

All India Institute of Medical Sciences (AIIMS) Paper 2014

**Physics**

1. A closely wound solenoid of 2000 turns and area of cross-section  $1.5 \times 10^{-4} \text{ m}^2$  carries a current of 2.0 A. It is suspended through its centre and perpendicular to its length, allowing it to turn in a horizontal plane in a uniform magnetic field  $5 \times 10^{-2} \text{ T}$ , making an angle of  $30^\circ$  with the axis of the solenoid. The torque on the solenoid will be
- (a)  $3 \times 10^{-3} \text{ N-m}$
  - (b)  $1.5 \times 10^{-3} \text{ N-m}$
  - (c)  $1.5 \times 10^{-2} \text{ N-m}$
  - (d)  $3 \times 10^{-2} \text{ N-m}$

**Ans: (c)**

2. A freshly prepared radioactive source of half-life 2 h emits radiation of intensity which is 64 times the permissible safe level. Calculate, the minimum time after which it would be possible to work safely with this source.
- (a) 12 h
  - (b) 24 h
  - (c) 6 h
  - (d) 130 h

**Ans: (a)**

3. A ball is dropped from a high rise platform  $t = 0$  starting from rest. After 6 s another ball is thrown downwards from the same platform with a speed  $v$ . The two balls meet at  $t = 18 \text{ s}$ . What is the value of  $v$ ?
- (a) 74 m/s
  - (b) 64 m/s
  - (c) 84 m/s
  - (d) 94 m/s

**Ans: (a)**

4. The thermo emf  $E$  (in volts) of a certain thermocouple is found to vary with  $Q$  (in  $^\circ\text{C}$ ) according to equation  $(E = 20Q - \frac{Q^2}{20})$ , where  $Q$  is temperature of the

hot function, the cold function being kept at 0°C. Then the neutral temperature of the thermocouple is

- (a) 300°C
- (b) 400°C
- (c) 100°C
- (d) 200°C

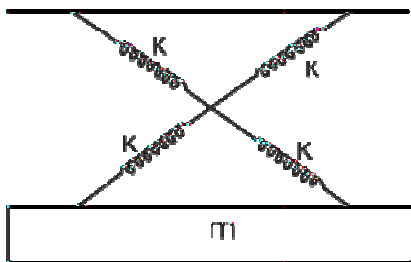
**Ans: (d)**

5. The maximum vertical distance through which a full dressed astronaut can jump on the earth is 0.5 m. Estimate the maximum vertical distance through which he can jump on the moon, which has a mean density  $2/3^{\text{rd}}$  that of the earth and radius one quarter that of the earth.

- (a) 1.5 m
- (b) 3 m
- (c) 6 m
- (d) 7.5 m

**Ans: (b)**

6. As shown in figure a simple harmonic motion oscillator having identical four springs has time period



- (a)  $T = 2\pi\sqrt{\frac{m}{4k}}$
- (b)  $T = 2\pi\sqrt{\frac{m}{2k}}$
- (c)  $T = 2\pi\sqrt{\frac{m}{k}}$
- (d)  $T = 2\pi\sqrt{\frac{m}{8k}}$

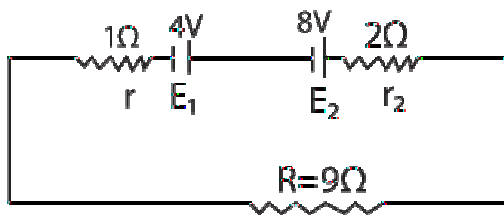
**Ans: (c)**

7. If there were a reduction in gravitational effect, which of the following forces do you think would change in some respect?

- (a) Magnetic force
- (b) Electrostatic force
- (c) Viscous force
- (d) Archimede's uplift

**Ans: (d)**

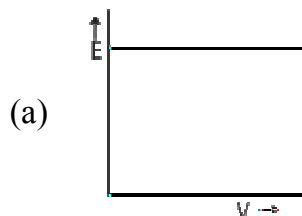
8. Two batteries of emf 4 V and 8 V with internal resistance  $1 \Omega$  and  $2 \Omega$  respectively are connected to an external resistance  $R = 9 \Omega$  as shown in figure. The current in circuit and the potential difference between P and Q respectively will be

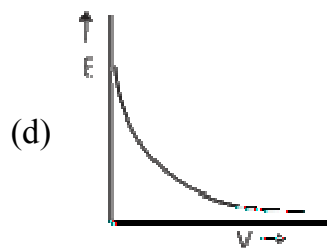
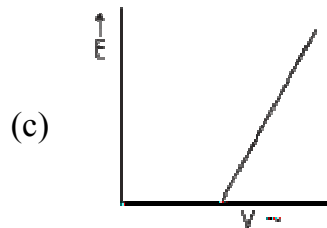
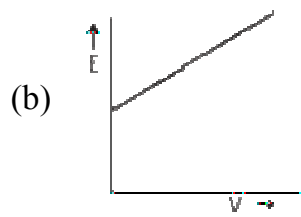


- (a)  $\frac{1}{2}A, 9V$
- (b)  $\frac{1}{12}A, 12V$
- (c)  $\frac{1}{3}A, 3V$
- (d)  $\frac{1}{6}A, 4V$

**Ans: (c)**

9. The correct graph respectively the relation between energy (E) of photoelectrons and frequency  $\nu$  of incident light is





**Ans: (c)**

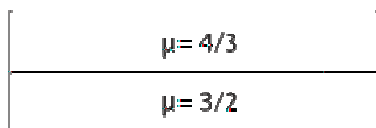
10. A body at temperature of  $728^{\circ}\text{C}$  and has surface area  $5\text{ cm}^2$ , radiates  $300\text{ J}$  of energy each minute. The emissivity is

(Given Boltzmann constant =  $5.67 \times 10^{-8}\text{ Wm}^2\text{K}^4$ )

- (a)  $e = 0.18$   
 (b)  $e = 0.02$   
 (c)  $e = 0.2$   
 (d)  $e = 0.15$

**Ans: (a)**

11. Considering normal incidence of ray, the equivalent refractive index of combination of two slabs shown in figure is



- (a) 1.8
- (b) 1.43
- (c) 2
- (d) None of the above

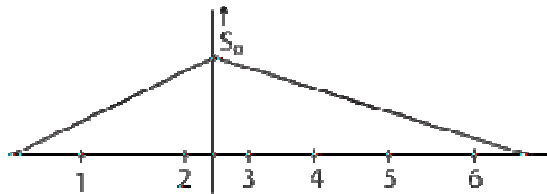
**Ans: (b)**

12. Three particles having charges in the ratio of 2 : 3 : 5 produce the same point on the photographic film in Thomson experiment. Their masses are in the ratio of

- (a) 2 : 3 : 5
- (b) 5 : 3 : 2
- (c) 15 : 10 : 6
- (d) 3 : 5 : 2

**Ans: (a)**

13. What will be ratio of speed in first two seconds to the speed in next 4s?



- (a)  $\sqrt{2} : 1$
- (b) 3 : 1
- (c) 2 : 1
- (d) 1 : 2

**Ans: (c)**

14. A black body emits heat at the rate of 20 W. When its temperature is 727°C. Another black body emits heat at the rate of 15 W, when its temperature is 227°C. Compare the area of the surface of the two bodies, if the surrounding is at NTP.

