JIPMER
Medical Entrance Exam
Solved Paper 2010

Physics

1. The potential energy of a particle varies with distance x from fixed a origin as $v = \left(\frac{A\sqrt{x}}{x+B}\right)$; where, A and B are constants. The dimensions of AB are
(a) $[ML^{5/2}T^{-2}]$
(b) $[ML^{2}T^{-2}]$
(c) $[M^{3/2}L^{3/2}T^{-2}]$
(d) $[ML^{7/2}T^{-2}]$

2. A weightless thread can bear tension upto 37 N. A stone of mass 500 g is tied to it and revolved in a circular path of radius 4 m in a vertical plane. If $g = 10\ ms^{-2}$, then the maximum angular velocity of the stone will be
(a) 2 rad s^{-1} (b) 4 rad s^{-1}
(c) 8 rad s^{-1} (d) 16 rad s^{-1}

3. Two spherical bodies of masses M and $5M$ and radii R and $2R$ respectively are released in free space with initial separation between their centres equal to $12\ R$. If they attract each other due to gravitational force only,then the distance covered by the smaller body just before collision, is
(a) $1.5R$ (b) $2.5\ R$
(c) $4.5\ R$ (d) $7.5\ R$

4. The moment of inertia of a uniform circular disc of radius R and mass M about an axis passing from the edge of the disc and normal to the disc is
(a) MR^2 (b) $\frac{1}{2}MR^2$
(c) $\frac{3}{2}MR^2$ (d) $\frac{7}{2}MR^2$

5. A satellite orbiting the earth in a circular orbit of radius R completes one revolution in 3h. If orbital radius of geostationary satellite is 36000 km, orbital radius of earth is
(a) 6000 km (b) 9000 km
(c) 12000 km (d) 15000 km

6. A wire can be broken by applying load of 200 N. The force required to break another wire of the same length and same material, but double in diameter is
(a) 200 N (b) 400 N
(c) 600 N (d) 800 N

7. A cube of side 40 mm has its upper face displaced by 0.1 mm by a tangential force of 8 kN. The shearing modulus of cube is
(a) $2\times10^{9}\ Nm^{-2}$
(b) $4\times10^{9}\ Nm^{-2}$
(c) $8\times10^{9}\ Nm^{-2}$
(d) $16\times10^{9}\ Nm^{-2}$

8. The neck and bottom of a bottle are 3 cm and 15 cm in radius respectively. If the cork is pressed with a force 12 N in the neck of the bottle, then force exerted on the bottom of the bottle is
(a) 30 N (b) 150 N
(c) 300 N (d) 600 N

9. A square wire frame of size L is dipped in a liquid. On taking out a membrane is formed. If the surface tension of liquid is T, then force acting on a frame will be
(a) $2T\ L$ (b) $4T\ L$
(c) $8T\ L$ (d) $16T\ L$

10. 64 spherical rain drops of equal size are falling vertically through air with a terminal velocity 1.5 ms^{-1}. If these drops coalesce to form a big spherical drop, then terminal velocity of big drop is

(a) 8 ms^{-1} (b) 16 ms^{-1}
(c) 24 ms^{-1} (d) 32 ms^{-1}

11. The equation of a wave is $y = 5\sin\left(\frac{t}{0.04} - \frac{x}{4}\right)$; where, x is in cm and t is in second. The maximum velocity of the wave will be

(a) 1 ms^{-1} (b) 2 ms^{-1}
(c) 1.5 ms^{-1} (d) 1.25 ms^{-1}

12. Two vibrating strings of the same material but lengths L and $2L$ have radii $2r$ and r respectively. They are stretched under the same tension. Both the strings vibrate in their fundamental modes, the one of length L with frequency ν_1 and the other with frequency ν_2. The ratio ν_1/ν_2 is

(a) 2 (b) 4
(c) 8 (d) 1

13. 1 mole of an ideal gas at an initial temperature of T K does $6R$ joule of work adiabatically. If the ratio of specific heats of this gas at constant pressure and at constant volume is 5/3, then final temperature of the gas will be

(a) $(T-4)$K (b) $(T+4)$K
(c) $(T-2.4)$K (d) $(T+2.4)$K

14. Consider a compound slab consisting of two different materials having equal lengths, thicknesses and thermal conductivities K and $2K$ respectively. The equivalent thermal conductivity of the slab is

(a) $\sqrt{2}K$ (b) $3K$
(c) $\frac{4}{3}K$ (d) $\frac{2}{3}K$

15. A black body has a wavelength of λ at temperature 2000 K. Its corresponding wavelength at temperature 3000 K will be

(a) $\frac{2\lambda}{3}$ (b) $\frac{3\lambda}{2}$
(c) $\frac{4\lambda}{9}$ (d) $\frac{9\lambda}{4}$

16. A plane mirror produces a magnification of

(a) zero (b) −1
(c) +1 (d) between 0 and +1

17. Two coherent light beams of intensities I and $4I$ are superposed. The maximum and minimum possible intensities in the resulting beam are

