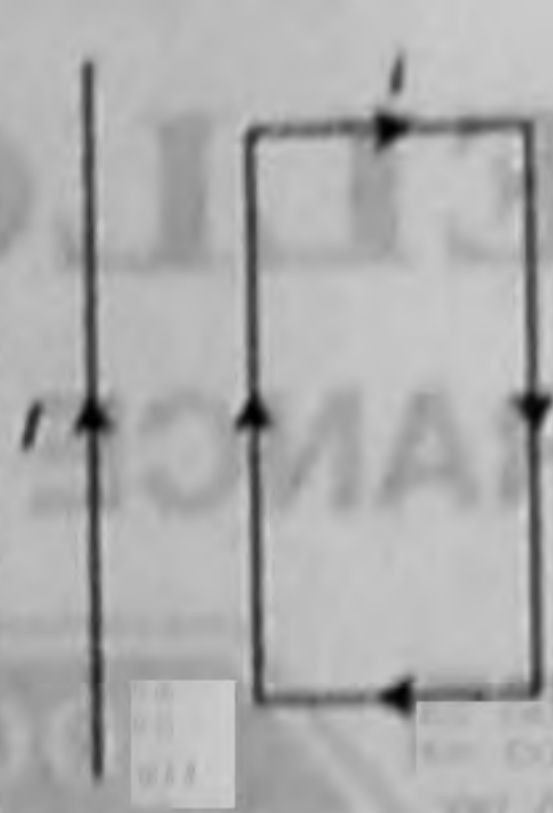



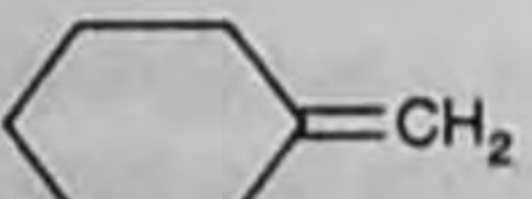
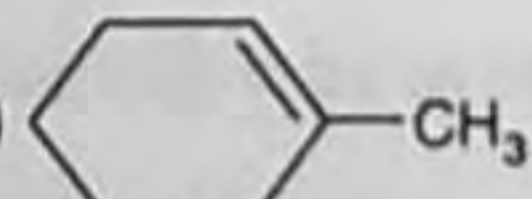
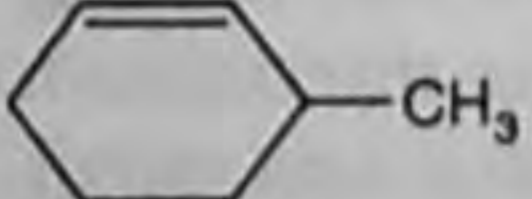

- An electric generator is based on
 - Faraday's law of electromagnetic induction
 - motion of charged particles in electromagnetic field
 - Newton's laws of motion
 - fission of uranium by slow neutrons
- Which of the following can be zero, when a particle is in motion for some time
 - Distance
 - Displacement
 - Speed
 - None of these
- An object of mass 10 kg moves at a constant speed of 10 m/s. A constant force, that acts for 4 s on the object, gives it a speed 2 m/s in opposite direction. The force acting on the object is
 - 3 N
 - 30 N
 - 3 N
 - 30 N
- A car of mass 1000 kg moves on a circular track of radius 20 m. If the coefficient of friction is 0.64, then the maximum velocity with which the car can move is
 - 22.4 m/s
 - 5.6 m/s
 - 11.2 m/s
 - none of these
- A particle is executing SHM. Then, the graph of velocity as a function of displacement is a/an
 - straight line
 - circle
 - ellipse
 - hyperbola
- A long spring, when stretched by a distance x , has potential energy U . On increasing the stretching to nx , the potential energy of the spring will be
 - $\frac{U}{n}$
 - nU
 - n^2U
 - $\frac{U}{n^2}$
- A body cools from 50°C to 49°C in 5 s. How long will it take to cool from 40°C to 39°C ? Assume temperature of surroundings to be 30°C and Newton's law of cooling is valid
 - 2.5 s
 - 10 s
 - 20 s
 - 5 s
- A sound has an intensity of $2 \times 10^{-8} \text{ W/m}^2$. Its intensity level in decibels is ($\log_{10} 2 = 0.3$)
 - 23
 - 3
 - 43
 - 4.3
- A ray reflected successively from two plane mirrors inclined at a certain angle undergoes a deviation of 240° . Then, the number of images observable is
 - 3
 - 5
 - 7
 - 9
- A concave mirror of focal length f in vacuum is placed in a medium of refractive index 2. Its focal length in the medium is
 - $\frac{f}{2}$
 - f
 - $2f$
 - $4f$
- In the lowest energy level of hydrogen atom, the electron has the angular momentum
 - $\frac{\pi}{h}$
 - $\frac{h}{\pi}$
 - $\frac{h}{2\pi}$
 - $\frac{2\pi}{h}$
- Three identical charges are placed at the corners of an equilateral triangle. If the force between any two charges is F , then the net force on each will be
 - $\sqrt{2}F$
 - $2F$
 - $\sqrt{3}F$
 - $3F$
- The resistance of the fuse wire is
 - Low
 - moderate
 - zero
 - very high
- If 1A of current is passed through CuSO_4 solution for 10 s, the number of copper atoms deposited at the cathode will be about
 - 1.6×10^{20}
 - 8×10^{19}
 - 3.1×10^{19}
 - 6.2×10^{19}

