## » PHYSICS

1. In radioactive decay process, the negatively charged emitted β-particles are
   (a) the electrons present inside the nucleus
   (b) the electrons produced as a result of the decay of neutrons inside the nucleus
   (c) the electrons produced as a result of collisions between atoms
   (d) the electrons orbiting around the nucleus

2. The maximum number of possible interference maxima for slit-separation equal to twice the wavelength in Young's double-slit experiment, is
   (a) infinite
   (b) five
   (c) three
   (d) zero

3. Two spherical conductors B and C having equal radii and carrying equal charges in them repel each other with a force F when kept apart at some distance. A third spherical conductor having same radius as that of B but uncharged, is brought in contact with B, then brought in contact with C and finally removed away from both. The new force of repulsion between B and C is
   (a) $\dfrac{F}{4}$
   (b) $\dfrac{3F}{4}$
   (c) $\dfrac{F}{8}$
   (d) $\dfrac{3F}{8}$

4. In gamma ray emission from a nucleus
   (a) both the neutron number and the proton number change
   (b) there is no change in the proton number and the neutron number
   (c) only the neutron number changes
   (d) only the proton number changes

5. A particle starting from the origin $(0, 0)$ moves in a straight line in the (x, y) plane. Its coordinates at a later time are $(\sqrt{3}, 3)$. The path of the particle makes with the x-axis an angle

   (a) 30°
   (b) 45°
   (c) 60°
   (d) 0°

6. A wheel has angular acceleration of 3.0 rad/s^2 and an initial angular speed of 2.00 rad/s. In a time of 2 s it has rotated through an angle (in radian) of
   (a) 6
   (b) 10
   (c) 12
   (d) 4

7. The resistance of an ammeter is $13\,\Omega$ and its scale is graduated for a current upto 100 A. After an additional shunt has been connected to this ammeter it becomes possible to measure currents upto 750 A by this meter. The value of shunt resistance is
   (a) $20\,\Omega$
   (b) $2\,\Omega$
   (c) $0.2\,\Omega$
   (d) $2\,k\Omega$

8. Under the influence of a uniform magnetic field a charged particle is moving in a circle of radius R with constant speed v. The time period of the motion
   (a) depends on v and not on R
   (b) depends on both R and v
   (c) is independent of both R and v
   (d) depends on R and not on v

9. The primary and secondary coils of a transformer have 50 and 1500 turns respectively. If the magnetic flux ϕ linked with the primary coil is given by $\phi = \phi_0 + 4t$, where ϕ is in weber, t is time in second and ϕ_0 is a constant, the output voltage across the secondary coil is
   (a) 90 V
   (b) 120 V
   (c) 220 V
   (d) 30 V

10. The frequency of a light wave in a material is 2×10^{14} Hz and wavelength is 5000 Å. The refractive index of material will be
    (a) 1.40
    (b) 1.50
    (c) 3.00
    (d) 1.33

11. A car moves from X to Y with a uniform speed v_u and returns to Y with a uniform speed v_d. The average speed for this round trip is

   (a) $\dfrac{2v_d v_u}{v_d + v_u}$

   (b) $\sqrt{v_u v_d}$

   (c) $\dfrac{v_d v_u}{v_d + v_u}$

   (d) $\dfrac{v_u + v_d}{2}$

12. *A particle executes simple harmonic oscillation with an amplitude a. The period of oscillation is T. The minimum time taken by the particle to* travel half of the amplitude from the equilibrium position is

   (a) $\dfrac{T}{4}$

   (b) $\dfrac{T}{8}$

   (c) $\dfrac{T}{12}$

   (d) $\dfrac{T}{2}$

13. A block B is pushed momentarily along a horizontal surface with an initial velocity v. If μ is the coefficient of sliding friction between B and the surface, block B will come to rest after a time
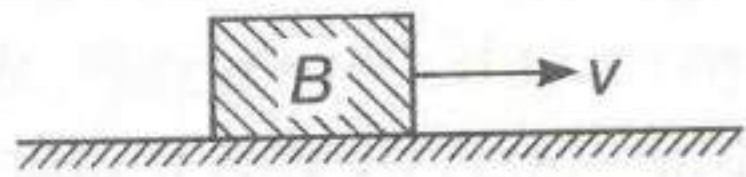
   (a) $\dfrac{v}{g\mu}$

   (b) $\dfrac{g\mu}{v}$

   (c) $\dfrac{g}{v}$

   (d) $\dfrac{v}{g}$

14. Two radioactive substances A and B have decay constants 5λ and λ respectively. At $t = 0$ they have the same number of nuclei. The ratio of number of nuclei of A to those of B will be $\left(\dfrac{1}{e}\right)^2$ after a time interval

   (a) $\dfrac{1}{4\lambda}$

   (b) 4λ

   (c) 2λ

   (d) $\dfrac{1}{2\lambda}$

15. A transformer is used to light a 100 W and 110 V lamp from a 220 V mains. If the main current is 0.5 A, the efficiency of the transformer is approximately

   (a) 30%

   (b) 50%

   (c) 90%

   (d) 10%

16. A charged particle (charge q) is moving in a circle of radius R with uniform speed v. The associated magnetic moment μ is given by

   (a) $\dfrac{qvR}{2}$

   (b) qvR^2

   (c) $\dfrac{qvR^2}{2}$

   (d) qvR

17. A steady current of 1.5 A flows through a copper voltameter for 10 min. If the electrochemical equivalent of copper is 30×10^{-5} g C^{-1}, the mass of copper deposited on the electrode will be

   (a) 0.40 g

   (b) 0.50 g

   (c) 0.67 g

   (d) 0.27 g

18. In a mass spectrometer used for measuring the masses of ions, the ions are initially accelerated by an electric potential V and then made to describe semicircular paths of radius R using a magnetic field B. If V and B are kept constant, the ratio $\left(\dfrac{\text{charge on the ion}}{\text{mass of the ion}}\right)$ will be proportional to

   (a) $\dfrac{1}{R}$

   (b) $\dfrac{1}{R^2}$

   (c) R^2

   (d) R

19. Three resistances P, Q, R each of 2Ω and an unknown resistance S form the four arms of a Wheatstone's bridge circuit. When a resistance of 6Ω is connected in parallel to S the bridge gets balanced. What is the value of S ?

