Biology Section - I

Straight Objective Type

Biology contains 90 multiple choice questions numbered 1 to 90. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

1. What will happen if bile duct is choked?
   (A) Faeces become dry
   (B) Acid will not be produced
   (C) There will be a little digestion in the large intestine
   (D) Little absorption of fat occur

2. Which among the following chemicals is used for causing defoliation of forest trees?
   (A) 2, 4-Dichlorophenoxy acetic acid
   (B) Super Phosphate
   (C) KOH
   (D) Urea

3. Angiosperms are commonly called as
   (A) Flowering Plants
   (B) Non-flowering plants
   (C) Amphibians of plant kingdom
   (D) None of these

4. Binomial nomenclature of man
   (A) Escherichia coli
   (B) Panthera tigris
   (C) Homo sapiens
   (D) Periplanata americana

5. In a Food chain Plants are
   (A) Primary consumer (B) Producers (C) Tertiary consumer (D) Decomposer

6. "Chipko movement" started in
   (A) Reni in Garhwal
   (B) Khejrali village
   (C) Chennai in Tamilnadu
   (D) None of these

7. The maximum quantity of air one can expire after maximum inspiration is known as
   (A) Residual air (B) Vital capacity (C) Tidal volume (D) Total lung capacity

8. In a neuron the nodes of Ranvier are places where
   (A) Medullary sheath is discontinuous
   (B) Cyton are discontinuous
   (C) Axon is absent
   (D) None of these

9. Identify the incorrect statement
   (A) Menstruation only occurs if the released ovum is not fertilized
   (B) Lack of menstruation may be indicative of pregnancy
   (C) During pregnancy, the events of menstrual cycle continue
   (D) In the absence of fertilization, corpus luteum degenerates

Space for rough work

10. Anti-Diuretic hormone is also called
(A) Insulin (B) Vasopressin (C) Glucagon (D) Prolactin

11. Biotic factors refer to
(A) Gases produced by industries (B) Nutrient deficient soil
(C) Living organisms (D) Fossil fuels

12. In a natural ecosystem, decomposers include
(A) Bacteria and fungi (B) Photosynthetic algae
(C) Macroscopic animals (D) All the above

13. Plasma protein that help form antibodies
(A) Albumin (B) Fibrinogen (C) Globulins (D) None of these

14. Abscissic acid is a plant hormone involved in
(A) Dormancy of seeds (B) Root elongation
(C) Shoot elongation (D) Increased cell division

15. Monocot leaves exhibit
(A) Reticulate Venation (B) Pinnately Reticulate
(C) Parallel Venation (D) Palmately Reticulate

16. Study of fossils come under
(A) Organic evolution (B) Paleogeography (C) Palaeontology (D) Herpetology

17. Nature's cleaners are
(A) Producers (B) Consumers (C) Decomposers (D) Carnivores

18. Ranthambore National Park is situated in
(A) Maharashtra (B) Rajasthan (C) Gujarat (D) U. P.

19. Bile pigments are
(A) Bilirubin (B)Biliverdin (C) Both A & B (D) None of these

20. In mammals, the brain centre which regulates body temperature is situated in
(A) Cerebellum (B) Cerebellar lobes (C) Hypothalamus (D) Medulla oblongata

Space for rough work

21. Ovulation is trigerred by a sudden surge in
(A) LH (B) Insulin (C) prolactin (D) FSH

22. A connecting link between plants and animals
(A) *Dimetrodon* (B) *Dodo* (C) *Euglena* (D) *Sphenodon*

23. In a food chain, generally maximum numbers are those of
(A) Producers (B) Primary consumers
(C) Tertiary consumers (D) Climax carnivores

24. First National Park in India is
(A) Kanha National Park (B) Periyar National Park
(C) Corbett National Park (D) Bandipur National Park

25. Vitamin - A can be classified as a
(A) Water soluble Vitamin (B) Polysaccharides (C) Fat soluble vitamin (D) Protein

26. The hormone that can cause Bolting is
(A) Auxin (B) Gibberellin (C) Cytokinin (D) ABA

27. When a pollen tube enters through micropyle, then the process is called
(A) Porogamy (B) Chalazogamy (C) Pseudogamy (D) Misogamy

28. According to Theory of abiogenesis, life originated from
(A) Non living things (B) Pre-existing life
(C) Cells (D) Extra-terrestrial matter

29. Ozone blanket is present in which of the following main layers of atmosphere?
(A) Mesosphere (B) Troposphere (C) Stratosphere (D) Thermosphere

30. Biosphere reserve project was started in India during
(A) 1984 (B) 1980 (C) 1986 (D) 1989

31. What will happen if terminal buds are removed from a plant?
(A) Plant will fall (B) The lateral buds will grow profusely
(C) The roots will die (D) The shoots will die