(a) $5I$ and I
(b) $5I$ and $3I$
(c) $9I$ and I
(d) $9I$ and $3I$

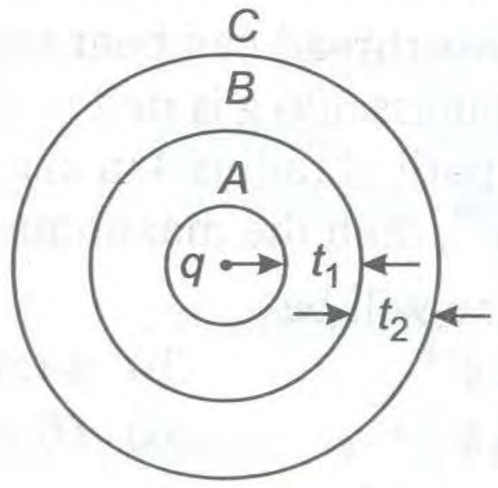
18. If Young's double slit experiment is performed in water instead of air, then

(a) no fringes would be seen
(b) fringe width would decrease
(c) fringe width would increase
(d) fringe width would remain unchanged

19. A charge q is located at the centre of a cube. The electric flux through any face is

(a) $\frac{4\pi q}{6(4\pi\varepsilon_0)}$ (b) $\frac{\pi q}{6(4\pi\varepsilon_0)}$
(c) $\frac{q}{6(4\pi\varepsilon_0)}$ (d) $\frac{2\pi q}{6(4\pi\varepsilon_0)}$

20. Figure shows three spherical and equipotential surfaces A, B and C round a point charge q. The potential difference $V_A - V_B = V_B - V_C$. If t_1 and t_2 be the distances between them, then



(a) $t_1 = t_2$ (b) $t_1 > t_2$
(c) $t_1 < t_2$ (d) $t_1 \leq t_2$

21. Three capacitors of capacitances 1 μF, 2μF and 4μF are connected first in a series combination, and then in a parallel combination. The ratio of their equivalent capacitances will be

(a) 2 : 49 (b) 49 : 2
(c) 4 : 49 (d) 49 : 4

22. At room temperature, copper has free electron density of $8.4 \times 10^{28}\ m^{-3}$. The electron drift velocity in a copper conductor of cross-sectional area of $10^{-6}\ m^2$ and carrying a current of 5.4 A, will be

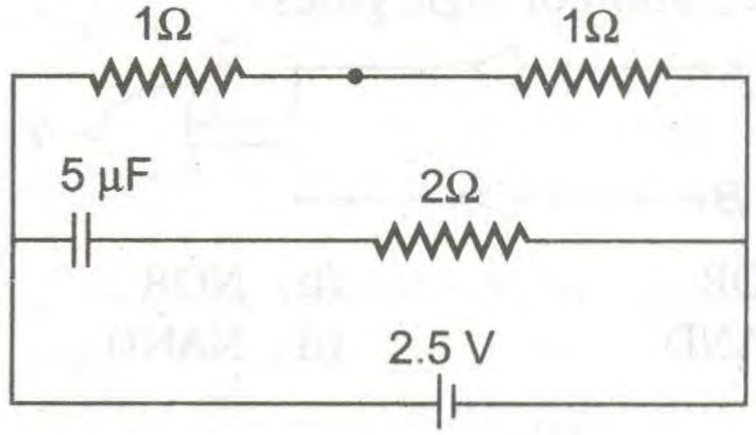
(a) 4 ms^{-1} (b) 0.4 ms^{-1}
(c) 4 cm s^{-1} (d) 0.4 mm s^{-1}

23. A uniform wire of resistance R and length L is cut into four equal parts, each of length $L/4$, which are then connected in parallel combination. The effective resistance of the combination will be

(a) R (b) $4R$

(c) $\frac{R}{4}$ (d) $\frac{R}{16}$

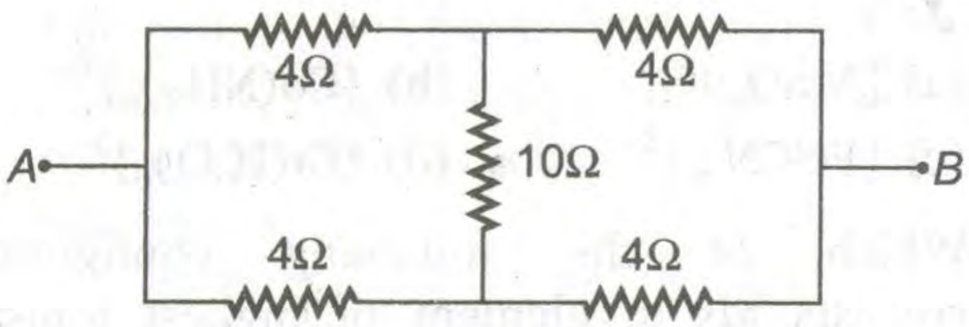
24. A capacitor of capacitance 5μF is connected as shown in the figure. The internal resistance of the cell is 0.5 Ω. The amount of charge on the capacitor plates is



(a) 80 μC (b) 40 μC

(c) 20 μC (d) 10 μC

25. The equivalent resistance across A and B is



(a) 2Ω (b) 3Ω

(c) 4Ω (d) 5Ω

26. An electric current passes through a long straight copper wire. At a distance 5 cm from the straight wire, the magnetic field is B. The magnetic field at 20 cm from the straight wire would be

(a) $\frac{B}{6}$ (b) $\frac{B}{4}$

(c) $\frac{B}{3}$ (d) $\frac{B}{2}$

27. An electron of mass m and charge q is travelling with a speed v along a circular path of radius r at right angles to a uniform magnetic field B. If speed of the electron is doubled and the magnetic field is halved, then resulting path would have a radius of