   (a) 2Ω

   (b) 3Ω

   (c) 6Ω

   (d) 1Ω

20. Two satellites of earth, S_1 and S_2, are moving in the same orbit. The mass of S_1 is four times the mass of S_2. Which one of the following statements is true ?

   (a) The time period of S_1 is four times that of S_2

   (b) The potential energies of earth and satellite in the two cases are equal

   (c) S_1 and S_2 are moving with the same speed

   (d) The kinetic energies of the two satellites are equal

21. An observer moves towards a stationary source of sound, with a velocity one-fifth of the velocity of sound. What is the percentage increase in the apparent frequency ?

   (a) Zero

   (b) 0.5%

   (c) 5%

   (d) 20%

22. A coil of inductance 300 mH and resistance 2Ω is connected to a source of voltage 2 V. The current reaches half of its steady state value in

   (a) 0.05 s

   (b) 0.1 s

   (c) 0.15 s

   (d) 0.3 s

23. The refractive index of glass is 1.520 for red light and 1.525 for blue light. Let D_1 and D_2 be angles of minimum deviation for red and blue light respectively in a prism of this glass. then,

   (a) $D_1 < D_2$

   (b) $D_1 = D_2$

   (c) D_1 can be less than or greater than D_2 depending upon the angle of prism

   (d) $D_1 > D_2$

24. A particle of mass 100 g is thrown vertically upwards with a speed of 5 m/s. The work done by the force of gravity during the time the particle goes up is

   (a) – 0.5 J   (b) –1.25 J

   (c) 1.25 J   (d) 0.5 J

25. A mass of M kg is suspended by a weightless string. The horizontal force that is required to displace it until the string makes an angle of 45° with the initial vertical direction is

   (a) $Mg(\sqrt{2} + 1)$ (b) $Mg\sqrt{2}$

   (c) $\dfrac{Mg}{\sqrt{2}}$ (d) $Mg(\sqrt{2} - 1)$

26. A force of $-F\,\hat{k}$ acts on O, the origin of the coordinate system. The torque about the point $(1, -1)$ is

   (a) $F(\hat{i} - \hat{j})$ (b) $-F(\hat{i} + \hat{j})$
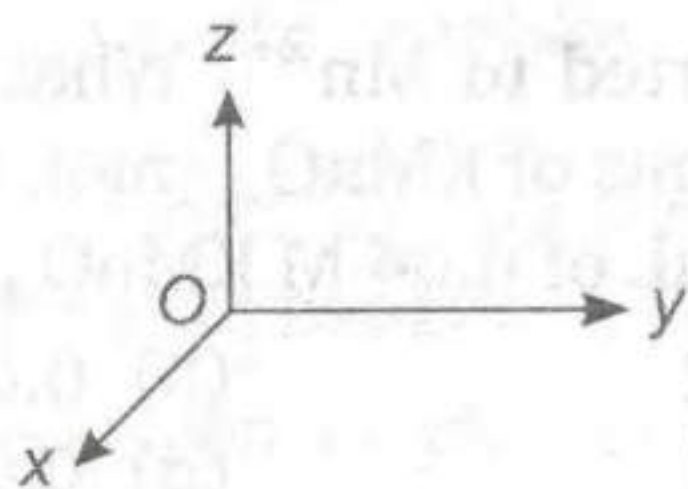
   (c) $F(\hat{i} + \hat{j})$ (d) $-F(\hat{i} - \hat{j})$

27. If M_O is the mass of an oxygen isotope $_8O^{17}$, M_p and M_n are the masses of a proton and a neutron, respectively, the nuclear binding energy of the isotope is

   (a) $(M_O - 8M_p)c^2$

   (b) $(M_O - 8M_p - 9M_n)c^2$

   (c) $M_O c^2$

   (d) $(M_O - 17M_n)c^2$

28. A sound absorber attenuates the sound level by 20 dB. The intensity decreases by a factor of

   (a) 1000   (b) 10000

   (c) 10   (d) 100

29. Which of the following parameters does not characterise the thermodynamic state of matter ?

   (a) Temperature   (b) Pressure

   (c) Work   (d) Volume

30. A charged oil drop is suspended in uniform field of 3×10^4 V/m so that it neither falls nor rises. The charge on the drop will be (Take the mass of the charge $= 9.9 \times 10^{-15}$ kg and $g = 10$ m/s^2)

   (a) 3.3×10^{-18} C   (b) 3.2×10^{-18} C

   (c) 1.6×10^{-18} C   (d) 4.8×10^{-18} C

31. Dimensions of resistance in an electrical circuit, in terms of dimension of mass M, of length L, of time T and of current I, would be

   (a) $[ML^2T^{-3}I^{-1}]$ (b) $[ML^2T^{-2}]$

   (c) $[ML^2T^{-1}I^{-1}]$ (d) $[ML^2T^{-3}I^{-2}]$

32. An alpha nucleus of energy $\dfrac{1}{2}mv^2$ bombards a heavy nuclear target of charge Ze. Then the distance of closest approach for the alpha nucleus will be proportional to

   (a) v^2 (b) $1/m$

   (c) $1/v^4$ (d) $1/Ze$

33. The work of 146 kJ is performed in order to compress one kilo mole of a gas adiabatically and in this process the temperature of the gas increases by 7°C. The gas is
   ($R = 8.3$ J mol^{-1} K^{-1})

   (a) diatomic

   (b) triatomic

   (c) a mixture of monoatomic and diatomic

   (d) monoatomic

34. Diwali rocket is ejecting 50 g of gases/s at a velocity of 400 m/s. The accelerating force on the rocket will be

   (a) 22 dyne   (b) 20 N

   (c) 20 dyne   (d) 100 N

35. A frame made of metallic wire enclosing a surface area A is covered with a soap film. If the area of the frame of metallic wire is reduced by 50%, the energy of the soap film will be changed by