Space for rough work

32. Gases responsible for Acid Rain
(A) O_2 (B) NO_2 (C) SO_2 (D) Both B & C

33. The Development of sperms within the male reproductive organ is called
(A) Spermiation (B) Oogenesis (C) Spermatogenesis (D) Impotency

34. The offspring resulting from a cross between two pure homozygous recessives would be.....
(A) 50% homozygous recessive and 50% homozygous dominant.
(B) 75% homozygous recessive and 25% heterozygous dominant.
(C) 75% homozygous recessive and 25% homozygous dominant.
(D) 100% homozygous recessive

35. In an ecosystem autotrophs are referred to as
(A) Consumers (B) Decomposers (C) Producers (D) None of the above

36. "Red Data Book" or IUCN Red List provides data on
(A) Biota or Red Sea (B) Effect of red light or photosynthesis
(C) Red pigmented plants (D) Endangered species

37. Oxyntic cells of the stomach produce
(A) Enterogastrone (B) Gastrin (C) HCl (D) Secretin

38. Growth hormone is secreted by
(A) Pituitary gland (B) Thyroid gland (C) Pineal gland (D) Hypothalamus

39. How many microspore mother cells will produce 1000 microspores?
(A) 100 (B) 200 (C) 250 (D) 500

40. By studying analogous structures, we look for.....
(A) Similarities in appearance and function but difference in structure.
(B) Similarities in appearance but difference in function.
(C) Both A & B
(D) None of these

41. The 10% law was proposed by
(A) Tansley (B) Darwin (C) Lindeman (D) Lamarck

Space for rough work

42. Kanha National Park is located in
(A) Assam (B) Rajasthan (C) Uttar Pradesh (D) Madhya Pradesh

43. Typical "lub-dub" sounds heard in the heart beat are due to
(A) Closing of bicuspid and tricuspid valves
(B) Closing of semilunar valves
(C) Blood flowing under pressure through aorta
(D) Closure of bicuspid-tricuspid valves followed by the semilunar valves

44. Kinetin is a type of
(A) Auxin (B) Gibberellins (C) Abscisic acid (D) Cytokinin

45. Ovulation in human female, occurs
(A) On the 14^{th} day of the menstrual cycle (B) When progesterone level increases
(C) When LH surge occurs (D) Both A and C

46. How many homozygous traits are produced in F2 generation of monohybrid cross?
(A) 1 (B) 2 (C) 3 (D) 4

47. Biogeochemical cycling refers to cycling of
(A) Energy in the ecosystem (B) Nutrients in the ecosystem
(C) Water (D) plants and animals

48. Wildlife is conserved
(A) *In-situ* (B) *Ex-situ* (C) Both A and B (D) None of these

49. Ureotelic Organisms are those that excrete
(A) Guanine (B) Ammonia (C) Uric acid (D) Urea

50. Dwarfism occurs due to
(A) Hyposecretion of Pituitary gland (B) Hyposecretion of gonads
(C) Hyposecretion of Leydig's cells (D) None of the above

51. Which one is female gametophyte?
(A) Embryo (B) Embryo sac (C) Endosperm (D) Synergid

52. Chromosomes in which the centromere is located slightly away from the centre where the two arms are slightly unequal in length & look 'L' shaped
(A) Acrocentric (B) Telocentric (C) Sub – metacentric (D) Metacentric

Space for rough work

53. Which cycle involves symbiosis between rhizobium & leguminous plants
(A) Oxygen cycle (B) Nitrogen cycle (C) Phosphorus cycle (D) Carbon cycle

54. Organization responsible for maintaining Red Data Book is
(A) IUCN (B) UNICEF (C) IBWL (D) WWF

55. Photosynthesis requires the presence of
(A) Water (B) Sunlight (C) CO_2 (D) All of these

56. The vegetative propagation in which the upper part (scion) of one **plant** grows on the root system (rootstock) of another plant is referred to as----------.
(A) Grafting (B) Cloning (C) Biopsy (D) Bioassay

57. The seeds of angiosperms develop within
(A) Styles (B) Sepals (C) Petals (D) Fruits

58. The percentage of cytosine (C) in a double stranded DNA is 28%. Choose the correct option:
(A)% of G is 22 (B) % of T is 28 (C) % of A is 22 (D) None

59. Under anaerobic conditions, denitrifying bacterium *Pseudomonas* changes
(A) Nitrate to nitrogen gas (B) Nitrate to ammonia
(C) Nitrate to nitrite (D) Nitrite to nitrate

60. Which National Park is the most popular conservation site developed to save endangered species like one-horned rhinoceros ?
(A) Corbett- Punjab (B) Palamau- Orissa
(C) Nandan Kanan- Rajasthan (D) Kaziranga- Assam

61. Which part of the brain is responsible for vomiting?
(A) Cerebellum (B) Medulla oblongata
(C) Olfactory lobes (D) Hypothalamus