(a) $\frac{r}{4}$ (b) $\frac{r}{2}$

(c) $2r$ (d) $4r$

28. A galvanometer acting as a voltmeter should have

(a) low resistance in series with its coil

(b) low resistance in parallel with its coil

(c) high resistance in series with its coil

(d) high resistance in parallel with its coil

29. A frog can be levitated in magnetic field produced by a current in a vertical solenoid placed below the frog. This is possible because the body of the frog behaves as

(a) paramagnetic

(b) diamagnetic

(c) ferromagnetic

(d) anti-ferromagnetic

30. The magnetic flux linked with a coil at any instant t is given by the equation $\phi = 5t^3 - 100t + 300$. The magnitude of emf induced in the coil after 3 s is

(a) 10 V (b) 20 V

(c) 35 V (d) 70 V

31. In 0.1 s, the current in a coil increases from 1 A to 1.5A. If inductance of coil is 60 mH, then induced current in external resistance of 3Ω will be

(a) 1 A (b) 0.5 A

(c) 0.2 A (d) 0.1 A

32. The impedance of a circuit, when a resistance R and an inductor of inductance L are connected in series in an AC circuit of frequency f, is

(a) $\sqrt{R + 2\pi^2 f^2 L^2}$ (b) $\sqrt{R + 4\pi^2 f^2 L^2}$

(c) $\sqrt{R^2 + 4\pi^2 f^2 L^2}$ (d) $\sqrt{R^2 + 2\pi^2 f^2 L^2}$

33. In a series L-C-R circuit, resistance $R = 10\,\Omega$ and the impedance $Z = 10\,\Omega$. The phase difference between the current and the voltage is

(a) 0° (b) 30°

(c) 45° (d) 60°

34. Which of the following electromagnetic waves have the smallest wavelength?

(a) γ-rays (b) X-rays

(c) UV waves (d) Infrared rays

35. The kinetic energy of an electron, which is accelerated in the potential difference of 100 V, is

(a) 1.6×10^{-17} J (b) 1.6×10^{-14} J

(c) 1.6×10^{-10} J (d) 1.6×10^{-8} J

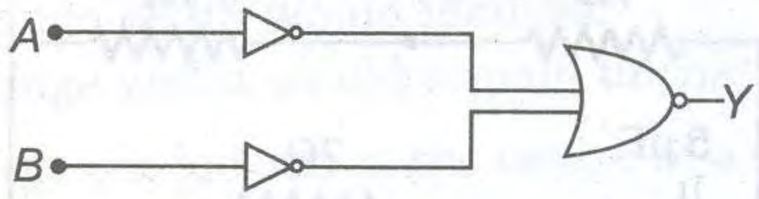
36. J.J. Thomson's cathode ray tube experiment demonstrated that
(a) cathode rays are streams of negatively charged ions
(b) all the mass of an atom is essentially in the nucleus
(c) the e/m of electrons is much greater than the e/m of protons
(d) the e/m ratio of the cathode ray particles changes when a different gas is placed in the discharged tube

37. Wavelength of light emitted from second orbit to first orbit in a hydrogen atom is
(a) 6563 Å
(b) 4102 Å
(c) 4861 Å
(d) 1215 Å

38. The half-life of a radio-isotope is 4h. If initial mass of the isotope was 200g, then mass remaining after 24 h will be
(a) 1.042 g (b) 2.084 g
(c) 3.125 g (d) 4.167 g

39. If $_{92}U^{238}$ emits 8 α-particles and 6 β-particles, then the resulting nucleus is
(a) $_{82}U^{206}$ (b) $_{82}Pb^{206}$
(c) $_{82}U^{210}$ (d) $_{82}U^{214}$

40. Which logic gate is represented by the following combination of logic gates?



(a) OR (b) NOR
(c) AND (d) NAND

Chemistry

1. In the electronic structure of H_2SO_4, the total number of unshared electrons is
(a) 20 (b) 16
(c) 12 (d) 8

2. The general molecular formula for disaccharide is
(a) $C_{12}H_{22}O_{11}$ (b) $C_{10}H_{20}O_{10}$
(c) $C_{12}H_{20}O_{10}$ (d) $C_{12}H_{22}O_{10}$

3. The correct order towards bond angle is
(a) $sp^3 < sp^2 < sp$ (b) $sp < sp^2 < sp^3$
(c) $sp < sp^3 < sp^2$ (d) $sp^2 < sp^3 < sp$

4. The vapour pressure of 100g water reduces from 3000 Nm^{-2} to 2985 Nm^{-2} when 5g of substance 'X' is dissolved in it. Substance 'X' is
(a) methanol (b) glucose
(c) carbon dioxide (d) Cannot predict

5. Which of the following relation is correct ?
(a) I^{st} IE of C > I^{st} IE of B
(b) I^{st} IE of C < I^{st} IE of B
(c) II^{nd} IE of C > II^{nd} IE of B
(d) Both (b) and (c)

6. The complex ion which has no d-electrons in the central metal atom is
(a) $[MnO_4]^-$ (b) $[Co(NH_3)_6]^{3+}$
(c) $[Fe(CN)_6]^{3-}$ (d) $[Cr(H_2O)_6]^{3+}$

7. Which of the following configurations corresponds to element of highest ionisation energy?
(a) $1s^2, 2s^1$ (b) $1s^2, 2s^2, 2p^3$
(c) $1s^2, 2s^2, 2p^2$ (d) $1s^2, 2s^2, 2p^6, 3s^1$