15. A rectangular loop carrying a current i is situated near a long straight wire such that the wire is parallel to one of the sides of the loop and is in the plane of the loop. If a steady current I is established in the wire as shown in the figure, the loop will



- (a) rotate about an axis parallel to the wire
 (b) move away from the wire
 (c) move towards the wire
 (d) remain stationary
16. Two points A and B are situated at distance x and $2x$ respectively from the nearer pole of a magnet 2 cm long. The ratio of magnetic field at A and B is
 (a) 4 : 1 exactly
 (b) 4 : 1 approximately
 (c) 8 : 1 exactly
 (d) 8 : 1 approximately
17. The inductance of a coil is proportional to
 (a) its length
 (b) the number of turns
 (c) the resistance of the coil
 (d) the square of the number of turns
18. On increasing the reverse bias to a large value in a p - n junction diode current
 (a) increases slowly
 (b) remains fixed
 (c) suddenly increases
 (d) decreases slowly
19. The half-value period of a radioactive nucleide is 3 h . In 9 h its activity will be reduced by a factor of
 (a) $\frac{1}{9}$ (b) $\frac{1}{27}$
 (c) $\frac{1}{6}$ (d) $\frac{1}{8}$
20. An n -type semiconductor is formed by adding impurity materials
 (a) aluminium, boron or selenium
 (b) aluminium, boron or indium
 (c) phosphorus, antimony or arsenic
 (d) cobalt, aluminium or selenium
21. According to Bohr's theory (assuming infinite mass of the nucleus), the frequency of the second line of the Balmer series is :
 (a) $6.16 \times 10^{14}\text{ Hz}$ (b) $6.16 \times 10^{13}\text{ Hz}$
 (c) $6.16 \times 10^{10}\text{ Hz}$ (d) $6.16 \times 10^{16}\text{ Hz}$
22. A dip needle in a plane perpendicular to magnetic meridian will remain

- (a) vertical
 (b) horizontal
 (c) in any direction
 (d) at an angle of dip to the horizontal
23. If the end A of a wire is irradiated with α -rays and the other end B is irradiated with β -rays, then
 (a) a current will flow from A to B
 (b) there will be no current in the wire
 (c) a current will flow from B to A
 (d) a current will flow from each end to the mid point of the wire
24. A least distance of distinct vision is 25 cm . The focal length of a convex lens is 5 cm . It can act as a simple microscope of magnifying power
 (a) 4 (b) 5
 (c) 6 (d) none of these
25. A person standing in front of a mirror finds his image larger than himself. This implies that the mirror is
 (a) plane
 (b) convex
 (c) concave
 (d) cylindrical with bulging side outwards
26. A Carnot engine working between 300 K and 600 K has a work output of 800 joule per cycle. The amount of heat energy supplied from the source to engine in each cycle is
 (a) 800 J (b) 1600 J
 (c) 3200 J (d) 6400 J
27. A body floats with one third of its volume outside water and $\frac{3}{4}$ of its volume outside another liquid. The density of other liquid is
 (a) $\frac{9}{4}\text{ g/cc}$ (b) $\frac{4}{9}\text{ g/cc}$
 (c) $\frac{8}{3}\text{ g/cc}$ (d) $\frac{3}{8}\text{ g/cc}$
28. If the maximum velocity and acceleration of a particle executing SHM are equal in magnitude the time period will be
 (a) 1.57 s (b) 3.14 s
 (c) 6.28 s (d) 12.56 s
29. The angle of projection at which the horizontal range and the maximum height of a projectile are equal is
 (a) 30° (b) 45°
 (c) 60° (d) 76°
30. The largest and the shortest distances of the earth from the sun are r_1 and r_2 . Its distance from the sun when it is at the perpendicular to the major axis of the orbit drawn from the sun, is
 (a) $\frac{r_1 + r_2}{4}$ (b) $\frac{r_1 r_2}{r_1 + r_2}$
 (c) $\frac{2r_1 r_2}{r_1 + r_2}$ (d) $\frac{r_1 + r_2}{3}$