62. The endocrine gland that plays a key role in the differentiation of T-Lymphocytes is
(A) Thymus (B) Thyroid (C) Adrenal (D) Pancreas

63. When pollen of a flower is transferred to the stigma of same flower of the same plant, the pollination is referred to as:
(A) Xenogamy (B) Geitonogamy (C) Autogamy (D) Allogamy

Space for rough work

64. Syngamy refers to
(A) Fusion of one of the sperms with secondary nucleus
(B) Fusion of one of the sperms with the egg
(C) Fusion of one of the sperms with the egg and other with the secondary nucleus
(D) Fusion of one of the sperms with synergids

65. Who coined the term ecosystem?
(A) Odum (B) Gardner (C) Darwin (D) A. G. Tansley

66. Hot spots of biodiversity are areas with
(A) Little biodiversity (B) Maximum biodiversity
(C) Minimum organisms (D) Both A and C

67. Origin of heart beat and its conduction is represented by
(A) AV node→Bundle of His→SA node→Purkinje fibres
(B) SA node→Purkinje fibres→AV node→Bundle of His
(C) Purkinje fibres→AV node→SA node→Bundle of His
(D) SA node→ AV node→ Bundle of His→ Purkinje fibres

68. Auxins promote
(A) Growth of lateral buds (B) Apical dominance (C) Bolting (D) All of the above

69. Budding differs from binary fission in that in the first
(A) Gamete formation is not involved
(B) The resultant daughter cells are not of equal size
(C) Fertilization is not involved
(D) DNA replication does not occur

70. Acrosome is a large **lysosome**-like vesicle which develops over the anterior half of the head in the spermatozoa of male humans, is derived from
(A) Golgi Bodies (B) Mitochondria (C) Centriole (D) Peroxisome

71. First link in the food chain is green plants because
(A) It alone can synthesize food (B) It is fixed at one place
(C) It can pick up everything (D) It is present in large number

72. Photosynthesis is an
(A) Catabolic process (B) Anabolic process (C) Amphibolic process (D) None of these

Space for rough work

73. Uric acid is excreted in
(A) Frog (B) Rabbit (C) Man (D) Pigeon

74. Which of the following secretes Pepsinogen in stomach?
(A) Follicular cells (B) Oxyntic cells (C) Chief cells (D) None of these

75. A bisexual flower which never opens up in its life span and whose petals remain permanently closed is known as---------- flowers
(A) Chasmogamous (B) Cleistogamous (C) Both A & B (D) None of these

76. Human offsprings would be female, if 23rd pair of chromosome in zygote is
(A) YY (B) XY (C) XX (D) XYY

77. The concept of pyramid of numbers was developed by?
(A) Charles Darwin (B) Jean Baptiste Lamarcke
(C) Andrew Huxley (D) Charles Elton

78. Which one is restricted to a given area?
(A) Cosmopolitan species (B) Endemic species (C) Both A & B (D) None of these

79. Cellulose digestion in rabbit is associated with
(A) Caecum (B) Colon (C) Small intestine (D) None of these

80. Production of alcohol by yeast fermentation is
(A) Aerobic process (B) O_2 dependent process
(C) Anaerobic process (D) Both B and C

81. Consider the following statements regarding parthenocarpy
(i) It is natural or artificially induced production of fruit without fertilization of ovules
(ii) The fruit is therefore seedless
(iii) In some plants, pollination is required for parthenocarpy
Correct statements include:
(A) (i) only (B) (ii) only (C) (i) and (ii) (D) None of the above

82. Theory of Inheritance of Acquired Characteristics was given by
(A) Lamarck (B) Weismann (C) Darwin (D) De Vries

83. Father of Genetics is
(A) Stanley (B) A. G. Tansley (C) Mendel (D) Weismann

Space for rough work

84. World biodiversity day is
(A) 22nd April (B) 16th September (C) 5th June (D) 29th December

85. Parthenocarpic tomato fruits can be produced by
(A) Treating the plant with phenyl mercuric acetate
(B) Removing androecium of flowers before pollen grains are released
(C) Treating the plants with low concentration of gibberellic acid and auxins
(D) Raising the plants from vernalized seeds

86. Which Vitamin's deficiency causes Scurvy?
(A) Vitamin A (B) Vitamin C (C) Vitamin B_{12} (D) Vitamin K

87. Pollination by snail and slug is known as
(A) Ornithophily (B) Chiropterophily (C) Entomophily (D) Malacophily

88. Mendel conducted his hybridization experiments with
(A) *Cicer arieticum* (B) *Cajanuscajan* (C) *Pisum sativum* (D) *Lathyrus alatus*

89. Deficiency of Iodine results in?
(A) Goiter (B) Rickets (C) Haemorrhage (D) Gonorrhoea

90. The full form of MAB is
(A) Man and Botany (B) Man and Biosphere
(C) Man and Biotic community (D) Man, Antibiotic and Bacteria