- (a) 16 : 1
- (b) 1 : 4
- (c) 12 : 1
- (d) 1 : 12

**Ans: (d)**

15. The pressure on a square plate is measured by measuring the force on the plate and the length of the sides of the plate by using the formula  $p = \frac{F}{l^2}$ . If the maximum errors in the measurement of force and length are 4% and 2% respectively, then the maximum error in the measurement of pressure is
- (a) 1%
  - (b) 2%
  - (c) 8%
  - (d) 10%

**Ans: (c)**

16. The transfer ratio  $\beta$  of a transistor is 50. The input resistance of the transistor, when used in the common emitter mode is 1 k $\Omega$ . The peak value of the collector alternative current for an input peak voltage of 0.01 V is
- (a) 0.25  $\mu$ A
  - (b) 0.01  $\mu$ A
  - (c) 500  $\mu$ A
  - (d) 100  $\mu$ A

**Ans: (c)**

17. Four resistance 10  $\Omega$ , 5  $\Omega$ , 7  $\Omega$  and 3  $\Omega$  are connected so that they form the side of a rectangle AB, BC, CD and DA respectively. Another resistance of 10  $\Omega$  is connected across the diagonal AC. The equivalent resistance between A and B is
- (a) 2 $\Omega$
  - (b) 5 $\Omega$
  - (c) 7 $\Omega$
  - (d) 10 $\Omega$

**Ans: (b)**

18. The velocity of a particle moving in the x-y plane is given by  $\frac{dx}{dt} = 8\pi \sin 2\pi t$  and  $\frac{dy}{dt} = 5\pi \cos 2\pi t$  where,  $t = 0$   $x = 8$  and  $y = 0$ , the path of the particle is
- (a) a straight line
  - (b) an ellipse
  - (c) a circle

(d) a parabola

**Ans: (b)**

19. A rod of length  $L$  is hinged from one end. It is brought to a horizontal position and released. The angular velocity of the rod, when it is in vertical position is

(a)  $\sqrt{\frac{2g}{L}}$

(b)  $\sqrt{\frac{3g}{L}}$

(c)  $\sqrt{\frac{g}{2L}}$

(d)  $\sqrt{\frac{g}{L}}$

**Ans: (b)**

20. A weight  $w$  is suspended from the mid-point of a rope, whose ends are at the same level. In order to make the rope perfectly horizontal, the force applied to each of its ends must be

(a) less than  $w$

(b) equal to  $w$

(c) equal to  $2w$

(d) infinitely large

**Ans: (d)**

21. A particle moves along a curve of unknown shape but magnitude of force  $F$  is constant and always acts along tangent to the curve. Then,

(a)  $F$  may be conservative

(b)  $F$  must be conservative

(c)  $F$  may be non-conservative

(d)  $F$  must be non-conservative

**Ans: (d)**

22. A block has been placed on an inclined plane with the slope angle  $\theta$ , block slides down the plane at constant speed. The coefficient of kinetic friction is equal to

(a)  $\sin \theta$

(b)  $\cos \theta$

(c)  $g$

(d)  $\tan \theta$

**Ans: (d)**

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

(a)  $\frac{\pi q}{6(4\pi\epsilon_0)}$

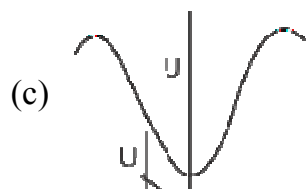
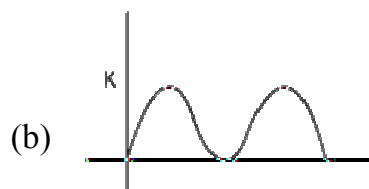
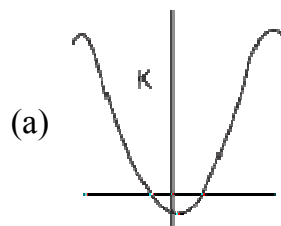
(b)  $\frac{q}{6(4\pi\epsilon_0)}$

(c)  $\frac{2\pi q}{6(4\pi\epsilon_0)}$

(d)  $\frac{4\pi q}{\frac{1}{6}(4\pi\epsilon_0)}$

**Ans: (d)**

24. During SHM, a particle has displacement  $x$  from mean position. If acceleration, Kinetic energy and excess potential energy are represented by a  $K$  and  $U$  respectively, then choose the appropriate graph





**Ans: (d)**

25. The root mean square velocity of hydrogen molecule at 27°C is  $v_H$  and that of oxygen at 402°C is  $v_0$ . then
- (a)  $v_0 > v_H$
  - (b)  $4v_0 = 9v_H$
  - (c)  $2v_0 = 3v_H$
  - (d)  $9v_0 = 134v_H$

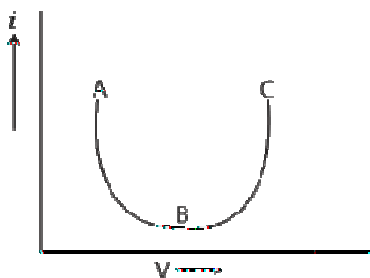
**Ans: (c)**

26. A charged spherical conductor a radius  $a$  and charge  $q$ , is surrounded by another charged concentric sphere of radius  $b$  ( $b > a$ ). The potential difference between conductors is  $V$ . When, the spherical conductor of radius  $b$  is discharged completely, then the potential difference between conductor will be

- (a)  $V$
- (b)  $\frac{V_a}{b}$
- (c)  $\frac{q_1}{4\pi\epsilon_0 a} - \frac{q_2}{4\pi\epsilon_0 b}$
- (d) None of the above

**Ans: (a)**

27. The current-voltage graph for a device is shown in figure. The resistance is negative in region.



- (a) AB
- (b) BC

- (c) ABC
- (d) None of these

**Ans: (a)**

28. Silver and copper voltmeters are connected in parallel with a battery of emf 12 V. In 30 min 1 g of silver and 1.8 g of copper are liberated. The energy supplied by the battery is
- (a) 720 J
  - (b) 2.41 J
  - (c) 24.12 J
  - (d)  $4.34 \times 10^4$  J

**Ans: (d)**

29. At a specific instant emission of radioactive compound is deflected in a magnetic field. The compound can emit
- (a) electron
  - (b) protons
  - (c)  $\text{He}^{2+}$
  - (d) neutrons

**Ans: (c)**

30. A magnet is cut in three equal parts by cutting it perpendicular to its length. The time period of original magnet is  $T_0$  in a uniform magnetic field B. Then, the time period of each part in the same magnetic field is
- (a)  $\frac{T_0}{2}$
  - (b)  $\frac{T_0}{3}$
  - (c)  $\frac{T_0}{4}$
  - (d) None of these

**Ans: (b)**

31. A 50 Hz AC current of crest value 1 A flows through the primary of a transformer. If the mutual inductance between the primary and secondary be 0.5 H, the crest voltage induced in the secondary is
- (a) 75 V
  - (b) 150 V

- (c) 100 V
- (d) None of these

**Ans: (c)**

32. If the length and area of cross-section of a conductor are doubled, then its resistance will be
- (a) unchanged
  - (b) halved
  - (c) doubled
  - (d) quadrupled