- If the heat of solution for one mole of KCl in 20 moles of water and 200 moles of water was +3.80 kcal and +4.40 kcal respectively, then the heat of dilution is
 (a) + 8.20 kcal (b) - 8.2 kcal
 (c) +0.60 kcal (d) -0.60 kcal
- The size of an octahedral void formed in a closest packed lattice as compared to tetrahedral void is
 (a) equal (b) smaller
 (c) larger (d) not definite
- A substance will be deliquescent if its vapour pressure is
 (a) equal to the atmospheric pressure
 (b) equal to that of water vapour in the air
 (c) greater than that of water vapour in the air
 (d) less than that of water vapour in the air
- The weight of iron which will be converted into its oxide (Fe_3O_4) by the action of 18 g of steam on it will be (at. wt. of Fe = 56)
 (a) 168 g (b) 84 g
 (c) 42 g (d) 21 g
- Cupellation process is used in the metallurgy of
 (a) Cu (b) Ag
 (c) Al (d) Fe
- Which of the following two are isostructural?
 (a) XeF_2 , IF_2^- (b) NH_3 , BF_3
 (c) CO_3^{2-} , SO_3^{2-} (d) PCl_5 , ICl_5
- If one litre of air is passed repeatedly over heated copper and magnesium till no further reduction in volume takes place. The volume finally obtained would be approximately
 (a) 800 mL (b) 200 mL
 (c) 10 mL (d) zero
- Which one of the following transition metal ions is diamagnetic?
 (a) Co^{2+} (b) Ni^{2+}
 (c) Cu^{2+} (d) Zn^{2+}
- The right order of the solubility of sulphates of alkaline earth metals in water is
 (a) $\text{Be} > \text{Ca} > \text{Mg} > \text{Ba} > \text{Sr}$
 (b) $\text{Mg} > \text{Be} > \text{Ba} > \text{Ca} > \text{Sr}$
 (c) $\text{Be} > \text{Mg} > \text{Ca} > \text{Sr} > \text{Ba}$
 (d) $\text{Mg} > \text{Ca} > \text{Ba} > \text{Be} > \text{Sr}$
- On adding AlCl_3 to water
 (a) the ionization of water increases
 (b) the ionization of water decreases
 (c) the ionization of water remains constant
 (d) the ionic product of water increases
- In nitroprusside ion, the iron and NO exist as Fe^{2+} and NO^+ rather than Fe^{3+} and NO. These forms can be differentiated by
 (a) estimating the concentration of iron
 (b) measuring the concentration of CN^-
 (c) measuring the solid state magnetic moment
 (d) thermally decomposing the compound
- Which of the following is not an organometallic compound?
 (a) Ethyl magnesium bromide
 (b) Tetraethyl lead
 (c) Sodium ethoxide
 (d) Trimethyl aluminium
- 8.2 L of an ideal gas weigh 9.0 at 300 K and 1 atm pressure. The molecular mass of gas is
 (a) 9 (b) 27
 (c) 54 (d) 81
- Which of the following liberates methane on treatment with water?
 (a) Silicon carbide
 (b) Calcium carbide
 (c) Beryllium carbide
 (d) Magnesium carbide
- Inert pair effect plays an important role in case of
 (a) phosphorus (b) bismuth
 (c) antimony (d) arsenic
-  CH_2OH on dehydration with conc. H_2SO_4 predominantly forms
 (a)  (b) 
 (c)  (d) 
- Pick out the correct statement
 An alloy of Na + K is
 (a) liquid at room temperature
 (b) used in specially designed thermometers