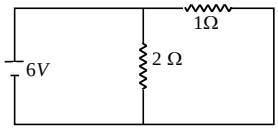
Space for rough work

Physics Section - II

Straight Objective Type

Physics contains 45 multiple choice questions numbered 1 to 45. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

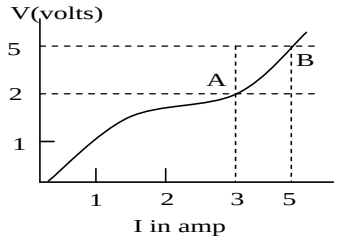
1. The Current passing through 1Ω resistor is



(A) 8 A (B) 6 A
(C) 4 A (D) 12 A

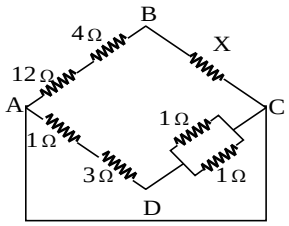
2. A cylindrical conductor of length 3.14 m and diameter 1mm has resistance 4 ohm. Its resistivity is (in ohm meter)
(A) 10^{-6} (B) 2×10^{-6} (C) 2×10^{-9} (D) 10^{-8}

3. The Figure represents the V-I characteristics of a circuit element. The dynamic resistance in the region AB is:



(A) $(2/3)\Omega$ (B) $(3/2)\Omega$
(C) 2Ω (D) 1Ω

4. In the arrangement of resistances shown in the diagram the potential difference between B and D will be zero, when the resistance X is:



(A) 4Ω (B) 3Ω
(C) 2Ω (D) zero

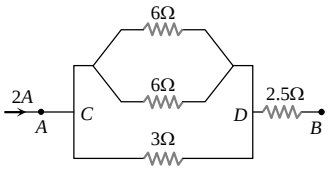
5. If two bulbs of 25 W & 100 W rated at 200 volts are connected in series across a 440 volts supply.
(A) 25 watt bulb will fuse (B) 100 watt bulb will fuse
(C) None of the bulb will fuse (D) both the bulbs will fuse

Space for rough work

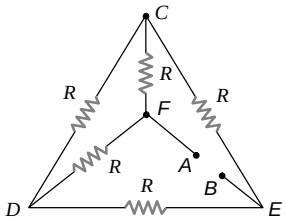
6. A resistor of resistance R is connected to an ideal battery. If the value of R is decreased, the power dissipated in the resistor will
(A) May increase (or) decrease (B) decrease (C) remain unchanged. (D) Increase

7. The specific resistance of a wire is ρ. Its volume is 4 m^3 and its resistance is 9 ohms, then its length will be
(A) $\rho\sqrt{\frac{1}{3}}$ (B) $\frac{6}{\sqrt{\rho}}$ (C) $\frac{3}{\sqrt{\rho}}$ (D) $\rho\sqrt{\frac{1}{6}}$

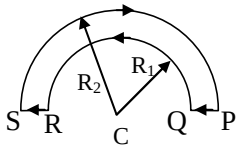
8. The equivalent resistance and potential difference between *A* and *B* for the circuit is respectively
(A) 4 Ω, 8 *V* (B) 8 Ω, 4 *V*
(C) 2 Ω, 2 *V* (D) 16 Ω, 8 *V*



9. Five equal resistances each of resistance *R* are connected as shown in the figure. *A* battery of *V* volts is connected between *A* and *B*. The current flowing in *AFCEB* will be
(A) $\frac{3V}{R}$ (B) $\frac{V}{R}$
(C) $\frac{V}{2R}$ (D) $\frac{2V}{R}$



10. A wire loop PQRSP formed by joining two semi-circular wires of radii R_1 and R_2 carries a current I as shown. The magnitude of the magnetic induction at the centre C is:



(A) $\frac{\mu_0 I}{4}\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$ (B) $\frac{\mu_0 I}{2}\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$ (C) $\frac{\mu_0 I}{8}\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$ (D) $\mu_0 I\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$

Space for rough work

11. Magnetic field is not associated with
(A) A charge in uniform motion (B) an accelerated charge
(C) A decelerated charge (D) a stationary charge

12. A moving charged particle placed in a uniform magnetic field experiences
(A) A force in the direction of the field (B) a force opposite to the direction of the field
(C) A force perpendicular to the direction of field (D) no force at all

13. Which of the following cannot be deflected by a magnetic field?
(A) Alpha rays (B) Beta rays
(C) Gamma rays (D) Moving charge particle

14. An electron moving in a circular path of radius *r* makes *n* rotations per second. The magnetic field produced at the centre has magnitude
(A) Zero (B) $\frac{\mu_0 \quad ne}{2 \quad r}$ (C) $\frac{\mu_0 \quad ne}{2 \quad \pi \quad r}$ (D) $\frac{\mu_0 \quad n^2 \quad e}{2 \quad r}$