**Ans: (a)**

33. According to Wien's law

- (a)  $\lambda_m T = \text{constant}$
- (b)  $\frac{\lambda_m}{T} = \text{constant}$
- (c)  $\lambda_m \sqrt{T} = \text{constant}$
- (d)  $\frac{\lambda_m}{\sqrt{T}} = \text{constant}$

**Ans: (a)**

34. A source of light lies on the angle bisector of two plane mirrors inclined at angle  $\theta$ . The values of  $\theta$ , so that the light reflected from one mirror does not reach the other mirror will be

- (a)  $\theta \geq 120^\circ$
- (b)  $\theta \geq 90^\circ$
- (c)  $\theta \leq 120^\circ$
- (d) None of the above

**Ans: (a)**

35. A ruby laser produces radiations of wavelength, 662.6 nm in pulse whose duration are  $10^{-9}$  s. If the laser produces 0.39 J of energy per pulse, how many photons are produced in each pulse

- (a)  $1.3 \times 10^9$
- (b)  $1.3 \times 10^{18}$
- (c)  $1.3 \times 10^{27}$

(d)  $3.9 \times 10^{18}$

**Ans: (b)**

36. Balmer gives an equation for wavelength of visible radiation of H<sup>-</sup> spectrum

as  $\lambda = \frac{kn^2}{n^2 - 4}$ . The value of k in terms of Ryberg's constant R is

(a) R

(b) 4R

(c) R/4

(d) 4/R

**Ans: (d)**

37. In  $\mu_e$  and  $\mu_h$  are electron and hole mobility. E be the applied electric field, the current density  $\tau$  for intrinsic semiconductor is equal to

(a)  $n_i e(\mu_e + \mu_h)E$

(b)  $n_i e(\mu_e - \mu_h)E$

(c)  $\frac{n_i e(\mu_e + \mu_h)}{E}$

(d)  $\frac{E}{n_i e(\mu_e + \mu_n)}$

**Ans: (a)**

38. The KE of the electron in an orbit of radius r in hydrogen atom is (e = electronic charge)

(a)  $\frac{e^2}{r}$

(b)  $\frac{e^2}{2r}$

(c)  $\frac{e^2}{r}$

(d)  $\frac{e^2}{2r^2}$

**Ans: (b)**

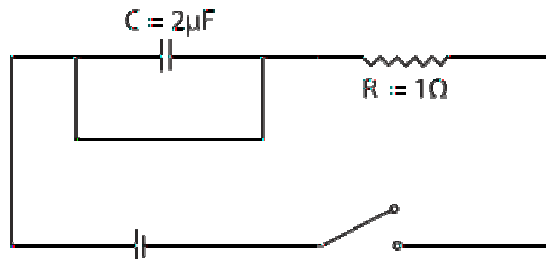
39. Three charged particles are collinear and are in equilibrium, then

(a) all the charged particles have the same polarity

- (b) the equilibrium is unstable
- (c) all the charged particles cannot have the same polarity
- (d) Both (b) and (c) are correct

**Ans: (d)**

40. The capacitive time constant of the RC circuit shown in the figure is



- (a) zero
- (b) infinity
- (c) 2s
- (d) 2 μs

**Ans: (b)**

**Directions** (Q. Nos. 41 to 60) *In each of the following questions, two statements are given, One is assertion and the other is reason. Examine the statement carefully and mark the correct answer according to the instruction given below*

41. **Assertion** Mass of moving photon varies inversely as the wavelength.

**Reason** Energy of the particle = Mass  $\times$  (speed of light)<sup>2</sup>

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (a)**

42. **Assertion** A hollow metallic closed container maintained at a uniform temperature can act as a source of a black body radiation.

**Reason** The inertial mass and gravitational mass of a body are equivalent.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.

- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (c)**

43. **Assertion** The ratio of inertial mass to gravitational mass is equal to one.

**Reason** The inertial mass and gravitational mass of a body are equivalent.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (c)**

44. **Assertion** In a stationary wave, there is not transfer of energy.

**Reason** There is no outward motion of the disturbance from one particle to adjoining particle in a stationary wave.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (d)**

45. **Assertion** In photoelectron emission the velocity of electron ejected from near the surface is larger than that coming from interior of metal.

**Reason** The velocity of ejected electron will be zero.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (d)**

46. **Assertion** If the ice on the polar caps of the earth melts, then length of day will increase.

**Reason** Moment of inertia of the earth increases, as ice on polar caps melts.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.

- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (a)**

47. **Assertion** Dielectric polarization means formation of positive and negative charges inside the dielectric.

**Reason** Free electron are formed in this process.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (d)**

48. **Assertion** Static crashes are heard on radio, when lightning flash occurs in the sky.

**Reason** Electromagnetic waves having frequency of radiowave range, interfere with radiowaves.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (a)**

49. **Assertion** The satellites equipped with electronic devices are called active satellites.

**Reason** Passive satellite works as active satellite

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (a)**

50. **Assertion** In He-Ne laser, population inversion takes place between energy levels of neon atoms.

**Reason** The base to emitter region is forward biased.

- (a) If both the assertion and reason are true and reason explains the assertion.

- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (b)**

51. **Assertion** A transistor amplifier in common emitter configuration has a low input impedance.

**Reason** The base to emitter region is forward biased.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (b)**

52. **Assertion** Thermodynamic process in nature are irreversible.

**Reason** Dissipative effects cannot be eliminated.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (c)**

53. **Assertion** Crystalline solids can cause X-rays to diffract.

**Reason** Interatomic distance in crystalline solids is of the order of 0.1 nm.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (a)**

54. **Assertion** For higher temperature, the peak emission wavelength of a black body shifts to lower wavelength.

**Reason** Peak emission wavelength of a black body is proportional to the fourth power of temperature.

- (a) If both the assertion and reason are true and reason explains the assertion.



- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (d)**

55. **Assertion** Displacement of a body may be zero, when distance travelled by it is not zero.

**Reason** The displacement is the longer distance between initial and final position.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (c)**

56. **Assertion** Magnetic field interacts with a moving charge and not with a stationary charge.

**Reason** A moving charge produces a magnetic field.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (a)**

57. **Assertion** There is no current in the metals in the absence of electric field.

**Reason** Motion of free electrons are randomly.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (a)**

58. **Assertion** When height of a tube is less than liquid rise in the capillary tube, the liquid does not overflow.

**Reason** Product of radius of meniscus and height of liquid in capillary tube always remains constant.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (d)**

59. **Assertion** Sound would travel faster on a hot summer day than on cold winter day.

**Reason** Velocity of sound is directly proportional to the square of its absolute temperature.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (a)**

60. **Assertion** When charges are shared between any two bodies no charge is really lost some loss of energy does occurs.

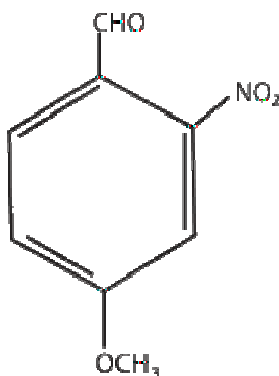
**Reason** Some energy disappears in the form of heat, sparking etc.

