it
 3) electrons and protons in an atom of it

4) protons and neutrons in an atom of it

An ionic compound is made up of

- 1) neutral atoms
- 2) neutral molecules
- 3) electrically charged molecules
- 4) electrically charged atoms or group of atoms

The process of protecting iron by coating with zinc is called

- 1) smelting
- 2) galvanizing
- 3) rusting
- 4) corrosion

The centers of protein synthesis in the cell are the

- 1) vacuoles
- 2) ribosome
- 3) mitochondria
- 4) golgi bodies

The controlling center of all cell activities is the

- 1) nucleus
- 2) nucleolus
- 3) mitochondria
- 4) cytoplasm

Layering is an example of

- 1) phototropism
- 2) osmosis
- 3) grafting
- 4) vegetative propagation

Yeast is used for the production of

- 1) ethyl alcohol
- 2) acetic acid
- 3) cheese
- 4) curd

The basic difference between the gymnosperms and angiosperms is in

- 1) the means of fertilization
- 2) the types of tissues present
- 3) the method of growth
- 4) the way in which seeds are born

Which of the following statements is correct?

- 1) Heat is produced during respiration
- 2) Carbon dioxide is given out during photosynthesis
- 3) Oxygen is essential for respiration
- 4) Suitable temperature conditions are essential for photosynthesis

The instant energy sources in living things are

- 1) fats
- 2) vitamins
- 3) proteins
- 4) carbohydrates

The producers in an ecosystem are

- 1) heterotrophs
- 2) autotrophs
- 3) parasites
- 4) saprophytes

A body under uniformly accelerated motion covers 20 m and 60 m in first two consecutive seconds of time from the beginning. The body starts with an initial velocity

- 1) 0 m/s
- 2) 5 m/s
- 3) 10 m/s
- 4) 15 m/s

For molecules in a solid which statement is not true?

- 1) They vibrate about the mean position
- 2) They sometimes rotate
- 3) They have no mass
- 4) They vibrate with larger amplitude at higher temperature

Sonar is a device for

- 1) location and ranging of aircraft
- 2) location and ranging of submarines
- 3) producing a musical note of high frequency
- 4) measuring the frequency of a musical note

In the SI system, the unit of pressure is

- 1) atmosphere
- 2) dyne/cm²
- 3) pascal
- 4) mm of mercury

A body is floating in a liquid, contained in a beaker. The whole system falls freely under gravity. The upward force acting on the body due to the liquid is

- 1) zero
- 2) equal to the weight of the body in air
- 3) equal to weight of liquid displaced by the whole body
- 4) equal to weight of the immersed portion of the body

A body acquires a positive charge of 1 Coulomb. It means,

- 1) 1 electron has been removed from the body
- 2) 1 additional electron has been acquired by the body
- 3) 6.25×10^{18} electrons have been removed from the body
- 4) 6.25×10^{18} additional electrons have been acquired by it.

Magnetic lines of force due to a straight current are

- 1) straight
- 2) elliptical
- 3) concentric
- 4) parabolic

Particles which can be added to the nucleus without changing chemical properties are called

- 1) electrons
- 2) protons
- 3) neutrons
- 4) alpha particles

When a mixture of sand, common salt, glass powder and iodine is heated, the sublimate is

- 1) iodine
- 2) glass powder
- 3) common salt
- 4) sand

The maximum no. of electrons that can occupy the s sub-level is

- 1) 2
- 2) 6
- 3) 10
- 4) 14

Which of the following is likely to have the highest melting point?

- 1) Iodoform CHI_3
- 2) NaCl
- 3) SiCl_4
- 4) HCl

Bleaching powder is

- 1) a mixture of calcium hypochlorite and calcium chloride
- 2) calcium hypochlorite
- 3) calcium chloride hypochlorite
- 4) a mixture of calcium hypochlorite, calcium chloride and slaked lime

An element which does not react with Oxygen is

- 1) Chlorine
- 2) Helium
- 3) Iodine
- 4) Nitrogen

Where would you look for active cell division in a plant?

- 1) in pith cells
- 2) in the cortical cells
- 3) in the inter-nodal region
- 4) at the tips of stems & roots

Who among the following scientists is associated with the discoveries in genetic engineering?

- 1) Khurana
- 2) Watson
- 3) Darwin
- 4) Morgan

Petals would most likely be missing in flowers that are pollinated by

- 1) bees
- 2) wind
- 3) moths
- 4) birds

A virus reproduces by

- 1) binary fission
- 2) mitosis
- 3) inducing the host cell to form viruses
- 4) reproducing asexually under favorable conditions

A root grows into downward into the soil

- 1) in order to find water
- 2) because it needs mineral salts
- 3) because root tissues respond to auxins
- 4) to get away from light

Ecology is the study of

- 1) the physical structure of organisms
- 2) the inter-relationships of organisms and their surroundings

3) the inheritance of characteristics among organisms

4) the naming and classification of organisms

Which of the following is an infectious disease?