15. Proton and α–particle projected perpendicularly into a magnetic field, if both move in a circular path with same speed, then ratio of radii
(A) 1: 2 (B) 2:1 (C) 1: 4 (D) 1: 1

16. Geothermal energy is feasible in the regions that
(A) are near the sea (B) have coalmines
(C) Have thermal plants (D) area over hot spots in the crust

17. A substance cannot fire or burn as long as its temperature is lower than
(A) Critical temperature (B) melting point (C) boiling point (D) ignition temperature

18. A good fuel is one which possess
(A) High calorific value and low ignition temperature
(B) High calorific value and high ignition temperature
(C) High calorific value and moderate ignition temperature
(D) Low calorific value and moderate ignition temperature

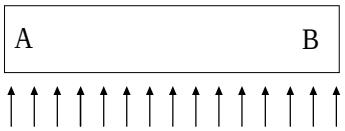
Space for rough work

19. A convex mirror with a focal length of 100 cm is used to form an image. An object is placed 50 cm in front of the mirror. Given the incidence side is taken as negative, what is the image distance from the mirror (pole)?
(A) 33.33 cm (B) -33.33 cm (C) 66.66 cm (D) -66.66 cm

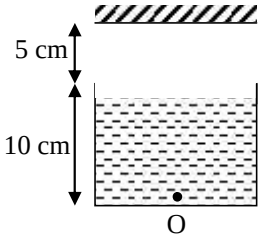
20. An object is placed at a distance of 30 cm from a thin converging lens along its axis. The lens has a focal length of 10 cm. What are the values of the image distance and magnification (respectively)?
(A) 60 cm and 2 (B) 15 and 2 (C) 60 cm and -0.5 (D) 15 cm and -0.5

21. A light ray in air is incident on an air to glass boundary at an angle of 45.0 degrees and is refracted into glass medium at 30° with the normal. What is the index of refraction of the glass? ($\sin 45° = \frac{1}{\sqrt{2}}$ and $\sin 30° = 1/2$)
(A) 2.13 (B) 1.74 (C) 1.23 (D) 1.41

22. Rays of light fall on a glass slab ($\mu > 1$) as shown in figure. If μ at A is maximum and at B it is minimum, then what will happen to these rays?
(A) it will tilt towards A (B) It will tilt towards B
(C) It will not deviate (D) There will be total internal reflection



23. Consider the situation shown in figure. Water (μ_w = 4/3) is filled in a beaker up to a height of 10 cm. A plane mirror is fixed at a height of 5 cm from the surface of water. Distance of image from the mirror after reflection from it of an object O at the bottom of the beaker, is :
(A) 15 cm (B) 12.5 cm
(C) 7.5 cm (D) 10 cm



24. The refractive index of water with respect to air is 4/3 and the refractive index of glass with respect to air is 3/2. Then the refractive index of water with respect to glass is:
(A) 9/8 (B) 8/9 (C) 1/2 (D) 2

25. Two plane mirrors are parallel to each other and spaced 20 cm apart. An object is kept between them at 15 cm from A. Out of the following at which point, an image is not formed in mirror A: (distance measured from mirror A)
(A) 15 cm (B) 25 cm (C) 45 cm (D) 55 cm

Space for rough work

26. A coin is placed at the bottom of a water tank of depth 0.5 m. The critical angle of water is about 49°. When viewed normally, the depth of the coin appears to be (in m):
(A) 0.5 (B) 0.5 / sin 49° (C) 0.5 (sin 49°) (D) sin 49° / 0.5

27. A bird in air looks at a fish vertically below it and inside water h_1 is the height of the bird above the surface of water and h_2 the depth of the fish below the surface of water. If refractive index of water with respect to air be μ, then the distance of the fish as observed by the bird is:
(A) $h_1 + h_2$ (B) $h_1 + \frac{h_2}{\mu}$ (C) $\mu h_1 + h_2$ (D) $\mu h_1 + \mu h_2$

28. An ultrasonic wave is sent from a ship towards the bottom of the sea. It is found that the time interval between the sending and receiving of the wave is 1.6 s. What is the depth of the sea, if the velocity of sound in the seawater is 1400 m/s?
(A) 1120 m (B) 560 m (C) 1400 m (D) 112 m

29. An example for mechanical wave.
(A) Radio wave (B) Light wave (C) Infrared radiation (D) Sound wave

30. The frequency of a rod is 200 Hz. If the velocity of sound in air is $340 ms^{-1}$, the wavelength of the sound produced is
(A) 1.7cm (B) 6.8cm (C) 1.7m (D) 6.8m

31. If a vibrator strikes the water 10 times in one second, then the frequency of wave is _____.
(A) 10 Hz (B) 0.5 Hz (C) 5 Hz (D) 0.1 Hz