   (a) 100%   (b) 75%

   (c) 50%   (d) 25%

36. Mercury boils at 367°C. However, mercury thermometers are made such that they can measure temperature upto 500°C. This is done by

   (a) maintaining vacuum above mercury column in the stem of the thermometer

   (b) filling nitrogen gas at high pressure above the mercury column

(c) filling oxygen gas at high pressure above the mercury column

(d) filling nitrogen gas at low pressure above the mercury column

37. In a laboratory four convex lenses L_1, L_2, L_3 and L_4 of focal lengths 2, 4, 6 and 8 cm, respectively are available. Two of these lenses form a telescope of length 10 cm and magnifying power 4. The objective and eye lenses are respectively

(a) L_2, L_3 (b) L_1, L_4

(c) L_1, L_2 (d) L_4, L_1

38. A symmetric double convex lens is cut in two equal parts by a plane perpendicular to the principal axis. If the power of the original lens is 4D, the power of a cut lens will be

(a) 2D   (b) 3D

(c) 4D   (d) 5D

39. For a metallic wire, the ratio $\dfrac{V}{i}$ (V = applied potential difference and i = current flowing) is

(a) independent of temperature

(b) increases as the temperature rises

(c) decreases as the temperature rises

(d) increases or decreases as temperature rises depending upon the metal

40. The potential energy of a molecule on the surface of a liquid compared to one inside the liquid is

(a) zero   (b) lesser

(c) equal   (d) greater

» CHEMISTRY

1. Which of the following is not correct ?

(a) Hydrolysis of NCl_3 gives NH_3 and $HOCl$

(b) NH_3 is less stable than PH_3

(c) NH_3 is a weak reducing reagent compared to PH_3

(d) Nitric oxide in solid state exhibits diamagnetic property

2. SiO_2 is reacted with sodium carbonate. What is the gas liberated ?

(a) CO   (b) O_2

(c) CO_2 (d) O_3

3. The compounds formed at anode in the electrolysis of an aqueous solution of potassium acetate, are

(a) C_2H_6 and CO_2 (b) C_2H_4 and CO_2

(c) CH_4 and H_2 (d) CH_4 and CO_2

4. Which of the following is not correct regarding the elecolytic preparation of H_2O_2 ?

(a) Lead is used as cathode

(b) 50% H_2SO_4 is used

(c) Hydrogen is liberated at anode

(d) Sulphuric acid undergoes oxidation

5. Which of the following is correct?

(a) The pH of one litre solution containing 0.49 g of H_2SO_4 is 2.0

(b) The conjugate base of H_2S is S^{2-}

(c) BF_3 is a Lewis base

(d) Phenolphthalein is colourless in basic medium

6. Which of the following is correct ?

(a) Catalyst undergoes permanent chemical change

(b) Particle size of solute in true solution is 10^{-3} m

(c) Starch solution is a hydrosol

(d) Hydrolysis of liquid ester in the presence of mineral acid is an example of heterogeneous catalysis reactions

7. In an oxidation-reduction reaction, MnO_4^- ion is converted to Mn^{2+}. What is the number of equivalents of $KMnO_4$ (mol. wt. = 158) present in 250 mL of 0.04 M $KMnO_4$ solution ?

(a) 0.02   (b) 0.05

(c) 0.04   (d) 0.07

8. Which of the following reagents converts both acetaldehyde and acetone to alkanes ?

(a) Ni/H_2 (b) $LiAlH_4$

(c) $I_2/NaOH$ (d) Zn-Hg/conc. HCl

9. The heat of formation of $CO(g)$ and $CO_2(g)$ are $\Delta H = -110$ and $\Delta H = -393\ kJ\ mol^{-1}$ respectively. What is the heat of reaction (ΔH) (in $kJ\ mol^{-1}$) for the following reaction ?

$$CO(g) + \frac{1}{2}O_2(g) \longrightarrow CO_2(g)$$
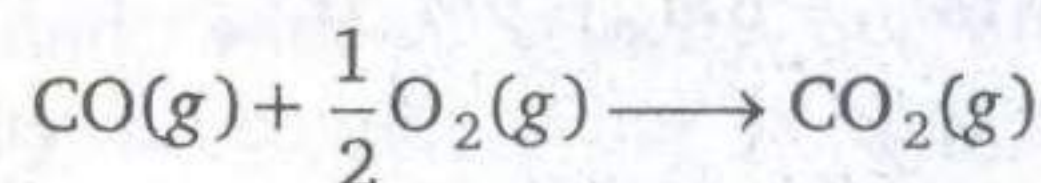
(a) -504 (b) -142.5

(c) -283 (d) 504

10. What is the wavelength (in m) of a particle of mass 6.62×10^{-29} g moving with a velocity of $10^3\ ms^{-1}$?

(a) 6.62×10^{-4} (b) 6.62×10^{-3}

(c) 10^{-5} (d) 10^5

11. What is the electrode potential (in V) of the following electrode at 25°C ?

Ni^{2+} (0.1 M)| Ni(s)

(Standard reaction potential of Ni^{2+} |Ni is $-0.25V$, $\dfrac{2.303\,RT}{F} = 0.06$)

(a) -0.28 V   (b) -0.34 V

(c) -0.82 V   (d) -0.22 V

12. What is the equation for the equilibrium constant (K_c) for the following reaction?

$$\frac{1}{2}A(g) + \frac{1}{3}B(g) \underset{}{\overset{T(K)}{\rightleftharpoons}} \frac{2}{3}C(g)$$

(a) $K_c = \dfrac{[A]^{1/2}[B]^{1/3}}{[C]^{3/2}}$ (b) $K_c = \dfrac{[C]^{3/2}}{[A]^{2}[B]^{3}}$

(c) $K_c = \dfrac{[C]^{2/3}}{[A]^{1/2}[B]^{1/3}}$ (d) $K_c = \dfrac{[C]^{2/3}}{[A]^{1/2} + [B]^{1/3}}$

13. Which of the following can give a Grignard reagent when reacted with magnesium in dry ether ?

(a) C_2H_6 (b) C_2H_5Cl

(c) C_2H_5OH (d) C_2H_5CN

14. Which of the following is not correct?

(a) Al reacts with NaOH and liberate H_2

(b) $AlCl_3$ is a Lewis acid

(c) Al is used in the manufacture of electrical cables

(d) NaOH is used during Hall's process of purification of bauxite

15. A 0.5 g/L solution of glucose is found to be isotonic with a 2.5 g/L solution of an organic compound. What will be the molecular weight of that organic compound ?