8. White P reacts with caustic soda, the products are PH_3 and NaH_2PO_2. This reaction is an example of
(a) hydrolysis
(b) reduction
(c) disproportionation
(d) neutralisation

9. The solubility of saturated solution of Ag_2CrO_4 is s mol L^{-1}. What is its solubility product?
(a) $4s^3$ (b) s^3
(c) $2s^3$ (d) $16s^2$

10. Which of the following has a bond formed by overlap of $sp - sp^3$ hybrid orbitals?
(a) $CH_3—C\equiv C—H$
(b) $CH_3—CH=CH—CH_3$
(c) $CH_2=CH—CH=CH_2$
(d) $HC\equiv CH$

11. Which one of the following proteins transports oxygen in the blood stream?
(a) Myoglobin (b) Insulin
(c) Albumin (d) Haemoglobin

12. The only *o p*-directing group which is deactivating in nature is
(a) $-NH_2$ (b) $-OH$
(c) $-X$ (halogens) (d) $-R$ (alkyl groups)

13. Which of the organic compounds will give red colour in Lassaigne test ?
(a) $C_6H_5NH_2$ (b) $NH_2-\overset{\overset{S}{\|}}{C}-NH_2$
(c) $NH_2-\overset{\overset{O}{\|}}{C}-NH_2$ (d) None of these

14. For a reaction, $A + B \longrightarrow$ Product, the rate is given by,
$$r = k[A]^{1/2}[B]^2.$$
What is the order of the reaction ?
(a) 0.5 (b) 2
(c) 2.5 (d) 1

15. The density of a gas is found to be 1.56 g/L at 745 mm pressure and 65°C. What is the moleculer mass of the gas?
(a) 44.2 u (b) 4.42 u
(c) 2.24 u (d) 22.4 u

16. Considering H_2O as weak field ligand, the number of unpaired electrons in $[Mn(H_2O)_6]^{2+}$ will be (Atomic number of Mn = 25)
(a) five (b) two
(c) four (d) three

17. Ethyl alcohol reacts with thionyl chloride to give
(a) $CH_3CH_2Cl + HCl$
(b) $CH_3CH_2Cl + H_2O + SO_2$
(c) $CH_3CH_2Cl + HCl + SO_2$
(d) $CH_3CH_2Cl + SO_2 + Cl_2$

18. The quantum numbers $+\frac{1}{2}$ and $-\frac{1}{2}$ for the electron spin represent
(a) rotation of the electron in clockwise and anticlockwise direction respectively
(b) rotation of the electron in anticlockwise and clockwise direction respectively
(c) magnetic moment of the electron pointing up and down respectively
(d) two quantum mechanical spin states which have no classical analogues

19. How long it will take to deposit 1.0 g of chromium when a current of 1.25 A flows through a solution of chromium (III) sulphate ? (Molar mass of Cr = 52)
(a) 1.24 min (b) 1.24 h
(c) 1.24 s (d) None of these

20. Gabriel phthalimide reaction is used for the preparation of
(a) primary aromatic amines
(b) secondary amines
(c) primary aliphatic amines
(d) tertiary amines

21. The monomers of terylene are
(a) phenol and formaldehyde
(b) ethylene glycol and phthalic acid
(c) adipic acid and hexamethylenediamine
(d) ethylene glycol and terephthalic acid

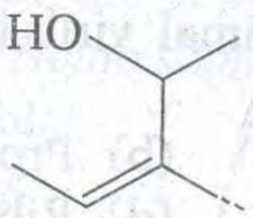
22. If *a* be the edge length of the unit cell and *r* be the radius of an atom then for fcc arrangement, the correct relation is
(a) $4a = \sqrt{3}\,r$ (b) $4r = \sqrt{3}\,a$
(c) $4r = \sqrt{2}\,a$ (d) $4r = \frac{a}{\sqrt{2}}$

23. CaC_2 and H_2O react to produce
(a) CH_4 (b) C_2H_4
(c) C_2H_2 (d) C_2H_6

24. Primary alcohols can be obtained from the reaction of *R* Mg *X* with
(a) CO_2 (b) HCHO
(c) CH_3CHO (d) H_2O

25. Proteins are composed of
(a) α-amino acids (b) carbohydrates
(c) vitamins (d) mineral salts

26. The IUPAC name of the following compound



, is
(a) 1, 2-dimethyl-2-butenol
(b) 3-methylpent-3-en-2-ol
(c) 3, 4-dimethyl-2-buten-4-ol
(d) None of the above

27. Ammonia gas can be dried over
(a) $CaCl_2$ (b) Conc. H_2SO_4
(c) P_2O_5 (d) quick lime

28. The number of phase in a colloidal system is
(a) 1 (b) 2
(c) 3 (d) 4

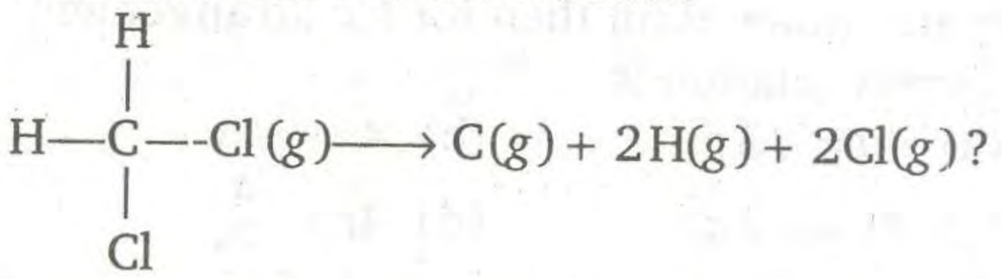
29. Which of the following has the highest bond order ?
(a) N_2 (b) O_2
(c) He_2 (d) H_2