32. Unit of wavelength is _____.
(A) Newton (B) erg (C) dyne (D) angstrom

33. SI Unit of time period is _____.
(A) Second (B) Hour (C) Minute (D) Nanosecond

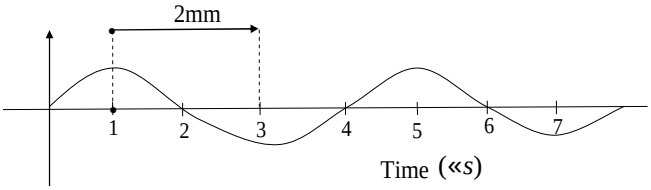
Space for rough work

34. The vibrations or the pressure variations inside the inner ear are converted into electrical signals by the_____.
(A) Cochlea (B) tympanic membrane (C) pinna (D) anvil

35. Vibrations inside the ear are amplified by the three bones namely the _____ in the middle ear.
(A) Hammer, anvil and stirrup (B) Hammer, anvil and pinna
(C) Hammer, cochlea and stirrup (D) auditory bone, anvil and stirrup

36. The persistence of audible sound due to the successive reflections from the surrounding objects even after the source has stopped to produce that sound is called ----.
(A) Reflection (B) echo (C) reverberation (D) rarefaction

37. The frequency of the wave is
(A) 25×10^{4} Hz (B) 0.25 Hz
(C) 25×10^{-3}Hz (D) 25×10^{5} Hz



38. A sound wave produces 60 compressions and 60 rarefactions in 0.6 sec then the frequency of sound wave is
(A) 100 Hz (B) 50 Hz (C) 200 Hz (D) none of these

39. Sonar works on the principal of
(A) Reflection of sound waves (B) momentum of sound waves.
(C) Energy of sound waves (D) refraction of sound waves

40. The frequency of a transverse wave is 50 KHz. Its speed in air and oil are 300 m/s and 1400 m/s respectively. Its wavelength in oil and air respectively are
(A) 2.8 cm, 6 mm (B) 6 mm, 2.8 cm (C) 2.8 m, 6 m (D)2.8 cm, 6 m

Space for rough work

41. The splash is heard 2.05 s after the stone is dropped into a well of depth 19.6 m. The velocity of sound is, (take g = 9.8 m/s^2)
(A) 342 m/s (B) 372 m/s (C) 392 m/s (D) 352 m/s

42. A man standing in front of a mountain at a certain distance beats a drum at regular intervals. The drumming rate is gradually increased and he finds that the echo is not heard distinctly when the rate becomes 40 per minute. Then moves nearer to the mountain by 90 m & finds the echo is not heard when the drumming rate becomes 60 per minute. Then the distance between the mountain and the initial position of the man and the velocity of sound are
(A) 360 m, 270 m/s (B) 270 m, 360 m/s (C) 72 m, 360 m/s (D) 150 m, 360 m/s

43. A simple pendulum has a time period of 2.0 sec at the earth's surface. It is taken to a height $R_o/2$ above the earth's surface, where R_o is the radius of the earth. What is the time period in sec?
(A) 1 (B) 3 (C) 4 (D) 2

44. Which of the following statements is incorrect?
(A) Sound travels radially outwards
(B) Sound travels as waves
(C) Sound is a form of energy
(D) Sound travels faster in vacuum than in air

45. The waves in which the particles of the medium vibrate in a direction perpendicular to the direction of wave motion are known as:
(A) Transverse waves (B) longitudinal waves (C) propagated waves (D) none of these

Space for rough work

Chemistry Section - III

Straight Objective Type

Chemistry contains 45 multiple choice questions numbered 1 to 45. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

1. Which of the following is not a physical change?
   (A) Boiling of water to give water vapour
   (B) Melting of ice to give water.
   (C) Dissolution of salt in water.
   (D) Combustion of Liquefied Petroleum Gas (LPG).

2. Which of the following statements about the given reaction are correct?
   $3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$
   (i) Iron metal is getting oxidized. (ii) water is getting reduced.
   (iii) Water is acting as reducing agent. (iv) water is acting as oxidizing agent.
   (A) (i), (ii) and (iii) (B) (iii) and (iv) (C) (i), (ii) and (iv) (D) (ii) and (iv)

3. Which of the following are exothermic processes?
   (i) Reaction of water with quick lime (ii) Dilution of sulphuric acid
   (iii) Evaporation of water (iv) Sublimation of camphor (crystals)
   (A) (i) and (ii) (B) (ii) and (iii) (C) (i) and (iv) (D) (iii) and (iv)

4. A dilute ferrous sulphate solution was gradually added to the beaker containing acidified permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation?
   (A) $KMnO_4$ is an oxidizing agent, it oxidizes $FeSO_4$.
   (B) $FeSO_4$ acts as an oxidizing agent and oxidizes $KMnO_4$.
   (C) The colour disappears due to dilution, no reaction is involved.
   (D) $KMnO_4$ is an unstable compound and decomposes in presence of $FeSO_4$ to a colorless compound.