(a) 300   (b) 600

(c) 900   (d) 200

16. t-butyl chloride preferably undergo hydrolysis by

(a) S_N1 mechanism

(b) S_N2 mechanism

(c) Any of (a) and (b)

(d) None of these

17. Oxidation state of oxygen in F_2O is

(a) $+1$ (b) -1

(c) $+2$ (d) -2

18. To dissolve argentite ore which of the following is used ?

(a) $Na[Ag(CN)_2]$ (b) NaCN

(c) NaCl   (d) HCl

19. If 50% of a radioactive substance dissociates in 15 min, then the time taken by substance to dissociate 99% will be

(a) 50 min   (b) 100 min

(c) 99 min   (d) 150 min

20. H—O—H bond angle in H_2O is 104.5° and not 109° 28' because of

(a) lone pair-lone pair repulsion

(b) lone pair-bond pair repulsion

(c) bond pair-bond pair repulsion

(d) high electronegativity of oxygen

21. The reaction,

$C_6H_5CHO + CH_3COOC_2H_5 \longrightarrow$
$C_6H_5CH = CHCOOC_2H_5$, is called

(a) Benzoin condensation

(b) Claisen condensation

(c) Cannizaro's reaction

(d) Perkin reaction

22. The best method to separate the mixture of *ortho* and *para* nitrophenol (1 :1) is

(a) vaporisation   (b) colour spectrum

(c) distillation   (d) crystallisation

23. Iodoform gives a precipitate with $AgNO_3$ on heating but chloroform does not because

(a) C — I bond in iodoform is weak and C — Cl bond in chloroform is strong

(b) chloroform is covalent

(c) iodoform is ionic

(d) None of the above

24. What are the values of n_1 and n_2 respectively for H_β line in the Lyman series of hydrogen atomic spectrum 44 ?

(a) 3 and 5   (b) 2 and 3

(c) 1 and 3   (d) 2 and 4

25. The homologue of ethyne is

(a) C_2H_2 (b) C_2H_6

(c) C_3H_8 (d) C_3H_4

26. A 0.1 aqueous solution of a weak acid is 2% ionised. If the ionic product of water is 1×10^{-4}, the $[OH^-]$ is

(a) 5×10^{-12} M   (b) 2×10^{-3} M

(c) 1×10^{-14} M   (d) None of these

27. Which of the following does not have coordinate bond?

(a) SO_2 (b) HNO_3

(c) H_2SO_3 (d) HNO_2

28. The total number of orbitals in the fifth energy level is

(a) 5   (b) 10

(c) 18   (d) 25

29. The most probable velocity (in cm/s) of hydrogen molecule at 27°C will be
    (a) 19.3×10^4 (b) 17.8×10^4
    (c) 24.93×10^9 (d) 17.8×10^8

30. In III group precipitation, NH_4Cl is added before adding NH_4OH to
    (a) decrease conc. of OH^-
    (b) prevent interference of PO_4^{3-}
    (c) increase conc. of Cl^-
    (d) increase conc. of OH^- ion

31. Steel is heated to below red heat and then, cooled slowly. The process refers to
    (a) hardening   (b) annealing
    (c) tempering   (d) nitriding

32. What is the wave number of 4th line in Balmer series of hydrogen spectrum ? $(R = 1,09,677 \text{ cm}^{-1})$
    (a) $24,630 \text{ cm}^{-1}$ (b) $24,360 \text{ cm}^{-1}$
    (c) $24,730 \text{ cm}^{-1}$ (d) $24,372 \text{ cm}^{-1}$

33. 9.2 g N_2O_4 is heated in a 1 L vessel till equilibrium state is established
    $$N_2O_4(g) \rightleftharpoons 2NO_2(g)$$
    In equilibrium state 50% N_2O_4 was dissociated, equilibrium constant will be
    (mol. wt. of $N_2O_4 = 92$)
    (a) 0.1   (b) 0.4
    (c) 0.3   (d) 0.2

34. Disperse phase and dispersion medium in butter are respectively

(a) solid and liquid   (b) liquid and solid

(c) liquid and liquid   (d) solid and solid

35. Which of the following carbonates decomposes readily at low temperatures ?
    (a) Na_2CO_3 (b) K_2CO_3
    (c) Li_2CO_3 (d) Rb_2CO_3

36. The atomic number of an element 'M' is 26. How many electrons are present in the M-shell of the element in its M^{3+} state ?
    (a) 11   (b) 15   (c) 14   (d) 13

37. In which of the following pairs, both molecules possess dipole moment ?
    (a) CO_2, SO_2 (b) BCl_3, PCl_3
    (c) H_2O, SO_2 (d) CO_2, CS_2

38. Which one of the following reactions is called Rosenmund reaction ?
    (a) Aldehydes are reduced to alcohols
    (b) Acids are converted to acid chlorides
    (c) Alcohols are reduced to hydrocarbons
    (d) Acid chlorides are reduced to aldehydes

39. During, acetylation of amines, what is replaced by acetyl group ?
    (a) Hydrogen atom attached to nitrogen atom
    (b) One or more hydrogen atoms attached to carbon atom
    (c) One or more hydrogen atoms attached to nitrogen atom
    (d) Hydrogen atoms attached to either carbon atom or nitrogen atom

40. Which is used in alcoholic beverages ?
    (a) Methanol   (b) Ethanol
    (c) Phenol   (d) Glycerol

≫ ZOOLOGY

1. The trisomy for 21st chromosome is called
   (a) Down's syndrome
   (b) Turner's syndrome
   (c) Sickle cell anaemia
   (d) Klinefelter's syndrome