- (c) both (a) and (b)
(d) none of the above
18. Schiff's base and Schiff's reagent are
(a) structural isomers
(b) anomers
(c) diastereomers
(d) entirely different compounds
19. Propene, $\text{CH}_3\text{CH}=\text{CH}_2$ can be converted into 1-propanol by oxidation. Indicate which set of reagents amongst the following is ideal to effect the above conversion?
(a) KMnO_4 (alkaline)
(b) Osmium tetroxide ($\text{OsO}_4/\text{CH}_2\text{Cl}_2$)
(c) B_2H_6 and alk. H_2O_2
(d) O_3/Zn
20. When hydrochloric acid gas is treated with propene in presence of benzoyl peroxide, it gives
(a) 2-chloropropane
(b) allyl chloride
(c) no reaction
(d) *n*-propyl chloride
21. An ester is boiled with KOH. The product is cooled and acidified with concentrated HCl. A white crystalline acid separates. The ester is
(a) methyl acetate
(b) ethyl acetate
(c) ethyl formate
(d) ethyl benzoate
22. A non-copper alloy is
(a) solder (b) brass
(c) bronze (d) bell metal
23. Which of the following is a condensation homopolymer?
(a) Nylon-6 (b) Nylon-66
(c) Nylon-610 (d) Dacron
24. A simple method to remove peroxides from ethers is to treat them with an aqueous solution of
(a) KI (b) KCNS
(c) $\text{Na}_2\text{S}_2\text{O}_3$ (d) Br_2
25. Isobutyl bromide may be obtained from isobutylene and HBr in the presence of
(a) peroxide (b) hydroquinone
(c) diphenyl amine (d) all of these
26. Which of the following has lowest octane number?
(a) Iso-octane (b) *n*-heptane
(c) *n*-hexane (d) *n*-hexadecane
27. Which of the following is the most reactive towards ring nitration?
(a) Benzene (b) Mesitylene
(c) Toluene (d) *m*-xylene
28. A solution of 500 mL of 0.2 M KOH and 500 mL of 0.2 M HCl is mixed and stirred; the rise in temperature is T_1 . The experiment is repeated using 250 mL each of solution, the temperature rise is T_2 . Which of the following is true?
(a) $T_1 = T_2$
(b) $T_1 = 2T_2$
(c) $T_1 = 4T_2$
(d) $T_2 = 9T_1$
29. Bones glow in dark because
(a) they contain shining material
(b) they contain red phosphorus
(c) they contain white phosphorus which undergoes slow combustion in contact with air
(d) white phosphorus changes to red phosphorus
30. Superconductors are derived from compounds of
(a) *p*-block elements (b) lanthanides
(c) actinides (d) transition elements

1. The first live healthy cloned mammal of the world was
 - (a) Molly sheep
 - (b) Dolly sheep
 - (c) Polly sheep
 - (d) A monkey
2. The maintenance of internal favourable conditions, by a self regulated mechanism, in spite of the fact that there are changes in the environment is called
 - (a) entropy
 - (b) homeostates
 - (c) enthalpy
 - (d) steady state
3. Two morphologically similar closely related sympatric populations which are reproductively isolated and can't introduced to produce fertile hybrid are called
 - (a) sibling species
 - (b) allopatric species
 - (c) morphospecies
 - (d) sympatric species
4. Free living non-symbiotic aerobic non-photosynthetic nitrogen fixing bacteria in soils is
 - (a) *Azotobacter*
 - (b) *Rhizobium*
 - (c) *Clostridium*
 - (d) *Anabaena*
5. When the mycelium of *Rhizopus oryzae* grows submerged in a nutritive medium such as sugar solution the young coenocytic hyphae develop septa and divide into short multinucleate segment known as
 - (a) oidia
 - (b) endospores
 - (c) exospores
 - (d) conidia
6. Viruses cannot multiply of their own because they
 - (a) are dead
 - (b) do not have sex organ and gametes
 - (c) lack genetic material
 - (d) lack cellular machinery to use their own genetic material
7. A structure absent in angiosperm is
 - (a) archegonium
 - (b) pistil
 - (c) megagametophyte
 - (d) micro-gametophyte
8. What is mitoplast ?
 - (a) Another name of mitochondria
 - (b) Membraneless mitochondria
 - (c) Mitochondria without outer membrane
 - (d) Mitochondria without inner membrane
9. Synaptonemal complex is a ribonucleo protein structure reported by Moses 1956. It is visible from
 - (a) leptotene through diplotene
 - (b) pachytene through diplotene
 - (c) zygotene through pachytene
 - (d) diplotene through metaphase
10. A tree growing in Indian Botanical Garden Sibpur (Howrah, Calcutta) with age over 200 yr, circumference 404 m, prop roots 1,600 and whose main stem has decayed is
 - (a) *Ficus benghalensis*
 - (b) *Ficus religiosa*
 - (c) *Eucalyptus regnans*
 - (d) No such tree exist
11. The number of pollen grains produced by head inflorescence of Asteraceae (Compositae) having 10 flowers. If each anther produces 20 pollen grains are
 - (a) 300
 - (b) 500
 - (c) 800
 - (d) 1,000
12. Ovary is obliquely placed in/distortion of ovary occurs in
 - (a) Ranunculaceae
 - (b) Brassicaceae
 - (c) Compositae
 - (d) Solanaceae
13. Seeds which are able to withstand reduction in moisture and temperature are called :
 - (a) dormant seeds
 - (b) orthodox seeds
 - (c) recalcitrant seeds
 - (d) non-viable seeds
14. Trophocytes, mycetocytes, oenocytes and urate cells, are found in the fat body of cockroach. Which statement is true ?
 - (a) Trophocytes contain reserve food
 - (b) Mycetocytes contains symbiotic bacteria
 - (c) Oenocytes secrete wax and urate cells contains uric acid
 - (d) all of the above
15. Cockroach has a stomadaeal valve between
 - (a) crop and gizzard
 - (b) gizzard and mesenteron
 - (c) mesenteron and ileum
 - (d) ileum and colon
16. Spermathecae of earthworm take part in
 - (a) collection of sperms of other animals
 - (b) collection of sperms of the same animals

