

**JUPITER ACADEMY**

**MODEL PAPER 2 PHYSICS**

**NEET-UG - PHYSICS**

**Time Allowed :** 60 mins

**Maximum Marks :** 180

**General Instructions:**  
ANSWER ANY 45 QUESTION

**Section A**

- 1 Which of the following quantities can be written in SI units in  $\text{kgm}^2 \text{A}^{-2} \text{s}^{-3}$  ? [4]
- a) Inductance
  - b) Capacitance
  - c) Resistance
  - d) Magnetic flux
- 2 If 'muscle times speed equals power', what is the ratio of the SI unit and the CGS unit of muscle? [4]
- a)  $10^5$
  - b)  $10^3$
  - c)  $10^7$
  - d)  $10^{-5}$
- 3 **Assertion (A):** Two similar trains are moving along the equatorial line with the same speed but in opposite direction. They will exert equal pressure on the rails. [4]
- Reason (R):** In uniform circular motion the magnitude of acceleration remains constant but the direction continuously changes.
- a) Both A and R are true and R is the correct explanation of A.
  - b) Both A and R are true but R is not the correct explanation of A.
  - c) A is true but R is false.
  - d) A is false but R is true.

- 4 A jet plane lands with a speed of 100 m/s and can accelerate at a maximum rate of  $-5.00\text{m/s}^2$  as it comes to rest. From the instant the plane touches the runway, what is the minimum time in seconds before it can come to rest? [4]
- a) 20.0
  - b) 10.0
  - c) 25.0
  - d) 30.0
- 5 A car moving with a speed of 50 km/h, can be stopped by brakes after at least 6 m. If the same car is moving at a speed of 100 km/h, the minimum stopping distance is: [4]
- a) 6 m
  - b) 18 m
  - c) 12 m
  - d) 24 m
- 6 If  $|\vec{A} + \vec{B}| = |\vec{A}| + |\vec{B}|$ , then the angle between A and B will be [4]
- a)  $0^\circ$
  - b)  $90^\circ$
  - c)  $120^\circ$
  - d)  $60^\circ$
- 7 A body of mass 8 kg is moved by a force  $F = 3x$  N, where x is the distance covered. Initial position is  $x = 2$  m and the final position is  $x = 10$  m. The initial speed is zero. The final speed is [4]
- a) 14 m/s
  - b) 18 m/s
  - c) 6 m/s
  - d) 12 m/s
- 8 An iron chain lies on a rough horizontal table. It starts sliding when one - fourth of its length hangs over the edge of the table. The coefficient of static friction between the chain and surface of the table is [4]
- a)  $\frac{1}{2}$

b)  $\frac{1}{4}$

c)  $\frac{1}{3}$

d)  $\frac{1}{5}$

- 9 A particle of mass  $m$  is moving in a circular path of constant radius  $r$  such that its centripetal acceleration  $a_c$  is varying with time  $t$  as,  $a_c = k^2 r t^2$ , where  $k$  is a constant. The power delivered to the particle by the forces acting on it is: [4]

a)  $mk^2 r^2 t^2$

b) zero

c)  $mk^2 r^2 t$

d)  $mk^2 r t$

- 10 If a body is rotating about  $z$  - axis with a speed  $\omega$  and a point is at a distance of  $r$  in the  $x - y$  plane then the velocity of the point is: [4]

a)  $3r\omega$

b)  $r\omega$

c)  $2r\omega$

d)  $r\omega/2$

- 11 Two planets A and B of radii  $R$  and  $1.5 R$  have densities  $\rho$  and  $\frac{\rho}{2}$  respectively. The ratio of acceleration due to gravity at the surface of B to A is: [4]

a) 2 : 1

b) 2 : 3

c) 3 : 4

d) 4 : 3

- 12 The breaking stress of a material is  $10^6 \text{ N/m}^2$ . If the density of the material is  $3 \times 10^3 \text{ kg/m}^3$ , what should be the length of the material so that it breaks by its own weight? (Take  $g = 10 \text{ m/s}^2$ ) [4]