2. Which of the following is the largest gland in an adult man ?
   (a) Thymus   (b) Liver
   (c) Thyroid   (d) Pancreas

3. In *Pheretima,* septa are absent between which segments ?
   (a) 3/4 and 9/10   (b) 4/5 and 8/9
   (c) 5/6 and 7/8   (d) 7/8 and 6/7

4. During emergency which of the following hormone is secreted?

(a) Aldosterone   (b) Thyroxine
(c) Adrenalin   (d) Calcitonin

5. In cockroach, larval and nymphal characters are maintained by
   (a) ecdysone   (b) salivary glands
   (c) parotid gland   (d) juvenile hormone

6. Which of the following is a transparent tissue?
   (a) Tendon   (b) Fibrous cartilage
   (c) Hyaline cartilage (d) All of these

7. Rh factor is present in
   (a) all vertebrates
   (b) all mammals
   (c) all reptiles
   (d) man and rhesus monkey only

8. In rabbit, end of a long bone is connected in another by
   (a) tendon   (b) ligaments
   (c) muscle   (d) cartilage

9. Which of the following cell type is capable of giving rise to other cell types in sponges ?
   (a) Thesocytes   (b) Pinacocytes
   (c) Cnidocytes   (d) Archaeocytes

10. Thigmotaxis is not shown by
   (a) *Paramecium*   (b) *Amoeba*
   (c) *Ascaris*   (d) *Hydra*

11. Which is correctly matched?
   (a) Apiculture   — Honey bee
   (b) Pisciculture — Silk moth
   (c) Sericulture   — Fish
   (d) Aquaculture   — Mosquito

12. Animals having a built in thermostat to maintain constant body temperature are known as
   (a) biothermic   (b) poikilothermic
   (c) oligothermic   (d) homeothermic

13. The intermediate host of *Schistosoma* is
   (a) snail   (b) mosquito
   (c) housefly   (d) sheep

14. The vitamin which is essential for blood clotting is
   (a) vitamin-A   (b) vitamin-B
   (c) vitamin-C   (d) vitamin-K

15. The female genital pore of *Pheretima posthuma* located upon the segment
   (a) 14th (b) 16th
   (c) 18th (d) 15th

16. Polyp phase is absent in
   (a) *Hydra*   (b) *Aurelia*
   (c) *Physalia*   (d) *Obelia*

17. In frog heart, there are cardiac muscles which consists of fibres called
   (a) Purkinje fibres (b) myonemes
   (c) telodendria   (d) columnae carnae

18. Malpighian tubules are
   (a) excretory organs of insects
   (b) excretory organs of frog
   (c) respiratory organs of insects
   (d) endocrine glands of insects

19. LH and FSH are collectively called
   (a) oxytocin   (b) somatotropins
   (c) luteotropic   (d) gonadotropins

20. Which of the following provides most evident proof of evolution?
   (a) Fossils   (b) Morphology
   (c) Embryo   (d) Vestigial organs

21. In Mollusca, eye is present over a stalk, called
   (a) ostracum   (b) operculum
   (c) ommatophores   (d) osphradium

22. Turbellarians are free living
   (a) nematodes   (b) cestodes
   (c) flat worms   (d) trematodes

23. The characteristic larva of phylum— 'Coelenterata' is
   (a) planula   (b) cysticercus
   (c) rhabdiform   (d) wriggler

24. In rabbit, head of epididymis present at the head of the testis is called
   (a) vas deferens   (b) cauda epididymis
   (c) gubernaculum   (d) caput epididymis

25. In blood, CO_2 in transported majorly as
   (a) sodium carbonate
   (b) carboxyhaemoglobin
   (c) bicarbonate
   (d) CO_2 as such

26. Animals undergoes inactive stage during winter, is known as
   (a) aestivation   (b) hibernation
   (c) adaptation   (d) acclimatization

27. Kupffer cells are present in
   (a) liver   (b) small intestine
   (c) pancreas   (d) thyroid gland

28. The embryo at 16 celled stage is known as
   (a) morula   (b) gastrula
   (c) blastula   (d) blastomere

29. Contractile vacuole in protozoan *Amoeba* is meant for
   (a) respiration   (b) excretion
   (c) locomotion   (d) osmoregulation

30. Which of the following is important for muscle contraction and nerve impulse transmission?
   (a) Ca^{2+} ions   (b) Mg^{2+} ions
   (c) Both (a) and (b) (d) Fe^{2+} ions

31. Which one is component of Ornithine cycle?
   (a) Ornithine, citrulline and alanine
   (b) Ornithine, citrulline and arginine
   (c) Amino acid are not used
   (d) Ornithine, citrulline and fumaric acid

32. Chromosome complement with $2n - 1$ is called
   (a) monosomy   (b) nullisomy
   (c) trisomy   (d) tetrasomy

33. Which of the following is not vestigial in man?
   (a) Tail vertebrae
   (b) Nails
   (c) Nictitating membrane
   (d) Vermiform appendix

34. Small fish get stuck near the bottom of a shark and derives its nutrition from it. This kind of association is called as
    (a) antibiosis
    (b) commensalism
    (c) predation
    (d) parasitism

35. The group of Anamniota includes
    (a) reptiles and birds
    (b) birds and mammals
    (c) fishes an amphibians
    (d) reptiles and mammals

36. The excretory material of bony fish is
    (a) urea
    (b) protein
    (c) ammonia
    (d) amino acid

37. The leucocytes contain which of the following in large quantity?
    (a) Basophils
    (b) Neutrophils
    (c) Eosinophils
    (d) Monocytes

38. During inspiration, the diaphragm
    (a) expands
    (b) shows no change
    (c) contracts and flattens
    (d) relaxes to become dome-shaped

39. The function of pineal body is to
    (a) lighten the skin colours
    (b) control sexual behaviour
    (c) regulates the period of puberty
    (d) All of the above

40. Synsacrum of fowl consists of about
    (a) 29 vertebrae
    (b) 3 vertebrae
    (c) 16 vertebrae
    (d) single vertebrae