- (a) If both the assertion and reason are true and reason explains the assertion.
- (b) If both the assertion and reason are true but reason does not explain the assertion.
- (c) If assertion is true but reason false
- (d) If assertion is false but reason is true

**Ans: (c)**

## Chemistry

1. The IUPAC name of the compound



- (a) 4-methoxy-2-nitrobenzaldehyde  
(b) 4-formyl-3-nitro anisole  
(c) 4-methoxy-6-nitro benzaldehyde  
(d) 2-formyl-5-methoxy nitrobenzene

**Ans: (a)**

2. Butyne-1 on oxidation with hot alkaline  $\text{KMnO}_4$  would give

- (a)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$   
(b)  $\text{CH}_3\text{CH}_2\text{COOH}$   
(c)  $\text{CH}_3\text{CH}_2\text{COOH} + \text{CO}_2 + \text{H}_2\text{O}$   
(d)  $\text{CH}_3\text{CH}_2\text{COOH} + \text{HCOOH}$

**Ans: (d)**

3. Which one of the following statements is false?

- (a) Photochemical smog causes irritation in eyes  
(b) London smog is a mixture of smoke and fog  
(c) Photochemical smog results in the formation of PAN  
(d) London smog is oxidizing in nature

**Ans: (d)**

4. Which of the following aqueous solutions has the highest boiling point?

- (a) 0.1 M  $\text{KNO}_3$   
(b) 0.1 M  $\text{Na}_3\text{PO}_4$   
(c) 0.1 M  $\text{BaCl}_2$   
(d) 0.1 M  $\text{K}_2\text{SO}_4$

**Ans: (b)**

5. An increase in equivalence conductance of a strong electrolyte with dilution is mainly due to
- (a) increase in number of ions
  - (b) increase in ionic mobility of ions
  - (c) increase in both, i.e., number of ions and ionic mobility of ions
  - (d) at normal dilution 100% ionization of electrolyte

**Ans: (b)**

6. The rate constant for a first order reaction becomes six times when the temperature is raised from 350 K to 400 K. Calculate the activation energy for the reaction.

$$[R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}]$$

- (a) 4.17 kJ mol<sup>-1</sup>
- (b) 41.7 kJ mol<sup>-1</sup>
- (c) 417.0 kJ mol<sup>-1</sup>
- (d) 4170 kJ mol<sup>-1</sup>

**Ans: (b)**

7. When dilute aqueous solution of AgNO<sub>3</sub> (excess) is added to KI solution, positively charged sol of AgI is formed due to adsorption of

- (a) NO<sub>3</sub><sup>-</sup>
- (b) O<sub>2</sub><sup>-</sup>
- (c) Ag<sup>+</sup>
- (d) K<sup>+</sup>

**Ans: (c)**

8. In electrorefining of copper some gold is deposited at

- (a) cathode
- (b) anode mud
- (c) cathode mud
- (d) electrode

**Ans: (b)**

9. CaCN<sub>2</sub> + C is called on

- (a) urea

- (b) thomas slag
- (c) nitrolim
- (d) triple super phosphate

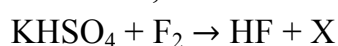
**Ans: (c)**

10. Which one of the following forms vortex ring?

- (a)  $P_2O_5$
- (b)  $PH_3$
- (c)  $NH_3$
- (d)  $P_4O_{10}$

**Ans: (b)**

11. What is X, in the following reaction?



- (a)  $K_2SO_4$
- (b)  $K_2S_2O_4$
- (c)  $K_2S_2O_3$
- (d)  $K_2S_2O_8$

**Ans: (d)**

12. Europium is

- (a) s- block element
- (b) p- block element
- (c) d- block element
- (d) f- block element

**Ans: (d)**

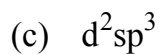
13. The stability of ferric ion is due to

- (a) half-filled d-orbitals
- (b) half-filled f-orbitals
- (c) completely filled d-orbitals
- (d) completely filled f-orbitals

**Ans: (a)**

14. An octahedral complex is formed when hybrid orbitals of the following types are involved.

- (a)  $sp^3$
- (b)  $dsp^2$



**Ans: (c)**

15. Which one amongst of the following isomerism is shown by  $[Pt(NH_3)_2Cl_2]$ ?

(a) Structural

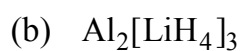
(b) Geometrical

(c) Optical

(d) Conformational

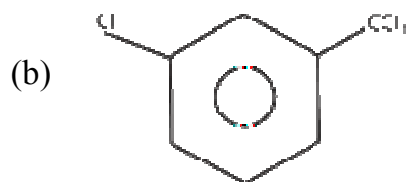
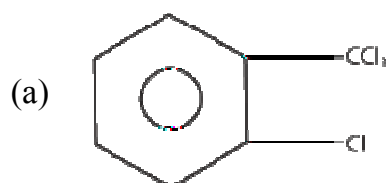
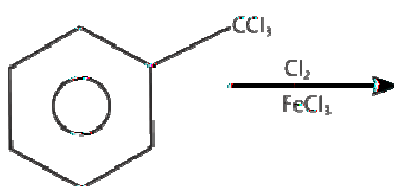
**Ans: (b)**

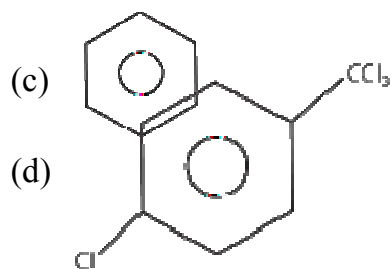
16. What is the structural formula of lithium tetrahydrido aluminate?



**Ans: (a)**

17. Find the major product in the following reaction,





**Ans: (b)**

18. An organic compound which produces a bluish green coloured flame on heating in presence of copper is
- chlorobenzene
  - benzaldehyde
  - aniline
  - benzoic acid

**Ans: (a)**

19. In Williamson's synthesis, ethoxy ethane is prepared by
- heating sodium ethoxide with ethyl bromide
  - passing ethanol over heated alumina
  - treating ethyl alcohol with excess of conc.  $H_2SO_4$  at 430-440 K
  - heating ethanol with dry  $Ag_2O$

**Ans: (a)**

20. Which among the following compounds will give a secondary alcohol on reacting with Grignard reagent followed by acid hydrolysis?

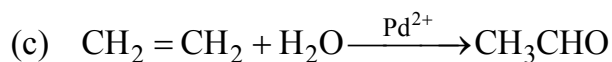
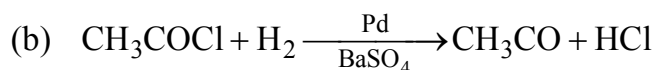
I.  $HCHO$                       II.  $C_2H_5CHO$   
 III.  $CH_3COCH_3$             IV.  $RCOOC_2H_5$

Select the correct answer using the codes given below.