30. Inorganic benzene is
(a) $B_3N_6H_3$ (b) $B_3N_3H_6$
(c) $Al_3N_3H_6$ (d) None of these

31. In long form of Periodic Table, the properties of the elements are a periodic function of their
(a) atomic size (b) ionisation energy
(c) atomic mass (d) atomic number

32. Which of the following is a wrong statement ? In a given period of the Periodic Table, the *s*-block element has, in general, a higher value of
(a) electronegativity (b) atomic radius
(c) ionisation energy (d) electron affinity

33. What is the ΔH of the reaction



$$H-C(Cl)(H)-Cl\,(g) \longrightarrow C(g) + 2H(g) + 2Cl(g)\,?$$

The average bond energies of C—Cl bond and C—H bond are 416 kJ and 325 kJ mol^{-1} respectively.
(a) 1482 kJ (b) 1482 J
(c) 1492 kJ (d) 1492 J

34. Which of the following is a Lewis acid ?
(a) OH^- (b) H^+
(c) F^- (d) NH_3

35. Heating of rubber with sulphur is called
(a) vulcanisation
(b) galvanisation
(c) sulphonation
(d) bessemerisation

36. Which of the following statement is correct ?
(a) $+I$ group stabilises a carbocation
(b) $+I$ group stabilises a carbanion
(c) $-I$ group stabilises a carbocation
(d) $-I$ group stabilises a free radical

37. Dihedral angle between two methyl groups of *n*-butane in the *gauche* and *anti* forms are
(a) 60°, 0° (b) 0°, 60°
(c) 60°, 180° (d) 180°, 60°

38. A solid *AB* has the NaCl structure. If radius of cation A^+ is 120 pm, the maximum possible value of the radius of the anion B^- is
(a) 240 pm (b) 60 pm
(c) 49.6 pm (d) 290 pm

39. Common alum is
(a) $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$
(b) $(NH_4)_2SO_4 \cdot FeSO_4 \cdot 6H_2O$
(c) $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$
(d) $K_2SO_4 \cdot Fe_2(SO_4)_3 \cdot 24H_2O$

40. The bond length of HCl bond is 2.29×10^{-10} m. The percentage ionic character of HCl, if measured dipole moment is 6.226×10^{-30} C-m, is
(a) 8% (b) 20%
(c) 17% (d) 50%

Zoology

1. Which part of an animal virus is not reproduced in multiple copies?
(a) Capsid (b) Protein
(c) Envelope (d) Ribosome

2. The echinoderms are
(a) arborial insects
(b) marine animals
(c) terrestrial insects
(d) freshwater forms

3. The blood of cockroach contains no respiratory pigment. It means that
(a) respiration is anaerobic
(b) cockroach does not respire
(c) oxygen goes directly into tissues by diffusion
(d) oxygen goes into tissue by intracellular capillary system

4. Tube feet is the locomotory organ in
(a) starfish (b) jelly fish
(c) silver fish (d) *Scoliodon*

5. Follicle stimulating hormone is secreted by
(a) anterior lobe of pituitary
(b) hypothalamus
(c) gonads
(d) posterior lobe of pituitary

6. Which of the following amino acids is not optically active?
(a) Glycine (b) Valine
(c) Leucine (d) Isoleucine

7. Which of the following vitamins is water soluble as well as an antioxidant?
(a) Vitamin-B_1 (b) Vitamin-A
(c) Vitamin-D (d) Vitamin-C

8. Human ear ossicles are
(a) incus and stapes
(b) stapes
(c) incus, malleus and stapes
(d) incus and malleus

9. During strenuous exercise, glucose is converted into
(a) glycogen (b) pyruvic acid
(c) starch (d) lactic acid

10. 'Adaptation' of eyes in dark is due to
(a) depletion of vision pigment in rods
(b) depletion of vision pigment in cones
(c) repletion of vision pigment in rods
(d) repletion of vision pigment in cones

11. Human ancestors who left cave paintings were
(a) Neanderthal man
(b) Cro-magnon man
(c) Java ape man
(d) Peking man

12. *Entamoeba histolytica* differs from *Amoeba* in absence of
(a) pseudopodia (b) contractile vacuole
(c) nucleus (d) ectoplasm

13. Heparin is synthesised in
(a) liver (b) kidney
(c) saliva (d) pancreas

14. Sea gulls excrete excess of NaCl from
(a) liver (b) lungs
(c) nasal cavity (d) kidney

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

16. 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

17. Bull semen is stored in
(a) liquid carbon dioxide
(b) liquid oxygen
(c) liquid nitrogen
(d) ice

18. In parasympathetic nervous system, which of the following is released?
(a) Epinephrine
(b) Norepinephrine
(c) Serotonin
(d) Acetylcholine

19. Pneumatic bones are expected to be found in
(a) house lizard (b) flying fish
(c) pigeon (d) tadpole of frog

20. Which compound has very important role in prebiotic evolution?
(a) Sulphur dioxide (b) Nitric oxide
(c) Methane (d) Sulphur trioxide

21. A man of blood group-A marries a woman of blood group-AB, which type of progeny would indicate that man is heterozygous?
(a) O (b) B
(c) A (d) AB