≫ BOTANY

1. Jumping genes in maize were discovered by
   (a) Hugo de Vries
   (b) Barbara McClintock
   (c) T H Morgan
   (d) Mendel

2. Streptomycin is obtained from
   (a) *Streptomyces griseus*
   (b) *S. aureofaciens*
   (c) *S. venezuelae*
   (d) *S. ramosus*

3. Indusium is found in
   (a) algae
   (b) ferns
   (c) moss
   (d) *Cycas*

4. The vacuole is lined by a membrane called
   (a) tonoplast
   (b) jacket
   (c) cell membrane
   (d) tonoplasm

5. Agar-agar is obtained from
   (a) *Chlorella*
   (b) *Spirogyra*
   (c) *Ulothrix*
   (d) *Gelidium*

6. DNA element with ability to change position is called
   (a) cistron
   (b) transposon
   (c) intron
   (d) recon

7. Initiation codon is
   (a) UUU
   (b) UGA
   (c) AUG
   (d) UAG

8. DNA multiplication is called
   (a) translation
   (b) replication
   (c) transduction
   (d) transcription

9. Duramen is present in
   (a) inner region of secondary wood
   (b) part of sap wood
   (c) outer region of secondary wood
   (d) region of pericycle

10. In plants, water supply is due to
    (a) osmosis
    (b) imbibition
    (c) guttation
    (d) adhesion force

11. Most of the economically important fibre yielding plants belong to family
    (a) Malvaceae
    (b) Solanaceae
    (c) Cruciferae
    (d) Poaceae

12. Paraffin wax is
    (a) ester
    (b) acid
    (c) monohydric alcohol
    (d) cholesterol

13. Which is always present in photochemical smog?
    (a) O_3
    (b) CO_2
    (c) SO_2
    (d) CH_4

14. In cell cycle, during which phase, chromosomes are arranged in equatorial plate?
    (a) Metaphase
    (b) Anaphase
    (c) Telophase
    (d) Prophase

15. The soil which is transported by wind is known as
    (a) colluvial
    (b) eolian
    (c) aluvial
    (d) glacial soil

16. Spindle fibre is made up of
    (a) tubulin
    (b) humulin
    (c) intermediate filament
    (d) flagellin

17. Lichen is the pioneer vegetation on which succession?
    (a) Hydrosere
    (b) Lithosere
    (c) Psammosere
    (d) Xerosere

18. In *Pinus*, male cone bears a large number of
    (a) ligules
    (b) anthers
    (c) micro-sporophylls
    (d) mega-sporophylls

19. Induction of flowering by low temperature treatment is
    (a) vernalization   (b) cryobiology
    (c) photoperiodism (d) prunning

20. Decomposers are
    (a) autotrophs   (b) autoheterotrophs
    (c) organotrophs   (d) heterotrophs

21. Cleavage polyembryony occurs in
    (a) *Pinus*   (b) Mini *Cycas*
    (c) *Cycas*   (d) *Ephedra*

22. Edible part of mushroom is
    (a) basidiocarp
    (b) secondary mycelium
    (c) primary mycelium
    (d) tertiary mycelium

23. Calyptra is derived from
    (a) archegonia   (b) capsule
    (c) antheridia   (d) columella

24. 'Clamp connections' are observed in
    (a) Basidiomycetes (b) Zygomycetes
    (c) Ascomycetes   (d) Oomycetes

25. What is the main cause for the extinction of some species in tropical forest ?
    (a) Deforestation   (b) Afforestation
    (c) Pollution   (d) Soil erosin

26. Most accepted theory for ascent of sap is
    (a) capillarity theory (b) root pressure theory
    (c) pulsation theory (d) transpiration pull

27. Which of the following is not the feature of gymnosperms ?
    (a) Parallel venation
    (b) Perennial plants
    (c) Distinct branches (long and short branches)
    (d) Xylem with vessels

28. The presence of diversity at the junction of territories of two different habitats is known as
    (a) bottle neck effect (b) edge effect
    (c) junction effect   (d) Pasteur effect

29. In which form does the food transported in plants?
    (a) Sucrose   (b) Fructose
    (c) Glucose   (d) Lactose

30. In *Cycas*, pollination takes place in
    (a) 3 celled stage (b) 4 celled stage
    (c) 2 celled stage (d) 1 celled stage

31. The bioassay of auxin is
    (a) avena curvature test
    (b) callus formation

    (c) culture of fungus
    (d) seed dormancy

32. A eukaryotic gene contains two kinds of base sequences. Which of these plays an important role in protein synthesis?
    (a) Introns   (b) Exons
    (c) Both (a) and (b) (d) None of these

33. L-shaped chromosomes are also called
    (a) acrocentric   (b) telocentric
    (c) sub-metacentric (d) None of these

34. Which of the following is/are grouped under phanerogams?
    (a) Angiosperms   (b) Gymnosperms
    (c) Pteridophytes   (d) Both (a) and (b)

35. A bacterium divides after every 35 min., if a culture containing 10^5 cells per mL is grown, then cell concentration per mL after 175 min. will be
    (a) 175×10^5 (b) 125×10^5
    (c) 48×10^5 (d) 32×10^5

36. Which of the following theory gives the latest explanation for the closure of stomata?
    (a) ABA theory
    (b) Munch theory
    (c) Starch glucose theory
    (d) Active K^+ transport theory

37. Biological concept of species is mainly based on
    (a) reproductive isolation
    (b) morphological features only
    (c) methods of reproduction only
    (d) morphology and methods of reproduction

38. In the treatment of waste water discharge, which treatment stage involves biological treatment ?
    (a) Primary treatment
    (b) Secondary treatment
    (c) Tertiary treatment
    (d) Reverse osmosis stage

39. Nucellus forms which of the following part of fruit ?
    (a) Seed coat   (b) Perisperm
    (c) Seed   (d) Raphe

40. If root of a flowering plant has 24 chromosomes, then its gamete has how many chromosomes ?
    (a) 24   (b) 12
    (c) 4   (d) 8