- Only II
- Only III
- II and IV
- III and IV

**Ans: (c)**

21. Which of the following is the industrial method of preparation of acetaldehyde?



(d) All of the above

**Ans: (c)**

22.  $\text{C}_3\text{H}_6\text{O}$  did not give a silver mirror with Tollen's reagent, but gave an oxime with hydroxylamine. It can give positive

(a) iodoform test

(b) Fehling's test

(c) Schiff's test

(d) carbylamines test

**Ans: (a)**

23. Which of the following carboxylic acids undergoes decarboxylation easily?

(a)  $\text{C}_6\text{H}_5\text{COCO}_2\text{H}$

(b)  $\text{C}_6\text{H}_5\text{COCH}_2\text{CO}_2\text{H}$

(c)  $\text{C}_6\text{H}_5\text{CHOHCO}_2\text{H}$

(d)  $\text{C}_6\text{H}_5\text{CHCO}_2\text{H}$



**Ans: (b)**

24. The stoichiometry of the following reaction is  $\text{K}_2\text{S}_2\text{O}_8(\text{aq}) + 2\text{KI}(\text{aq}) \rightarrow 2\text{K}_2\text{SO}_4(\text{aq}) + \text{I}_2(\text{aq})$

(a) 2 : 1

(b) 1 : 2

(c) 2 : 2

(d) 1 : 3

**Ans: (b)**

25.  $\Psi^2 = 0$  represents

(a) a node

(b) an orbital

(c) angular wave function

(d) wave function



**Ans: (a)**

26. If the de-Broglie wavelength of a particle of mass  $m$  is 100 times its velocity then its value in terms of its mass ( $m$ ) and Planck's constant ( $h$ ) is

(a)  $\frac{1}{10}\sqrt{\frac{m}{h}}$

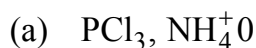
(b)  $10\sqrt{\frac{h}{m}}$

(c)  $\frac{1}{10}\sqrt{\frac{h}{m}}$

(d)  $10\sqrt{\frac{m}{h}}$

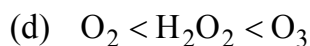
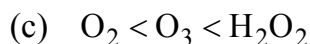
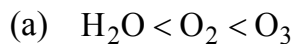
**Ans: (b)**

27. The pair having similar geometry is



**Ans: (c)**

28. The correct order in which the O—O bond length increases is



**Ans: (c)**

29. An LPG cylinder, containing 15 kg butane at  $27^\circ\text{C}$  and 10 atm pressure, is leaking. After one day, its pressure decreased to 8 atm. The quantity of gas leaked is

(a) 1 kg

(b) 2 kg

(c) 3 kg

(d) 4 kg

**Ans: (c)**

30. Assume each reaction is carried out in a open container. For which reaction  $\Delta H = \Delta E$ ?
- (a)  $\text{H}_2(\text{g}) + \text{Br}_2(\text{g}) \rightarrow 2\text{HBr}(\text{g})$
  - (b)  $\text{C}(\text{s}) + 2\text{H}_2\text{O}(\text{g}) \rightarrow 2\text{H}_2(\text{g}) + \text{CO}_2(\text{g})$
  - (c)  $\text{PCl}_5(\text{g}) \rightarrow \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$
  - (d)  $2\text{CO}(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{CO}_2(\text{g})$

**Ans: (a)**

31. In a basic buffer, 0.0025 mole of  $\text{NH}_4\text{Cl}$  and 0.15 mole of  $\text{NH}_4\text{OH}$  are present. The pH of the solution will be ( $\text{pK}_a = 4.74$ ).

- (a) 11.04
- (b) 10.24
- (c) 6.62
- (d) 5.48

**Ans: (a)**

32. Strongest conjugate base is

- (a)  $\text{Cl}^-$
- (b)  $\text{Br}^-$
- (c)  $\text{F}^-$
- (d)  $\text{I}^-$

**Ans: (c)**

33. For the gas phase reaction,  $\text{C}_2\text{H}_4 + \text{H}_2 \rightleftharpoons \text{C}_2\text{H}_6$ ; [ $\Delta H = -32.7 \text{ kcal}$ ]  
Carried out in a vessel, the equilibrium concentration of  $\text{C}_2\text{H}_4$  can be increased by

- (a) decreasing the pressure
- (b) increasing the temperature
- (c) removing some  $\text{C}_2\text{H}_6$
- (d) adding some  $\text{H}_2$

**Ans: (b)**

34. Which one of the following is a conjugated protein?

- (a) Phosphoprotein
- (b) Glycoprotein
- (c) Chromoprotein
- (d) All of these

**Ans: (d)**

35. A solution containing 0.319 g of  $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$  was passed through a cation exchange resin and acid coming out of the cation exchange resin required 28.5 mL of 0.125 M NaOH. Determine correct formula of the complex [mol. wt. of the complex = 266.5]
- (a)  $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$
  - (b)  $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{H}_2\text{O} \cdot \text{Cl}_2$
  - (c)  $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$
  - (d)  $[\text{Cr}(\text{H}_2\text{O})_3\text{Cl}_3]3\text{H}_2\text{O}$

**Ans: (a)**

36. Which of the following is not an actinoid?
- (a) Curium ( $Z = 96$ )
  - (b) Californium ( $Z = 98$ )
  - (c) Uranium ( $Z = 92$ )
  - (d) Terbium ( $Z = 65$ )

**Ans: (d)**

37. The period number in the long form of the periodic table is equal to
- (a) magnetic quantum number of any element of the period
  - (b) atomic number of any element of the period
  - (c) maximum principal quantum number of any element of the period
  - (d) maximum azimuthal quantum numbers of any element of the period

**Ans: (c)**

38. If the IP of Na is 5.48 eV, the ionisation potential of K will be
- (a) same as that of Na
  - (b) 4.4 eV
  - (c) 5.68 eV
  - (d) 10.88 eV

**Ans: (b)**

39. The entropy change involved in the isothermal reversible expansion of 2 moles of an ideal gas from a volume of  $10 \text{ dm}^3$  at  $27^\circ\text{C}$  is to a volume of  $100 \text{ dm}^3$
- (a)  $42.3 \text{ J mol}^{-1}\text{K}^{-1}$
  - (b)  $38.3 \text{ J mol}^{-1}\text{K}^{-1}$

- (c)  $35.8 \text{ J mol}^{-1}\text{K}^{-1}$
- (d)  $32.3 \text{ J mol}^{-1}\text{K}^{-1}$

**Ans: (b)**

40. Which of the following reagents may be used to distinguish between phenol and benzoic acid?
- (a) Neutral  $\text{FeCl}_3$
  - (b) Aqueous  $\text{NaOH}$
  - (c) Tollen's reagent
  - (d) Molisch reagent

**Ans: (a)**

**Directions** (Q. Nos. 41 to 60) *In each of the following questions, two statements are given. One is assertion and the other is reason. Examine the statement carefully and mark the correct answer according to the instruction given below*

41. **Assertion** Conformers are impractical to separate.  
**Reason** Conformers have negligibly small difference in their potential energy.
- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
  - (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
  - (c) Assertion is true but Reason is false
  - (d) Both Assertion and Reason are false

**Ans: (a)**

42. **Assertion** p-toluidine is a stronger base than m-toluene.  
**Reason** Methyl group from m-position exerts smaller electron donating inductive (+I) effect than from p-position.
- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
  - (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
  - (c) Assertion is true but Reason is false
  - (d) Both Assertion and Reason are false

**Ans: (c)**

43. **Assertion** 2-butyne on controlled hydrogenation with Pd/CaCO<sub>3</sub> in presence of PbO gives cis-2-butene.