5. Barium chloride on reacting with ammonium slulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved?
   (i) Displacement reaction (ii) Precipitation reaction
   (iii) Combination reaction (iv) Double displacement reaction
   (A) (i) only (B) (ii) only (C) (iv) only (D) (ii) and (iv)

Space for rough work

6. Electrolysis of water is a decomposition reaction, the mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is
(A) 1:1 (B) 2 : 1 (C) 4 : 1 (D) 1 : 2

7. The following reaction is used for the preparation of oxygen gas in the laboratory
$2KClO_3(s) \xrightarrow[\text{Catlyst}]{\text{Heat}} 2KCl(s) + 3O_2(g)$ which of the following statement (s) is (are) correct about the reaction
(A) It is a decomposition reaction and endothermic in nature.
(B) It is a combination reaction.
(C) It is decomposition reaction and accompanied by release of heat.
(D) It is a photochemical decomposition reaction and exothermic in nature.

8. In which of the following chemical equations, the abbreviations represent the correct states of the reactants and products involved at reaction temperature
(A) $2H_2(l) + O_2(l) \longrightarrow 2H_2O(g)$ (B) $2H_2(g) + O_2(l) \longrightarrow 2H_2O(l)$
(C) $2H_2(g) + O_2(l) \longrightarrow 2H_2O(l)$ (D) $2H_2(g) + O_2(g) \longrightarrow 2H_2O(l)$

9. Which of the following are combination reactions?
(i) $2KClO_3 \xrightarrow{\text{Heat}} 2KCl + 3O_2$ (ii) $MgO + H_2O \longrightarrow Mg(OH)_2$
(iii) $4Al + 3O_2 \longrightarrow 2Al_2O_3$ (iv) $Zn + FeSO_4 \longrightarrow ZnSO_4 + Fe$
(A) (i) and (iii) (B) (iii) and (iv) (C) (ii) and (iv) (D) (ii) and (iii)

10. What happens when a solution of an acid is mixed with a solution of a base in a test tube?
(i) The temperature of the solution increases. (ii) The temperature of the solution decreases.
(iii) The temperature of the solution remains the same. (iv) Salt formation takes place.
(A) (i) only (B) (i) and (iii) (C) (ii) and (iii) (D) (i) and (iv)

11. An aqueous solution turns red litmus solution blue. Excess addition of which of the following solution would reverse the change
(A) Baking powder (B) Lime
(C) ammonium hydroxide solution (D) Hydrochloric acid

12. Which of the following salts does not contain water of crystallization?
(A) Blue vitriol (B) Baking soda (C) Washing soda (D) Gypsum

Space for rough work

13. Calcium phosphate is present in tooth enamel. Its nature is
(A) Basic (B) acidic (C) Neutral (D) amphoteric

14. Which of the following statements is correct about an aqueous solution of an acid and of a base
(i) Higher the pH, stronger the acid. (ii) Higher the pH, weaker the acid.
(iii) Lower the pH, stronger the base. (iv) Lower the pH, weaker the base.
(A) (i) and (iii) (B) (ii) and (iii) (C) (i) and (iv) (D) (ii) and (iv)

15. Which of the following phenomenon occur, when a small amount of acid is added to water?
(i) Ionisation (ii) Neutralisation (iii) Dilution (iv) Salt formation
(A) (i) and (ii) (B) (i) and (iii) (C) (ii) and (iii) (D) (ii) and (iv)

16. Which of the following substance will not give carbon dioxide on treatment with dilute acid?
(A) Marble (B) Limestone (C) Baking soda (D) Lime

17. Which of the following is not a mineral acid?
(A) Hydrochloric acid (B) Citric acid (C) Sulphuric acid (D) Nitric acid

18. Which of the following statements is not correct?
(A) All metal carbonates react with acid to give a salt, water, and carbon dioxide
(B) All metal oxides react with water to give salt and acid
(C) Some metals react with acids to give salt and hydrogen
(D) Some non metal oxides react with water to form an acid

19. Which of the following is (are) true when HCl(g) is passed through water?
(i) It does not ionize in the solution as it is a covalent compound
(ii) It ionizes in the solution
(iii) It gives both hydrogen and hydroxyl ions in the solution
(iv) It forms hydronimum ion in the solution due to the combination of hydrogen ion with water molecule
(A) (i) only (B) (iii) only (C) (ii) and (iv) (D) (iii) and (iv)

20. Which of the following are present in a dilute aqueous solution of hydrochloric acid?
(A) $H_3O^+ + Cl^-$ (B) $H_3O^+ + OH^-$ (C) $Cl^- + OH^-$ (D) unionized HCl

Space for rough work

21. Which of the following property is generally not shown by metals?
(A) Electrical conduction (B) sonorous in nature (C) Dullness (D) Ductility