Directions (Q. 1-5) : *In each of the following questions, choose the alternative which best expresses the meaning of the given idiom/phrase.*

1. A pipe dream
   (a) A pleasant dream
   (b) A bad dream
   (c) An impracticable plan
   (d) A foolish idea

2. To give up the ghost
   (a) To die
   (b) To make false appearance
   (c) To terrify others by acting in suspicious manner
   (d) To leave useless pursuits

3. To disabuse one's mind
   (a) To conceal something
   (b) To remove a misapprehension
   (c) To banish from one's mind a thought
   (d) To proceed cautiously so as to avoid risks and dangers

4. To wrangle over an ass's shadow
   (a) To act in a foolish way
   (b) To quarrel over trifles
   (c) To waste time fron petty things
   (d) To do something funny

5. To be at daggers drawn
   (a) To be frightened
   (b) To be ready to face danger
   (c) To threaten one
   (d) To be bitter enemy

Directions (Q. 6-10) : *Choose the correct alternative to fill in the blank.*

6. According to corporate circles, Datta is pushing through the merger to create a financially _____ company in the processed foods business, the group's thrust area for the 1990s.
   (a) straight
   (b) powerful
   (c) leading
   (d) acceptable

7. A man who is well-bred and honourable in-variably shows ____ for the feelings of other people.
   (a) complacence
   (b) concern
   (c) consideration
   (d) contempt

8. You will have to face some practical problems when you start ____ this plan.
   (a) prosecuting
   (b) projecting
   (c) prescribing
   (d) proscribing

9. Speeding and blocking are traffic offences which lead to ___ accidents.
   (a) winsome
   (b) urban
   (c) gruesome
   (d) minor

10. The more your action and thought are allied and ___, the happier you grow.
    (a) invincible
    (b) divergent
    (c) integrated
    (d) unravelled

Directions (Q. 11-15) : *In each of the following questions, rearrange the parts P, Q, R and S to make a proper sentence.*

11. Around the world, painful terminal diseases/(P), the question of human death/(Q), people are wrestling with /(R), especially in the face of/(S)
    (a) R S Q P
    (b) P Q R S
    (c) R Q S P
    (d) P S Q R

12. The specific, ability requirements of the job/(P), depend on the/(Q), required for adequate job performance/(R), intellectual or physical abilities/(S)
    (a) P Q R S
    (b) S R Q P
    (c) P R Q S
    (d) S Q R P

13. Freedom, is the restricted kind in the sense/(P), the rich and the poor woman/(Q), that a wide gulf separates/(R), which a modern woman enjoys/(S)
    (a) P S R Q
    (b) S R Q P
    (c) R Q P S
    (d) S P R Q

14. In life, some rules are/ (P), as in business/(Q), they seem almost instinctive/(R), learnt so early that/(S)
    (a) R S P Q
    (b) Q P S R
    (c) R P S Q
    (d) Q S P R

15. Kapil, left in an aeroplane/(P), after reading a sailing magazine/(Q), had decided/(R), to build his own boat nine years earlier/(S)
    (a) P R Q S
    (b) R S Q P
    (c) R Q P S
    (d) P S R Q

16. I *would gladly accompany* your sister if you had asked me.
    (a) would have gladly accompanied
    (b) was to have gladly accompanied
    (c) will gladly accompany
    (d) No improvement

17. The indecisive man *was readily persuaded* to change his mind again.
    (a) was persuaded ready
    (b) was ready to persuade
    (c) was ready persuaded
    (d) No improvement

18. He enjoys *to tell stories* to children.
    (a) how to tell stories
    (b) telling stories
    (c) to narrate stories
    (d) No improvement

19. It is unreasonable to *distort* the statement of a man simply because he does not agree with your opinions.
    (a) discourage   (b) denounce
    (c) bend   (d) No improvement

20. *Would* you find me absent, please don't forget to leave a message behind.
    (a) As
    (b) Should
    (c) Unless
    (d) No improvement

21. The *rancous* shouts of the audience forced the management to call off the show.
    (a) unpleasant   (b) loud
    (c) harsh   (d) harmful

22. At the Hardy house there was great *consternation* when Aunt Gertrude saw Joe helping Frank up the stairs.
    (a) surprise   (b) panic
    (c) gaity   (d) anxiety

23. Methods of spreading the family planning message have been as *fecund* as they have been abortive.
    (a) fruitful   (b) failing
    (c) peculiar   (d) false

24. Now the *fury* of the demonstrators turned against the machines.
    (a) asperity   (b) passion
    (c) rage   (d) acrimony

25. Everyone who has worked for him *hammers* home that point because they feel that it is widely unappreciated.
    (a) hints   (b) stresses
    (c) strikes   (d) directs

26. Here *debonair* manners were noticed by everyone present in the city.
    (a) stiff   (b) cheerless
    (c) courteous   (d) pleasant

27. Like poverty, *affluence* can sometimes create its own problems.
    (a) sorrow   (b) indigence
    (c) exuberance   (d) opulence

28. It is surprising to find her *condoning* such an act.
    (a) disparaging   (b) condemning
    (c) disliking   (d) forbidding

29. He proved utterly *capricious* in his dealings with his friends.
    (a) helpful   (b) steadfast
    (c) understanding   (d) obstinate

30. As long as he remained in that office, he maintained his *hegemony*.
    (a) predominance   (b) poverty
    (c) subordination   (d) chaos

31. Medical study of the skin and its diseases
    (a) Dermatology   (b) Orthopaedics
    (c) Venereology   (d) Homeopathy

32. Code of diplomatic etiquette and precedence
    (a) Formalism   (b) Statesmanship
    (c) Protocol   (d) Hierachy

33. The branch of medical science which deals with the problems of the old
    (a) Oncology   (b) Geriatric
    (c) Obstetrics   (d) Endocrinol

34. One who promotes the idea of absence of government of any kind, when every man should be a law unto himself
    (a) Anarchist   (b) Belligerent
    (c) Iconoclast   (d) Agnostic

35. Design made by putting together coloured pieces of glass or stones
    (a) Oleograph   (b) Mosaic
    (c) Tracery   (d) Relief

Directions (Q. 36-40) : *Read the following passage carefully and answer the questions given below it.*

Most of us use the products of science—railways, aeroplanes, electricity, wireless and thousands of others—without thinking how they came into existence. We take them for granted, as if we were entitled to them as a matter of right. And we are very proud of the fact that we live in an advanced age and are ourselves so very 'advanced'. Now, there is no doubt that our age is a very different one from previous ages and I think it is perfectly correct to say that it is far more advanced. But that is a different thing from saying that we as individuals or groups are more advanced. It would be the height of absurdity to say that because an engine-driver can run an engine and Plato or Socrates could not, the engine-driver is more advanced than, or is superior to Plato or Socrates. But it would be perfectly correct to say that the engine itself is a more advanced method of locomotion than Plato's chariot was.