**Reason** Hydrogenation occur at the surfaces of metal containing adsorbed hydrogen.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (b)**

44. **Assertion** Treatment of chloroethane with a saturated solution of AgCN gives ethyl isocyanide as the major product.

**Reason** Cyanide (CN<sup>-</sup>) is an ambident nucleophile.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (b)**

45. **Assertion** Reaction of alcohols with SOCl<sub>2</sub> is catalysed by the presence of a tertiary amine (R<sub>3</sub>N).

**Reason** Tertiary amine promote the reaction by reacting with the by-product HCl.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

46. **Assertion** Aldol condensation is usually carried out in dilute solution of a strong base.

**Reason** Concentrated solution of strong base involved Cannizzaro reaction.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (c)**

47. **Assertion** Malonic acid ( $\text{HOOC}-\text{CH}_2-\text{COOH}$ ) does not form cyclic anhydride on heating.

**Reason** It is like  $\beta$ -keto acid, on heating it prefer to decarboxylate.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

48. **Assertion** Both 106 g of sodium carbonate and 12 g of graphite have same number of carbon atoms.

**Reason** Both 106 g sodium carbonate and 12 g of graphite contain 1 g-atom of carbon atoms.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

49. **Assertion** Energy of electron is largely determined by its principal quantum number.

**Reason** Principal quantum number is a measure of the most possible distance of finding the electron around the nucleus.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

50. **Assertion** When 1.0 mol of NaCl is doped with  $10^{-3}$  mol  $\text{SrCl}_2$ , the number of cationic sites remaining vacant is  $10^{-3}$ .

**Reason** Each  $\text{SrCl}_2$  unit produces two cationic vacancy.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (d)**

51. **Assertion** A process for which  $\Delta S_{\text{sys}} > 0$  as well as  $\Delta H > 0$ , passes from non-spontaneous to spontaneous state as temperature is increased.

**Reason** At higher temperature,  $T\Delta S$  exceeds  $\Delta H$ .

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

52. **Assertion** A catalyst does not influence the value of equilibrium constant.

**Reason** Catalyst influence the rate of both forward and backward reactions equally.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

53. **Assertion** Addition of a non-volatile solute to a volatile solvent increases the boiling point.

**Reason** Addition of non-volatile solute results in lowering of vapour pressure.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

54. **Assertion** Electrolysis of molten  $\text{CaH}_2$  produces hydrogen gas at anode.

**Reason** In  $\text{CaH}_2$ , hydrogen is present in the form of hydride  $\text{H}^-$ .

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

55. **Assertion**  $\text{NaOH}$  cannot be stored in a vessel made of aluminium or zinc.

**Reason** A protective layer of oxide is formed on the surface of the metal.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (c)**

56. **Assertion** Boron always forms covalent bond.

**Reason** The small size of  $\text{B}^{3+}$  favours formation of covalent bond.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false



(d) Both Assertion and Reason are false

**Ans: (a)**

57. **Assertion**  $\text{CaF}_2$  has been given the same fluorspar.

**Reason** Solid  $\text{CaF}_2$  emits light when heated.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

(b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

(c) Assertion is true but Reason is false

(d) Both Assertion and Reason are false

**Ans: (a)**

58. **Assertion** The purple colour of  $\text{KMnO}_4$  is due to the charge transfer transition.

**Reason** The intense colour in most of the transition metal complexes is due to d-d transition.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

(b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

(c) Assertion is true but Reason is false

(d) Both Assertion and Reason are false

**Ans: (b)**

59. **Assertion**  $\text{Al}_2\text{O}_3$  is converted to aluminium by reduction with carbon.

**Reason** Carbon (graphite) has greater affinity for oxygen than Al.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

(b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

(c) Assertion is true but Reason is false

(d) Both Assertion and Reason are false

**Ans: (d)**

60. **Assertion**  $[\text{Ni}(\text{CO})_4]$  is a diamagnetic complex.

**Reason** All the electrons in the complex are paired.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

- (b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

**AIIMS MBBS Entrance Exam - 2014**  
**Biology (Solved Paper)**

1. Wings a pigeon, bat and mosquito shows

- (a) atavism
- (b) convergent evolution
- (c) divergent evolution
- (d) mutation

**Ans: (b)**

2. Gelatin, an important raw material for preparation of photographic emulsion is a by product of

- (a) chicken
- (b) forest
- (c) cattle
- (d) fish

**Ans: (c)**

3. Phylogenetic system of classification includes

- (a) evolutionary trends only
- (b) genetic trends only
- (c) evolutionary trend as well as morphology
- (d) behavioural trends in environment

**Ans: (a)**

4. 'Red tide' is caused by

- (a) *Gonyaulax*
- (b) *Ceratium*
- (c) *Tacratium*
- (d) All of these

**Ans: (d)**

5. A person sitting at rest experiences a temporary cessation of breathing after forced deep breathing for a few minutes. This is due to

- (a) too much CO<sub>2</sub> in the blood
- (b) too much O<sub>2</sub> in the blood
- (c) very little CO<sub>2</sub> in the blood
- (d) both high O<sub>2</sub> and very little CO<sub>2</sub> in the blood

**Ans: (d)**

6. A physiological response of plants to the duration of light and darkness is a
- (a) daily phase cycle
  - (b) circadian rhythms
  - (c) biological clock
  - (d) photoperiodism

**Ans: (d)**

7. ABA is involved in
- (a) shoot elongation
  - (b) increased cell division
  - (c) dormancy clock
  - (d) root elongation

**Ans: (c)**

8. There is increase in blood urea when there is insufficient filtration in
- (a) loop of Henle
  - (b) distal tubule
  - (c) Bowman's capsule
  - (d) collecting tubule

**Ans: (c)**

9. Aerobic respiration produces more usable chemical energy than fermentation, because fermentation involves
- (a) formation of lactic acid
  - (b) complete oxidation of food
  - (c) partial oxidation of food
  - (d) evolution of CO<sub>2</sub> and alcohol

**Ans: (c)**

10. Which one of the following correctly describes the location of some body parts in the earthworm (*Pheretima*)?
- (a) Four pairs of spermathecae in 4-7 segments

- (b) One pair of ovaries attached at inter-segmental septum of 14<sup>th</sup> and 15<sup>th</sup> segments
- (c) Two pairs of testes in 10<sup>th</sup> and 11<sup>th</sup> segments
- (d) Two pairs of accessory glands in 16-18<sup>th</sup> segments

**Ans: (c)**

11. Hypothetical plant hormones are

- (a) florigen
- (b) vernalin
- (c) florigen and vernalin
- (d) auxin

**Ans: (c)**

12. Which one of the following shows heterothallism?

- (a) Rhizopus
- (b) Bacterium
- (c) Cycas
- (d) Ricinus

**Ans: (a)**

13. A drug addict showed symptoms such as increased appetite, chest pain, redness of eyes, increased urination. He was possibly taking

- (a) cannabis compounds
- (b) LSD
- (c) cocaine
- (d) amphetamines

**Ans: (a)**

14. The brain disease caused due to accumulation of amyloid  $\beta$ -peptide is

- (a) Addison's disease
- (b) Huntington's disease
- (c) Parkinson's disease
- (d) Alzheimer's disease