- (c) sperm maturation
(d) fertilisation
17. Which of the following has the highest water potential ?
(a) 1 M salt solution
(b) 1M sugar solution
(c) Distilled water
(d) 1M sugar solution with 2-3 bars pressure applied to it
18. C_4 plants can absorb CO_2 from
(a) its much low concentration
(b) its much high concentration
(c) carbonates
(d) bicarbonates
19. Which of the following physiological effects is caused in plants by gibberellic acid ?
(a) Shortening of genetically tall plants
(b) Rooting in stem cuttings
(c) Elongation of genetically dwarf plants
(d) Yellowing of young leaves
20. Red drop is
(a) drop in flowering of SDP when red light is given in the dark period
(b) drop in flowering in LDP when dark period is interrupted by red light
(c) fall in the rate of photosynthesis when monochromatic light of red region is given to the plant
(d) none of the above
21. LSD is derived from ergot, an extract got from fruiting body of fungus *Claviceps purpurea*, however, bhang, ganja and charas are obtained from the dried of *Cannatris indica*
(a) leaves and flower (b) leaves
(c) flowers (d) stems
22. Which is correct match ?
(a) Wilt of pigeon pea \rightarrow *Phytophthora infestans*
(b) Late blight of potato \rightarrow *Fusarium udum*
(c) Citrus canker \rightarrow *Xanthomonas axonopodis*
(d) Soft rot of sugarcane \rightarrow *Anguina tritici*
23. Multiple shoots are produced in meristem culture because the culture medium contains
(a) cytokinin for overcoming apical dominance
(b) auxin for proliferation of meristem
(c) auxin for overcoming apical dominance
(d) GA_3 for proliferation of meristem
24. Pancoat's syndrome is associated with
(a) neophobia (b) neophrenia
(c) neoplasm (d) neophelium
25. Bile can be prevented to pass into duodenum by
(a) pyloric valve
(b) sphincter of Boyden
(c) sphincter of Oddi
(d) cardiac sphincter
26. In lungs, air is separated from venous blood by
(a) squamous epithelium + tunica externa of blood vessel
(b) squamous epithelium + endothelium of blood vessel
(c) transitional epithelium + tunica medica of blood vessel
(d) columnar epithelium + 3 layered wall of blood vessel
27. Bicarbonates formed inside erythrocytes passes out into plasma while chloride of plasma pass into erythrocytes. The phenomenon is called
(a) bicarbonate shift
(b) Hamburger phenomenon
(c) carbochlorosis
(d) none of the above
28. In mammals the opening of post caval in the right auricle is guarded by
(a) mitral valve
(b) thebesius valve
(c) eustachius valve
(d) bicupid valve
29. Abnormal rise in white blood cells is
(a) leukaemia
(b) polycythemia
(c) anaemia
(d) pneumonia
30. The kidneys not only remove the waste product from the blood but also play a very important role in maintaining
(a) equilibrium of the body
(b) temperature of the body
(c) constant composition of the blood irrespective of the nature of the food or fluid intake
(d) blood pressure constant