36. Which one of the following statements is true?
    (a) An engine-driver is cleverer than Plato or Socrates.
    (b) Plato or Socrates is in no way inferior to the engine-driver.
    (c) Plato and Socrates surpassed the engine-driver in every respect.
    (d) The engine-driver cannot be compared to Plato or Aristotle.

37. In this passage the author mentions Plato and/or Socrates to emphasise that
    (a) they are/were men of great scholarship.
    (b) people as individuals in the modern age are not more advanced than their predecessors.
    (c) the engine is a better mode of locomotion than Plato's chariot.
    (d) Plato and Aristotle had greater respect for learning.

38. According to the author, the present age is far more advanced than
    (a) all the previous ages in some respect.
    (b) the age of Socrates and Aristotle in some respects.
    (c) some of the previous ages in all respects.
    (d) all the previous ages in all respects.

39. Many of us make use of machines
    (a) with very little knowledge of their mechanism
    (b) without any knowledge of their historical significance.
    (c) with full knowing of their genesis.
    (d) without knowing how they were invented.

40. People today are very proud because they live
    (a) in a philosophically advanced age.
    (b) in a materially advanced age.
    (c) in a scientifically advanced age.
    (d) in a spiritually advanced age.

Answers

PHYSICS

1. (b)	**2.** (b)	**3.** (d)	**4.** (b)	**5.** (c)	**6.** (b)	**7.** (b)	**8.** (c)	**9.** (b)	**10.** (c)
11. (a)	**12.** (c)	**13.** (a)	**14.** (d)	**15.** (c)	**16.** (a)	**17.** (d)	**18.** (b)	**19.** (b)	**20.** (c)
21. (a)	**22.** (b)	**23.** (a)	**24.** (b)	**25.** (d)	**26.** (c)	**27.** (b)	**28.** (d)	**29.** (c)	**30.** (a)
31. (d)	**32.** (b)	**33.** (a)	**34.** (b)	**35.** (c)	**36.** (b)	**37.** (d)	**38.** (a)	**39.** (b)	**40.** (d)

CHEMISTRY

1. (b)	**2.** (c)	**3.** (a)	**4.** (c)	**5.** (a)	**6.** (c)	**7.** (b)	**8.** (d)	**9.** (c)	**10.** (c)
11. (a)	**12.** (c)	**13.** (b)	**14.** (d)	**15.** (c)	**16.** (a)	**17.** (c)	**18.** (b)	**19.** (c)	**20.** (a)
21. (b)	**22.** (c)	**23.** (a)	**24.** (c)	**25.** (d)	**26.** (a)	**27.** (c)	**28.** (d)	**29.** (b)	**30.** (a)
31. (b)	**32.** (d)	**33.** (d)	**34.** (b)	**35.** (c)	**36.** (d)	**37.** (c)	**38.** (d)	**39.** (c)	**40.** (b)

ZOOLOGY

1. (a)	**2.** (b)	**3.** (a)	**4.** (c)	**5.** (d)	**6.** (c)	**7.** (d)	**8.** (b)	**9.** (d)	**10.** (c)
11. (a)	**12.** (d)	**13.** (a)	**14.** (d)	**15.** (a)	**16.** (b)	**17.** (a)	**18.** (a)	**19.** (d)	**20.** (a)
21. (c)	**22.** (c)	**23.** (a)	**24.** (d)	**25.** (c)	**26.** (b)	**27.** (a)	**28.** (a)	**29.** (d)	**30.** (a)
31. (b)	**32.** (a)	**33.** (b)	**34.** (b)	**35.** (c)	**36.** (a)	**37.** (b)	**38.** (c)	**39.** (d)	**40.** (c)

BOTANY

1. (b)	**2.** (a)	**3.** (b)	**4.** (a)	**5.** (d)	**6.** (b)	**7.** (c)	**8.** (b)	**9.** (a)	**10.** (d)
11. (a)	**12.** (a)	**13.** (a)	**14.** (a)	**15.** (b)	**16.** (a)	**17.** (b)	**18.** (c)	**19.** (a)	**20.** (c)
21. (a)	**22.** (a)	**23.** (a)	**24.** (a)	**25.** (a)	**26.** (d)	**27.** (d)	**28.** (b)	**29.** (a)	**30.** (a)
31. (a)	**32.** (b)	**33.** (c)	**34.** (d)	**35.** (d)	**36.** (d)	**37.** (a)	**38.** (b)	**39.** (b)	**40.** (b)

GENERAL ENGLISH

1. (c)	**2.** (a)	**3.** (b)	**4.** (b)	**5.** (d)	**6.** (b)	**7.** (c)	**8.** (b)	**9.** (c)	**10.** (c)
11. (c)	**12.** (b)	**13.** (d)	**14.** (b)	**15.** (b)	**16.** (a)	**17.** (d)	**18.** (b)	**19.** (d)	**20.** (b)
21. (c)	**22.** (a)	**23.** (a)	**24.** (c)	**25.** (b)	**26.** (b)	**27.** (b)	**28.** (b)	**29.** (b)	**30.** (c)
31. (a)	**32.** (c)	**33.** (b)	**34.** (a)	**35.** (b)	**36.** (b)	**37.** (b)	**38.** (a)	**39.** (d)	**40.** (c)