**Ans: (d)**

15. Which of the following is a 'cyanophage'?

- (a) S-13
- (b)  $\phi \times 174$
- (c) SV-40
- (d) LPP-1

**Ans: (d)**

16. Match items in Column I with those in Column II.

Column I	Column II
A. Peritrichous flagella	1. Ginkgo
B. Living fossil	2. Macrocystis
C. Smallest flowering plant	3. E. coli
D. Largest perennial alga	4. Wolffia

(a) A-3, B-1, C-4, D-5, E-2

(b) A-2, B-3, C-4, D-1, E-5

(c) A-4, B-2, C-1, D-5, E-3

(d) A-2, B-4, C-3, D-5, E-1

**Ans: (a)**

17. Osmosis is a type of

(a) imbibitions of solution

(b) diffusion of solvent

(c) evaporation of water

(d) diffusion of solute

**Ans: (b)**

18. RQ (Respiratory Quotient) is defined as

(a) volume of CO<sub>2</sub> evolved = volume of O<sub>2</sub> consumed

(b)  $\frac{\text{volume of O}_2 \text{ consumed}}{\text{volume CO}_2 \text{ evolved}}$

(c)  $\frac{\text{volume of CO}_2 \text{ evolved}}{\text{volume of O}_2 \text{ consumed}}$

(d)  $\frac{\text{volume of O}_2 \text{ evolved}}{\text{volume of CO}_2 \text{ consumed}}$

**Ans: (c)**

19. Atretic follicles are found in the

(a) fallopian tubes

(b) uterus

- (c) labia majora
- (d) ovary

**Ans: (d)**

20. Which one is matched correctly?
- (a) Arsenic—Black foot disease
  - (b) Flouride—Itai-itai
  - (c) Mercury—Skeletal fluorosis
  - (d) Cadmium—Minamata disease

**Ans: (a)**

21. Leghaemoglobin helps in
- (a) nitrogen-fixation
  - (b) protecting nitrogenase from O<sub>2</sub>
  - (c) destroy bacteria
  - (d) transport of food in plants

**Ans: (b)**

22. Match the Column I with Column II.

Column I	Column II
A. Bulliform cells	1. Stomata
B. Guard cells	2. Aerating pore
C. Lenticels	3. Accessory cells
D. Subsidiary cell	4. Isobilateral leaf

- (a) A-1, B-2, C-3, D-4
- (b) A-3, B-1, C-2, D-4
- (c) A-4, B-1, C-2, D-3
- (d) A-4, B-3, C-2, D-1

**Ans: (c)**

23. 'Cladode's is a characteristic morphological feature of
- (a) *Asparagus* and *Ruscus*
  - (b) *Casuarina* and *Opuntia*
  - (c) *Cladophora* and *Cactus*
  - (d) *Citrus* and *Euphorbia*

**Ans: (a)**

24. The species diversity decreases from lower to higher altitudes on a mountain. This is due to

- (a) increase in temperature
- (b) decrease in temperature
- (c) greater seasonal variability
- (d) Both (b) and (c)

**Ans: (d)**

25. What is not a common feature is *Periplaneta* and *Scorpions*?

- (a) Excretory organs are malpighian tubules
- (b) No appendages in abdomen
- (c) Respiratory organs are trachea
- (d) Both are mostly terrestrial arthropods

**Ans: (c)**

26. *Cycas* is classified as a gymnosperms due to its

- (a) motile sperms
- (b) fruit formation
- (c) naked ovule
- (d) phycnoxylic wood

**Ans: (c)**

27. In an area, a population with large size individuals having long life span, more parental care and slow development was present. The type of population growth curve will be

- (a) S-shaped
- (b) J-shaped
- (c) Z-shaped
- (d) All of these

**Ans: (a)**

28. A gland called 'Clock of ageing' that gradually reduces and degenerates in ageing is

- (a) thyroid
- (b) thymus
- (c) parathyroid
- (d) pituitary

**Ans: (b)**

29. Which of the following statement is correct?

- (a)  $DPD = OP - WP$
- (b)  $DPD = OP + WP$
- (c)  $DPD = WP - OP$
- (d)  $DPD = TP + OP$

**Ans: (a)**

30. Censar mechanism of seed dispersal is found in

- (a) Papaveraceae
- (b) Liliaceae
- (c) Leguminosae
- (d) Rosaceae

**Ans: (a)**

31. At a particular locus, frequency of 'A' allele is 0.6 and that of 'a' is 0.4. What would be the frequency of heterozygotes in a randomly mating population of equilibrium?

- (a) 0.16
- (b) 0.36
- (c) 0.48
- (d) 0.24

**Ans: (c)**

32. The  $C_4$  plants differ from  $C_3$  plants with reference to the

- (a) substrate that accepts  $CO_2$  in carbon assimilation
- (b) type of end product
- (c) type of pigment involved in photosynthesis
- (d) number of ATP that are consumed in preparing sugar

**Ans: (a)**

33. The colour in the brown fat is due is

- (a) its larger capacity for generating heat
- (b) large number of mitochondria present
- (c) a high concentration of iron containing cytochrome pigments
- (d) presence of chromatophores

**Ans: (c)**

34. Which of the following is common among mammals?

- (a) They do not moult
- (b) They have seven cervical vertebrae
- (c) They are carnivores



(d) They have ventral nerve cord

**Ans: (b)**

35. Elater mechanism for seed dispersal is exhibited by

(a) *Riccia*

(b) *Marchantia*

(c) *Dryopteris*

(d) *Funaria*

**Ans: (b)**

36. In which one of the following pairs, the two items mean the same thing?

(a) Haemophilia—Blood cancer

(b) SA-node-Pacemaker

(c) Malleus—Anvil

(d) Leucocytes—Lymphocytes

**Ans: (b)**

37. Which of the following part of human brain is also called emotional brain?

(a) Corpus callosum

(b) Limbic system

(c) Epithalamus

(d) Broca's area

**Ans: (b)**

38. Which of the following set of elements are essential for the photosynthesis to occurs

(a) Cu, Co, Fe

(b) Cu, Mo, Zn

(c) Mg, Co, Mn

(d) Mg, Fe, Mn, Cu, Cl, P

**Ans: (d)**

39. The disease caused by *leishmania* and transmitted by *Phlebotomus* is

(a) African sleeping sickness

(b) Amoebic dysentery

(c) Kala-azar fever

(d) Chaga's disease

**Ans: (c)**

40. Saheli, is an oral contraceptive pill that has very high contraceptive value with little side effects. It is because

- (a) it is taken once in a week
- (b) it contains synthetic progesterone
- (c) it contains centchroman
- (d) it decreases risk of cancer

**Ans: (c)**

**Direction (Q. Nos. 41-60)** These questions consist two statement each printed as Assertion and Reason. While answering these question, you are required to choose any one of the following four options.

41. **Assertion** Rigon mortis is the state of body stiffening prior to death.

**Reason** It is due to relaxation of action and myosin filaments.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (d)**

42. **Assertion** Seeds fails to germinate at very low and high temperature.