22. Aluminum is used for making cooking utensils. Which of the following properties of Aluminum are responsible for the same?
(i) Good thermal conductivity (ii) Good electrical conductivity
(iii) Ductility (iv) High melting point
(A) (i) and (ii) (B) (i) and (iii) (C) (ii) and (iii) (D) (i) and (iv)

23. Which one of the following metals does not react with cold as well as hot water?
(A) Na (B) Ca (C) Mg (D) Fe

24. What happens when calcium is treated with water?
(i) It does not react with water
(ii) It reacts violently with water
(iii) It reacts less violently with water
(iv) Bubbles of hydrogen gas formed stick to the surface of calcium
(A)(i) and (iv) (B) (i) and (iii) (C) (i) and (ii) (D) (iii) and (iv)

25. Generally metals react with acids to give salt and hydrogen gas. Which of the following acids does not give hydrogen gas on reacting with metals (except Mn and Mg)?
(A) H_2SO_4 (B) HCl (C) HNO_3 (D) All of these

26. The composition of Aqua-Regia solution is
(A) Dil. HCl : Conc. HNO_3
3 : 1
(B) Conc. HCl : Dil. HNO_3
3 : 1
(C) Conc. HCl : Conc. HNO_3
3 : 1
(D) Dil. HCl : Dil. HNO_3
3 : 1

Space for rough work

27. Which of the following are not Ionic Compounds?
(i) KCl (ii) HCl (iii) CCl_4 (iv) NaCl
(A) (i) and (ii) (B) (ii) and (iii) (C) (iii) and (iv) (D) (i) and (iii)

28. Metals are refined by using different methods which of the following metals are refined by electrolytic refining?
(i) Au (ii) Cu (iii) Na (iv) K
(A) (i) and (ii) (B) (i) and (iii) (C) (ii) and (iii) (D) (iii) and (iv)

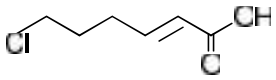
29. Stainless steel is very useful materials for our life. In stainless steel, iron is mixed with
(A) Ni and Cr (B) Cu and Cr (C) Ni and Cu (D) Cu and Au

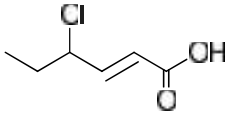
30. An electrolytic cell consists of
(i) Positively charged cathode (ii) negatively charged anode
(iii) Positively charged anode (iv) negatively charged cathode
(A) (i) and (ii) (B) (iii) and (iv) (C) (i) and (iii) (D) (ii) and (iv)

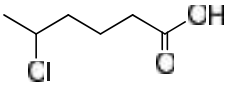
31. The electronic configurations of three elements X, Y and Z are $X \rightarrow 2,8$; $Y \rightarrow 2,8,7$ and $Z \rightarrow 2,8,2$ which of the following is correct
(A) X is a metal (B) Y is a metal
(C) Z is a non – metal (D) Y is a non – metal and Z is a metal

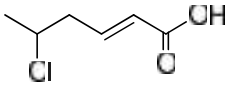
32. Generally non-metals are bad conductors of electricity. Which of the following is a good conductor of electricity?
(A)Diamond (B) Graphite (C) Sulphur (D) Fullerene

33. The correct structure for the compound with the IUPAC name 5 – Chlorohexa – 2 – enoicacid

(A) 

(B) 

(C) 

(D) 

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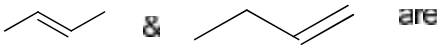
34.  are
(A) Chain isomers (B) Positional isomers
(C) Functional group isomers (D) both A & C

35. Which of the following will not decolourise bromine water?
(A) C_4H_8 (B) C_3H_4 (C) C_3H_8 (D) C_4H_6

36. Open chain saturated hydrocarbons are called_____.
(A) Paraffins (B) Alkenes (C) Alkynes (D) Alkyl groups

37. Characteristic reaction of alkanes is_____.
(A) Addition (B) Substitution (C) Polymerization (D) Isomerisation

38. The major constituent of biogas is_____.
(A) Propane (B) Acetylene (C) Methane (D) Benzene

39. Buckminster – Fullerene is a variety of
(A) Boron (B) Carbon – 60 (C) Ammonia (D) Fluorine

40. $-C\equiv C-$ Bond is found in
(A) Ethene (B) Butene (C) Ethyne (D) Glylerine

41. Diethyl ether & methyl n-propyl ether are
(A) Position isomers (B) Metamers (C) Functional isomers (D) Chain isomers

42. Functional isomerism is given by
(A) CH_3CH_2OH (B) $CH_3CH_2NH_2$ (C) CH_3CN (D) All of these

43. Functional Isomer of propanal is
(A) Acetone (B) Ethanol (C) Propanol (D) Diethyl Ether

44. Which of the following is not an allotrope of carbon?
(A) Soot (B) Graphite (C) Diamond (D) Carborundum

45. Substances with the same molecular formula but different structures are called
(A) Ester (B) Isomers (C) Polymers (D) Enantiomers

Space for rough work