22. Balbiani rings are the structural features of
(a) allosomes
(b) polytene chromosomes
(c) autosomes
(d) lampbrush chromosomes

23. How many sperm cells are present in an average (3 mL) ejaculation?
(a) 200 million (b) 300 million
(c) 400 million (d) 500 million

24. The permanent decrease in population number occurs due to
(a) migration (b) natality
(c) emigration (d) mortality

25. Which one of the following is not a vestigial structural in *Homo sapiens*?
(a) Third molar
(b) Epiglottis
(c) Plica semilunaris
(d) Pyramidalis muscle

26. The velocity of conduction of nerve impulse in frog is
(a) 300 m/s
(b) same as of electricity
(c) faster than sound
(d) 30 m/s

27. Connecting link between annelids and molluscs is
(a) Neopilina *(b) Peripatus*
(c) *Periplaneta* (d) *Limulus*

28. The extra structure that provides nutrition to the embryo is
(a) umbilicus (b) amnion
(c) chorion (d) placenta

29. Ruminants belong to order
(a) Proboscida (b) Artiodactyla
(c) Marsupials (d) Edentata

30. Which of the following is a respiratory disease?
(a) Polio (b) Arthritis
(c) Asthma (d) Cancer

31. Sciatic vein of frog opens in
(a) heart (b) kidney
(c) pelvic region (d) liver

32. Aspirin is a/an
(a) antibiotic
(b) antipyretic
(c) antiseptic
(d) None of the above

33. Which of the following have notochord throughout life?
(a) Birds (b) Fish
(c) Snake (d) *Amphioxus*

34. First National Park developed in India is
(a) Gir (b) Kaziranga
(c) Jim Corbett (d) None of these

35. During unfavourable conditions, the sponges form
(a) cyst (b) encyst
(c) spicule (d) gemmule

36. Tree of life is
(a) arbor vitae (b) pons Varolii
(c) organ of Corti (d) diencephalon

37. Which is common between earthworm, leech and centipede?
(a) They have Malpighian tubules
(b) They are hermaphrodite
(c) They have ventral nerve cord
(d) None of the above

38. Eustachian canal connects
(a) middle ear with external ear
(b) middle ear with internal ear
(c) external ear with internal ear
(d) pharynx with middle ear

39. Shell of molluscs is derived from
(a) foot (b) mantle
(c) ctenidia (d) placoid

40. Sporogony of malarial parasite occurs in
(a) liver of man
(b) RBCs of man
(c) salivary glands of mosquito
(d) stomach wall of mosquito

Botany

41. Bacteria are considered plant because they
(a) are green in colour
(b) have rigid cell wall
(c) have chlorophyll
(d) have stomata

42. Solarisation is
(a) formation of chlorophyll
(b) destruction of chlorophyll
(c) utilisation of sunlight
(d) effects of solar light

43. Which is essential for root hair growth?
(a) Zinc (b) Calcium
(c) Molybdenum (d) Sulphur

44. A fern prothallus is bisexual. If fertilisation takes place between their gametes than it is known as
(a) cross-fertilisation (b) self-fertilisation
(c) isogamous (d) viviparous

45. In *Pisum sativum*, there are 14 chromosomes. How many types of homologous pairs can be prepared?
(a) 14 (b) 7
(c) 2^{14} (d) 2^{10}

46. Chicory powder which is mixed with coffee powder is obtained from
(a) root
(b) leaf
(c) stem
(d) seeds

47. 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

48. In callus culture, roots can be induced by the supply of
(a) auxin (b) cytokinin
(c) gibberellin (d) ethylene

49. Stem cuttings are commonly used for the propagation of
(a) banana (b) rose
(c) mango (d) cotton

50. Pure tall plants are crossed with pure dwarf plants. In the F_1 generation, all plants were tall. These tall plants of F_1 generation were selfed and the ratio of tall to dwarf plants obtained was 3 : 1. This is called
(a) dominance (b) inheritance
(c) codominance (d) heredity

51. Edible part in 'sorosis', a composite fruit, is
(a) cotyledons
(b) endosperm
(c) perianth and peduncle
(d) fleshy thalamus

52. Which of the following is a true nut?
(a) Walnut (b) Cashewnut
(c) Groundnut (d) Pistachio

53. Most primitive member, in which roots are not present, is
(a) *Psilotum* (b) *Rhynia*
(c) *Lycopodium* (d) *Selaginella*

54. Botanical name of 'chana' is
(a) *Cicer arietinum*
(b) *Phaseolus aureus*
(c) *Lablab purpureus*
(d) *Dolichos*

55. The edible dry fruit 'chilgoza' is
(a) fruit of *Cycas*
(b) fruit of *Pinus gerardiana*
(c) seed of *Cycas*
(d) seed of *Pinus gerardiana*

56. Ubisch bodies are present in
(a) pollen tube (b) pollen gain
(c) microspore (d) tapetum

57. An obligate root parasite is
(a) *Rafflesia* (b) *Loranthus*
(c) *Viscum* (d) *Striga*

58. Lady finger belongs to family
(a) Malvaceae (b) Cucurbitaceae
(c) Liliaceae (d) Brassicaceae

59. What differentiates leaf of dicots from monocots?
(a) Parallel venation
(b) Differentiation of palisade and spongy parenchyma
(c) Stomata only on upper side
(d) Stomata both on upper and lower sides