1) leucoderma 2) diabetes mellitus

3) beriberi 4) dysentery

Where is the largest optical telescope in India ?

1) Ooty 2) Leh 3) Udaipur 4) Kavalur

Leh has the extremities of temperature, i.e. hottest summer days (50° C) and coolest winter nights (-20° C) due to...

1) altitude 2) slant of the sun's rays

3) thickness of atmosphere 4) thinness of atmosphere

The most recent satellite sent by India is,

1) Aryabhata 2) IRAS 3) INSAT 2D 4) INSAT 2E

What is most important about the landing module of the Pathfinder mission to Mars ?

1) It landed in Ares Vallis 2) It had a compact three petal structure 3) It could carry Sojourner

4) It used balloons for cushioning its landing

'Dolly' was born from the

1) DNA taken from its father

2) sperms taken from its father

3) Cells taken from its mother

4) DNA taken from its mother

A dead body has been recovered from water. Can we know whether death occurred before drowning ?

1) No, death leaves no traces.

2) Yes, because the heart would contain water.

3) No, because the heart will contain nothing.

4) Yes, because the lungs will not contain water.

The temperature of the sun cannot be found by

1) thermometer 2) barometer

3) photometer 4) spectrometer

The dimmest type of star from the following is

1) black dwarf 2) pulsar

3) white dwarf 4) brown dwarf

The hottest part of the Sun's atmosphere is

1) core 2) photosphere

3) chromosphere 4) corona

A device used for photographing dim objects is

1) Charge-coupled device 2) Telescope

3) Bolometer 4) Zoom Lens

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Young Scientists Practical Questions

Friday, January 14, 2000

Physics

To find the displacement of ray light through glass slab

Place the glass slab on a piece of drawing paper and mark its boundaries
Put pins P1 & P2 on one side of the slab making an angle with the normal
Observe the pins from the opposite side and place pins P3 & P4 such that all four pins are collinear
Trace the path of the ray through the slab. Measure the displacement. Comment on it.

To find the displacement of ray of light through glass prism

Place the prism on a sheet of drawing paper and mark its boundaries
Put pins P1 & P2 on one side of the prism, making an angle with the normal to that side
Observe the pins from the other edge of the prism in the direction of the ray of incidence
Place pins P3 & P4 in such a way that the images of P1 & P2 and the pins P3 & P4 coincide
Trace the path of the ray through the prism. Measure the displacement. Comment on it.

To find the RI of given material

You are given a sheet of drawing paper showing a ray of light passing through a slab of some material
The angles of incidence (i) and refraction (r) are marked. Measure them.
Find the refractive index of the material using the relationship $\mu = \sin(i) / \sin(r)$, where, $\sin(\text{angle}) = (\text{length of opposite side}) / (\text{length of hypotenuse})$
What property of the material does refractive index indicate?

To find the RI of given material

You are given a sheet of drawing paper showing a ray of light passing through a prism of some material

The angles of incidence (i) and emergence (e) are marked. Measure them.

Find the refractive index of the material using the relationship $\mu = \frac{\sin(A/2 + \delta_m/2)}{\sin(A/2)}$,

where, A is the angle of the prism between the two edges, and δ_m is the angular displacement of the ray. (You can obtain the Sine values from a log table, provided)

What property of the material does refractive index indicate?

Laws of reflection at plane surface

You are given a plane mirror and the required apparatus.

State and prove the laws of reflection of light at a plane surface

Do the laws remain same for a curved surface? How?

Multiple reflections from two plane mirrors

Place the given mirrors vertically of the paper, making an angle θ between them.

Place a pin on the angle bisector of the angle θ .

Observe the total number (n) of images of this pin visible in the mirrors.

Repeat the above for two more values of θ .

State the relationship between the n and θ

Laws of reflection at curved surface

You are given a concave mirror and the required apparatus.

State and prove the laws of reflection of light at the surface

Is there any relationship with the laws of reflection for a plane surface

Focal length of a concave mirror

You are given a concave mirror. Determine its focal length.

What do you mean by focal length?

Can we use the same technique to find the focal length of a convex mirror? Why?

Focal length of a convex lens

You are given a convex lens. Determine its focal length.

Can you use the same method to find the focal length of a concave lens? Why?

Did you place the object at a specific distance? Why?