**Reason** Seeds sown deep into the soil fail to germinate.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (b)**

43. **Assertion** Lysosomes are organelle in eukaryotic cells that contains digestive enzymes to digest macromolecules.

**Reason** Lysosomes are also called phagolysosomes or heterophagosomes or digestive vacuoles.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false

(d) Both Assertion and Reason are false

**Ans: (a)**

44. **Assertion** Reproductive isolation brings about sympatric speciation.

**Reason** It is the primary mode of speciation.

e.g., Darwin's finches.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion

(c) Assertion is true but Reason is false

(d) Both Assertion and Reason are false

**Ans: (b)**

45. **Assertion** Presence of photorespiration is considered as a wasteful and energy consuming process in crop plants, ultimately leads to reduction in yield.

**Reason** During  $C_3$  synthesis up 50%  $CO_2$  fixed may have to pass through photorespiratory process to form carbohydrate such as sucrose.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion

(c) Assertion is true but Reason is false

(d) Both Assertion and Reason are false

**Ans: (a)**

46. **Assertion** Enzymes becomes inactive below minimum temperature.

**Reason** The inactivity of the enzymes is due to denaturation.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion

(c) Assertion is true but Reason is false

(d) Both Assertion and Reason are false

**Ans: (c)**

47. **Assertion** Fine structure of the objects can be observed by Transmission Electron Microscope (TEM).

**Reason** Study of living cells can not be done through TEM, because of high voltage, which is required to operate it, kills the cells.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (b)**

48. **Assertion** The total content of iron in an adult body is 3.5 gram. The iron deficiency lead to ammonia.

**Reason** Iron ( $\text{Fe}^{2+}$ ) combines with the pigment porphyrin to form heme.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

49. **Assertion** Mammals have developed a complex respiratory system.

**Reason** Mammalian skin is impermeable to gases.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (b)**

50. **Assertion** Removal of keystone species cause serious disruption in the functioning of the community.

**Reason** Keystone species are low in abundance (or biomass) than the dominant species.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (b)**

51. **Assertion** In bacteria the chromosome is irregularly folded into a compact mass, the nucleoid or genophore of definite form.

**Reason** In bacteria there is no organized nucleus.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

52. **Assertion** DNA is more stable while RNA is more reactive.

**Reason** DNA was first discovered by Watson and Crick (1953).

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (c)**

53. **Assertion** Second infection of the same pathogen is quickly eliminated.

**Reason** Preformed memory B and T-cells elicit a quick and vigorous attack on pathogens.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

54. **Assertion** Eukaryotic cells have more DNA than prokaryotic cells

**Reason** Eukaryotic are more complex than prokaryotes genetically.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

55. **Assertion** In open water zone upto the depth to which light can penetrate, called photic zone.

**Reason** The photic zone is categorized into euphotic and disphotic zone.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (b)**

56. **Assertion** Zoospores in *Chlamydomonas* are frequently formed in the night during favourable conditions.

**Reason** Zoospore swim for a certain time and then grows into a new plant.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (b)**

57. **Assertion** After hearing a sound, nerve impulse passes from neurons to the brain

**Reason** The neurons which passes nerve impulse from body organ to brain is called afferent neuron.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (b)**

58. **Assertion** Placenta in addition to connection with mother and foetus to ductless gland.

**Reason** It releases human gonadotropins.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

59. **Assertion** A woman is capable of sucking a man of refusing to own a child, who has blood group O. The man has blood group B and woman has A.

**Reason** She is right as genetically, the can be the father of the child.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

60. **Assertion** The thallus of *Riccia* is internally differentiated into an upper photosynthetic region and lower storage region.

**Reason** The lower storage region is formed from parenchymatous cells.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
- (c) Assertion is true but Reason is false
- (d) Both Assertion and Reason are false

**Ans: (a)**

## General Knowledge & Aptitude

1. Who constructed Sanchi Stupa?
  - (a) Chandragupta
  - (b) Kautilya
  - (c) Gautam Buddha
  - (d) Ashok**Ans: (d)**
2. Where did Lord Buddha breathe his last (Mahapari Nirvan)?
  - (a) Rajgir
  - (b) Bodh Gaya
  - (c) Sarnath
  - (d) Kushinagar**Ans: (d)**
3. Sudden decrease of birth rate would cause
  - (a) increase in per capita income
  - (b) increase in investment
  - (c) increase in savings
  - (d) increase in loan requests**Ans: (a)**
4. Among the following who was not a proponent of Bhakti cult?
  - (a) Nagarjuna
  - (b) Tukaram
  - (c) Tyagaraja
  - (d) Vallabhacharya**Ans: (a)**
5. Who was the founder of Ram Krishna Mission?
  - (a) Swami Vivekananda
  - (b) Raja Ram Mohan Rai
  - (c) Swami Dayananda Saraswati
  - (d) Ram Krishna Paramhansa**Ans: (a)**
6. Which is closest star to the Earth?
  - (a) Sirius



- (b) Sun
- (c) Deneb
- (d) Vega

**Ans: (b)**

7. Tsunamis are originated due to

- (a) Sea waves
- (b) Earthquake
- (c) Hurricane
- (d) Rotation of Earth

**Ans: (b)**

8. Which of the following is igneous rock?

- (a) Limestone
- (b) Slate
- (c) Marble
- (d) Basalt

**Ans: (d)**

9. Which river crosses the equator twice?

- (a) Amazon
- (b) Congo
- (c) Nile
- (d) Orinoco

**Ans: (b)**

10. Water vapour is turned into water droplets by the process of

- (a) evaporation
- (b) liquification
- (c) convection
- (d) condensation

**Ans: (d)**

11. Which sector of Indian economy contributes largest to the gross national product?

- (a) Primary sector
- (b) Secondary sector
- (c) Tertiary sector
- (d) Public sector

**Ans: (c)**

12. The most literate union territory in India is

- (a) Delhi
- (b) Lakshadweep
- (c) Chandigarh
- (d) Pondicherry

**Ans: (b)**

13. What is the fixed strength of Rajya Sabha?

- (a) 210
- (b) 220
- (c) 230
- (d) 250

**Ans: (d)**

14. Which one among following is not a fixed capital?

- (a) Tools
- (b) Machines
- (c) Building
- (d) Money

**Ans: (b)**

15. Who was the first woman Prime Minister to become the Prime Minister of a country?

- (a) Golda Meir
- (b) Margaret Thatcher
- (c) Indira Gandhi
- (d) Sirimavo Bhandharnaike

**Ans: (d)**

16. What is a modem connected to?

- (a) Processor
- (b) Mother board
- (c) Printer
- (d) Phone line

**Ans: (d)**

17. Spam is related to

- (a) Computer
- (b) Art
- (c) Music

(d) Game

**Ans: (a)**

18. Late Raja Ravi Verma was an eminent figure in which of the following fields?

(a) Dance

(b) Politics

(c) History

(d) Painting

**Ans: (d)**

19. Who is known as 'Little Corporal'?

(a) Adolf Hitler

(b) Napoleon Bonaparte

(c) William E Gladstone

(d) None of these

**Ans: (b)**

20. SAARC was founded in

(a) New Delhi

(b) Dhaka

(c) Geneva

(d) Thimpu

**Ans: (b)**