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

61. Endoplasmic reticulum is in continuation with
(a) Golgi body (b) nuclear wall
(c) mitochondria (d) cell wall

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

63. Pappus is modified
(a) calyx (b) corolla
(c) bracts (d) gynoecium

64. Trimerous flower, superior ovary and axile placentation is characteristics of
(a) Liliaceae
(b) Cucurbitaceae
(c) Solanaceae
(d) Compositae

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

66. During the meiotic division, the
(a) homologous chromosomes are separated
(b) linkage is disturbed
(c) homologous chromosomes do not segregate
(d) All of the above

67. During the G_1-phase of cell division
(a) RNA and proteins are synthesised
(b) DNA and proteins are synthesised
(c) cell prepares for M-phase
(d) cell undergoes duplication

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

69. The bioassay of auxin is
(a) avena curvature test
(b) callus formation
(c) culture of fungus
(d) seed dormancy

70. Clinging roots are found in
(a) orchids (b) *Trapa*
(c) *Podostemon* (d) screwpine

71. Benthic organisms are found in
(a) surface of marine water
(b) middle of water in sea
(c) bottom of sea
(d) on ground

72. Water bloom is generally caused by
(a) green algae
(b) blue-green algae
(c) bacteria
(d) *Hydrilla*

73. The process which can not take place in the absence of viruses is
(a) transformation (b) conjugation
(c) translocation (d) transduction

74. Molybdenum causes
(a) mottling (b) wilting
(c) reclamation (d) chlorosis

75. Ozone depletion in stratosphere would result in
(a) forest fires
(b) global warming
(c) skin cancer incidence
(d) None of the above

76. From which of the following plant is a medicine for respiratory disorders obtained?
(a) *Ephedra* (b) *Eucalyptus*
(c) *Cannabis* (d) *Saccharum*

77. Decarboxylation is involved in
(a) electron transport system
(b) glycolysis
(c) Krebs' cycle
(d) lactic acid fermentation

78. Osmotic pressure of a solution is
(a) greater than pure solvent
(b) less than pure solvent
(c) equal to pure solvent
(d) less than or greater than pure solvent

79. In Whittaker's system of classification, prokaryotes belong to the kingdom
(a) Monera (b) Protista
(c) Animalia (d) Fungi

80. Expanded green stem of *Opuntia* is called
(a) phylloclade (b) tendril
(c) bulb (d) cladode

General English

Direction (Q.1-5) *In each of the following questions, choose the alternative which is* ***opposite*** *in meaning to the word given in italics in the sentence.*

1. Guerillas *infiltrated* into the region during the severe winter of 1997.
(a) entered
(b) expelled
(c) penetrated
(d) filtered

2. He has always been *fastidious* while examining answer scripts.
(a) amiable (b) discriminating
(c) critical (d) judicious

3. The professor had to share a hotel room with a *garrulous* tax collector.
(a) dumb (b) speechless
(c) tongue-tied (d) silent

4. It was *fortuitous* that I met her in that party.
(a) unlucky (b) bad
(c) distressing (d) abominable

5. He is *zealous* only in the initial stages of a project.
(a) absent-minded (b) distraught
(c) inattentive (d) indifferent

Direction (Q. 6-10) *In each of the following questions, rearrange the parts* P, Q, R *and* S *to make a proper sentence.*

6. Various leading a productive (P) disabilities stand (Q) in and personally satisfying life (R) the way of millions of Indians. (S)

Which one of the following sequences is correct?
(a) Q R P S (b) P S Q R
(c) Q S P R (d) P R Q S

7. Farmers whether or not water will be available
P
land use plans only can prepare alternative
Q R
if they know in advance.
S

Which one of the following sequences is correct?
(a) R S Q P (b) P Q S R
(c) R Q S P (d) P S Q R

8. No amount poor countries if they do of direct
P Q
aid will help not develop the capacity to
R
generate wealth for themselves
S

Which one of the following sequences is correct?
(a) Q P R S (b) R S Q P
(c) Q S R P (d) R P Q S

9. Having achieved success to ride the next big
P
outsourcing wave in software exports and
Q
information technology areas, this time in
R
manufacturing from the U.S. Indian
manufactures-exporters are well equipped.
S

Which one of the following sequences is correct?
(a) P S Q R (b) Q R P S
(c) P R Q S (d) Q S P R

10. The majority of Britons believe that there if the
P
increasing problem must be restrictions on
Q R
cheap air travel of global warming is going to be
S
tackeled.

Which one of the following sequences is correct?
(a) S R Q P (b) P Q R S
(c) S Q R P (d) P R Q S

Direction (Q. 11-15) *In each of the following questions, choose the alternative which is most nearly the* ***same*** *in meaning to the word given in italics in sentence.*

11. He ended his speech on a *supercilious* note which was quite unexpected of a person of balanced and stable temperament.
(a) defamatory (b) contemptuous
(c) superfluous (d) irrelevant

12. Graduation day is *momentous* day for most students.
(a) memorable (b) melancholy
(c) important (d) hectic

13. The two opposing parties have reached a *stalemate*.
(a) dilemma (b) deadlock
(c) exhaustion (d) settlement

14. The Prime Minister delivered an *impromptu* speech to the students.
(a) important (b) impressive
(c) inspiring (d) off hand

15. This is a *lucrative* business.
(a) profitable (b) dangerous
(c) challenging (d) questionable

Direction (Q. 16-20) *In each of the following questions, choose the alternative which best expresses the meaning of the given idiom/phrase.*

16. Made a clean breast of
(a) confessed (b) took off his shirt
(c) suffered (d) spoke ill

17. A man of letters
(a) a man who wrote many letters
(b) a leader who received more letters
(c) a scholar with literary taste
(d) a good reader of letters

18. Reading between the lines
(a) reading slowly and haltingly
(b) understanding the sense rather than the actual words
(c) understanding the meaning of words and not the sense
(d) reading superficially

19. Cheek by jowl
(a) very near (b) tongue tied
(c) very far (d) irritated

20. Talking through one's hat
(a) talking nonsense
(b) talking ignorantly
(c) talking irresponsibly
(d) talking insultingly

Direction (Q. 21-25) *Read the following passage carefully and answer the questions given below it.*

Goldfish can be kept easily in small ponds and and aquariums, they make good pets, but like many other pets, they must have proper care and the right kind of place to live.

A two inch fish requires a minimum of two gallons of water containing sufficient oxygen to support life. Some oxygen will make its way into the water of an aquarium from the air that touches the surface. Plants in an aquarium also help to furnish oxygen. Snails help to keep an aquarium clean. Thus, with plenty of plants and snail, the water in an aquarium does not have to be changed frequently. A large lake may prove to be a quite unsuitable abode for goldfish.

It is important that goldfish should not be overfed. They can be fed such things as dried insects in addition to commercially prepared goldfish food, but they should never be fed more than once a day. Even then, they should not be given more food than can be consumed in about five minutes. This ensures prolonged life.

21. Which of the following statements is true?
(a) Goldfish should be given food only once a day
(b) Snails eat up the goldfish in an aquarium.
(c) Plants provide food to the snails
(d) Goldfish comes above the surface of water to get oxygen from air

22. Which of the following statements is not true?
(a) Snails make the aquarium clean by eating up goldfish
(b) Two gallons of water with sufficient oxygen is enough for two inch fish
(c) Goldfish can be made good pets
(d) Plants in an aquarium provide oxygen to goldfish

23. Which of the following helps supply goldfish with oxygen?
(a) Snails (b) Plants
(c) Dried insects (d) Aquarium

24. Water in an aquarium needs to be changed if
(a) there are plenty of snails and plants in it
(b) there is no sufficient oxygen in it
(c) it is very clean and contains sufficient oxygen
(d) it does not contain goldfish food and dried insects

25. What is important to remember when feeding goldfish?
(a) They should be fed more than once a day
(b) They should be fed at five-minute intervals
(c) They should be fed with plants and snails
(d) They should be fed only once a day

Direction (Q. 26-30) *In each of the following questions, choose the alternative which can be substituted for the given sentence.*

26. The study of sound.
(a) Aeronautics (b) Aesthetics
(c) Acoustic (d) Astrology

27. Murder of one's parents.
(a) Parricide (b) Patricide
(c) Uxoricide (d) Matricide

28. Government by the Gods.
(a) Theocracy (b) Thearchy
(c) Neocracy (d) Monarchy

29. A place for bees.
(a) Hive (b) Hutch
(c) Lair (d) Den

30. One who studies the evolution of mankind.
(a) Somnambulist (b) Cartographer
(c) Prephologist (d) Anthropologist

Direction (Q.31-35) *In each of the following questions, a part of the sentence is italicised. Below each sentence, three possible substitutions for the italicised part are given. Choose the one which proves the italicised part. If none of the substitutions improves the italicised part, your answer is* (d).

31. *All his answers* were correct.
(a) His all answers (b) His every answers
(c) All of his answers (d) No improvement

32. It was quite clear that the runner *could be able* to improve upon his own record.
(a) should be able (b) would be able
(c) will be able (d) No improvement

33. Within last few years most of the fertile land *had undergone* Indigo cultivation.
(a) had underwent (b) has undergone
(c) was undergone (d) No improvement

34. His *powerful desire* brought about his downfall.
(a) his intense desire (b) his desire for power
(c) his fatal desire (d) No improvement

35. If he *had time* he will call you.
(a) would have (b) would have had
(c) has (d) No improvement

Direction (Q.36-40) *Four alternatives* (a), (b), (c) *and* (d) *are given under each sentence, you are required to select the most suitable alternative to fill in the blank in the sentence to make it meaningful.*

36. He is too ..... to be deceived easily.
(a) strong (b) modern
(c) intelligent (d) kind

37. There has been a ..... lack of efficiency in all the crucial areas of the working of Public Sector Undertakings.
(a) positive (b) surprising
(c) conspicuous (d) stimulative

38. The shepherd was looking after the ..... of sheep.
(a) crew (b) gang
(c) fleet (d) flock

39. The Managing Director treated the employees to a ..... lunch at an expensive hotel.
(a) precious (b) thriving
(c) stupendous (d) sumptuous

40. Satish was ..... with a natural talent for music.
(a) given (b) found
(c) endowed (d) entrusted

Answers

Physics

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

Chemistry

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

Zoology

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

Botany

41. (b)	42. (b)	43. (b)	44. (b)	45. (b)	46. (a)	47. (d)	48. (a)	49. (b)	50. (a)
51. (c)	52. (b)	53. (b)	54. (a)	55. (d)	56. (d)	57. (a)	58. (a)	59. (b)	60. (b)
61. (b)	62. (a)	63. (a)	64. (a)	65. (a)	66. (a)	67. (a)	68. (a)	69. (a)	70. (a)
71. (c)	72. (b)	73. (d)	74. (a)	75. (c)	76. (a)	77. (c)	78. (a)	79. (a)	80. (a)

General English

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