a) 33.3 m

b) 0.0333 m

c) 3.33 m

- d) 0.33 m
- 13 A capillary tube of radius  $r$  is immersed in water and water rises in it to a height  $h$ . The mass of water in the capillary tube is 5 g. Another capillary tube of radius  $2r$  is immersed in water. The mass of water that will rise in this tube is [4]
- a) 5.0 g  
 b) 10 g  
 c) 20 g  
 d) 2.5 g
- 14 The sun radiates energy in all directions. The average radiation received on the earth's surface from the sun per second is  $1.4 \text{ kWm}^{-2}$ . The average earth - sun distance is  $1.5 \times 10^{11}$  m. The mass lost by the sun per day (1 day = 86,400 s) is [4]
- a)  $3.8 \times 10^{14}$  kg  
 b)  $4.4 \times 10^9$  kg  
 c)  $7.6 \times 10^{14}$  kg  
 d)  $3.8 \times 10^{12}$  kg
- 15 A compressive force,  $F$  is applied at the two ends of a long thin steel rod. It is heated, simultaneously, such that its temperature increases by  $\Delta T$ . The net change in its length is zero. Let  $l$  be the length of the rod,  $A$  its area of crosssection,  $Y$  its Young's modulus, and  $\alpha$  its coefficient of linear expansion. Then,  $F$  is equal to: [4]
- a)  $lAY\alpha\Delta T$   
 b)  $\frac{AY}{\alpha\Delta T}$   
 c)  $l^2 Y \alpha\Delta T$   
 d)  $AY\alpha\Delta T$
- 16 Mechanical equivalent of heat is equal to the amount of [4]
1. work done to produce 1 cal heat
  2. a conversion factor between calorie and joule
  3. Both work done to produce 1 cal heat and a conversion factor between calorie and joule
  4. Neither Both work done to produce 1 cal heat nor a conversion factor between calorie and joule

- a) Statement (i) is correct.
- b) Statement (iii) is correct.
- c) Statement (ii) is correct.
- d) Statement (iv) is correct.
- 17 The heat required to increase the temperature of 4 moles of a monoatomic ideal gas from 273 K to 473 K at constant volume is [4]
- a) 200 R
- b) 1200 R
- c) 800 R
- d) 400 R
- 18 A mass M is suspended from a spring of negligible mass. The spring is pulled a little and then released so that the mass executes simple harmonic oscillations with a time period T. If the mass is increased by m, then the time period becomes  $\left(\frac{5}{4}T\right)$ . The ratio of  $\frac{m}{M}$  is: [4]
- a)  $\frac{25}{16}$
- b)  $\frac{5}{4}$
- c)  $\frac{4}{5}$
- d)  $\frac{9}{16}$
- 19 A body is executing the S.H.M. with an angular frequency of 2 rad/sec. Velocity of the body at 20 m displacement, when amplitude of motion is 60 m, is [4]
- a) 113 m/s
- b) 90 m/s
- c) 118 m/s
- d) 131 m/s
- 20 Out of the following functions representing motion of a particle which represents SHM [4]
1.  $y = \sin\omega t - \cos\omega t$
  2.  $y = \sin^3\omega t$

$$3. \quad y = 5 \cos \left( \frac{3\pi}{4} - 3\omega t \right)$$

$$4. \quad y = 1 + \omega t + \omega^2 t^2$$

- a) Only (iv) does not represent SHM
- b) Only (i)
- c) Only (i) and (iii)
- d) Only (i) and (ii)
- 21 Beats arise when two waves having slightly different frequencies,  $\nu_1$  and  $\nu_2$  and comparable amplitudes, are superimposed. The beat frequency is: [4]
- a)  $\nu_{\text{beat}} = \nu_1 \sim 2\nu_2$
- b)  $\nu_{\text{beat}} = 2\nu_1 \sim \nu_2$
- c)  $\nu_{\text{beat}} = \nu_1 - \nu_2$
- d)  $\nu_{\text{beat}} = \nu_1 + \nu_2$
- 22 Two identical charged spheres suspended from a common point by two massless strings of lengths  $l$ , are initially at a distance  $d$  ( $d \ll l$ ) apart because of their mutual repulsion. The charges begin to leak from both the spheres at a constant rate. As a result, the spheres approach each other with a velocity  $v$ . Then  $v$  varies as a function of the distance  $x$  between the spheres, as [4]
- a)  $v \propto x^{-\frac{1}{2}}$
- b)  $v \propto x^{-1}$
- c)  $v \propto x$
- d)  $v \propto x^{\frac{1}{2}}$
- 23 Three capacitors each of capacitance  $C$  and of breakdown voltage  $V$  are joined in series. The capacitance and breakdown voltage of the combination will be: [4]
- a)  $3C, 3V$
- b)  $\frac{C}{3}, \frac{V}{3}$
- c)  $\frac{C}{3}, 3V$
- d)  $3C, \frac{V}{3}$

- 24 The amount of charge a capacitor can store when a potential difference of 1V is applied across it is called its [4]
- a) resistance
  - b) capacitance
  - c) reactance
  - d) inductance
- 25 The element of a heater is rated (P, V). If it is connected across a source of voltage  $\frac{V}{2}$ , [4]  
then the power consumed by it will be
- a) P
  - b)  $\frac{P}{4}$
  - c) 2P
  - d)  $\frac{P}{2}$
- 26 An electric bulb marked 40 W - 200 V is used in a circuit of supply voltage 100 V. [4]  
Now its power is:
- a) 10 W
  - b) 40 W
  - c) 20 W
  - d) 100 W
- 27 An electron of mass  $0.90 \times 10^{-30}$  kg under the action of a magnetic field moves in a [4]  
circle of 2.0 cm radius at a speed of  $3.0 \times 10^6$  metre per sec. If a proton of mass  $1.8 \times 10^{-27}$  kg was to move in a circle of the same radius in the same magnetic field, then its speed will be:
- a)  $6.0 \times 10^4$  m/s
  - b)  $3.0 \times 10^6$  m/s
  - c)  $1.5 \times 10^3$  m/s
  - d) cannot be estimated from the same data
- 28 Two long current carrying conductors are placed parallel to each other at a distance [4]  
of 8 cm between them. The magnitude of magnetic field produced at mid - point between the two conductors due to current flowing in them is  $300 \mu$  T. The equal current flowing in the two conductors is:

- a) 60 A in the opposite direction.
- b) 300 A in the opposite direction
- c) 30 A in the opposite direction.
- d) 30 A in the same direction.
- 29 Two short bar magnets P and Q are arranged such that their centres are on the x - axis and are separated by a large distance. The magnetic axes of P and Q are along x and y - axis respectively. At a point R, midway between their centres; if B is the magnitude of induction due to Q, the magnitude of total induction at R due to the both magnets is: [4]
- a)  $\sqrt{5}B$
- b) B
- c) 3B
- d)  $\frac{\sqrt{5}}{2}B$
- 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 [4]
- a) None of these
- b)  $\frac{T_0}{4}$
- c)  $\frac{T_0}{3}$
- d)  $\frac{T_0}{2}$
- 31 **Assertion:** Diamagnetic materials can exhibit magnetism. [4]
- Reason:** Diamagnetic materials have permanent magnetic dipole moment.
- a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- c) Assertion is correct statement but reason is wrong statement.
- d) If both assertion and reason are false.
- 32 The induced emf in a coil is proportional to: [4]



- a) product of magnetic flux and area of the coil
- b) magnetic flux through the coil
- c) area of the coil
- d) rate of change of magnetic flux through the coil
- 33 The quality factor of LCR circuit having resistance (R) and inductance (L) at resonance frequency ( $\omega$ ) is given by: [4]
- a)  $\frac{R}{\omega L}$
- b)  $\left(\frac{\omega L}{R}\right)^{\frac{1}{2}}$
- c)  $\frac{\omega L}{R}$
- d)  $\left(\frac{\omega L}{R}\right)^2$
- 34 What is the amplitude of electric field produced by radiation coming from a 100 W bulb at a distance of 4 m? The efficiency of bulb is 3.14% and it may be assumed as a point source. [4]
- a)  $14 \times 10^4$  V/m
- b)  $4.2 \times 10^4$  V/m
- c) 3.43 V/m
- d) 2.42 V/m
- 35 If the total electromagnetic energy falling on a surface is U, then the total momentum delivered (for complete absorption) is: [4]
- a)  $\frac{U}{c}$
- b) cU
- c)  $\frac{U}{c^2}$
- d)  $c^2 U$
- 36 The characteristic X - ray radiation is emitted when: [4]
- a) the source of electrons emits a monoenergetic beam
- b) the valence electrons in the target atoms are removed as a result of collision

- c) the bombarding electrons knock out electrons from the inner shell of the target atoms and one of the outer electrons falls into this vacancy
- d) the electrons are accelerated to a fixed energy
- 37 The objective of a telescope has a focal length of 1.2 m. It is used to view a 10.0 m tall tower 2 km away. What is the height of the image of the tower formed by the objective? [4]
- a) 4 mm
- b) 2 mm
- c) 6 mm
- d) 8 mm
- 38 In a compound microscope, maximum magnification is obtained when the final image [4]
- a) coincides with the objective
- b) is formed at the least distance of distinct vision
- c) coincides with the object
- d) is formed at infinity
- 39 The plane faces of two identical plano - convex lenses, each having focal length of 40 cm, are placed against each other to form a usual convex lens, The distance from this lens at which an object must be placed to obtain a real, inverted image with magnification one is: [4]
- a) 160 cm
- b) 40 cm
- c) 80 cm
- d) 20 cm
- 40 Monochromatic light of wavelength  $\lambda_1$  travelling in a medium of refractive index  $n_1$  enters a denser medium of refractive index  $n_2$ . The wavelength in the second medium is: [4]
- a)  $\lambda_1 (n_2 / n_1)$
- b)  $\lambda_1 (n_2 - n_1) / n_2$
- c)  $\lambda_1 (n_1 / n_2)$

d)  $\lambda_1 (n_2 - n_1)/n_1$

- 41 The kinetic energy of an electron, which is accelerated in the potential difference of 100 volts, is [4]
- a) 6.636 cal
  - b)  $1.602 \times 10^{-17}$  J
  - c) 416.6 cal
  - d)  $1.6 \times 10^4$  J
- 42 Photons of 5.5 eV energy fall on the surface of the metal emitting photoelectrons of maximum kinetic energy 4.0 eV. The stopping voltage required for these electrons is: [4]
- a) 4.0 V
  - b) 9.5 V
  - c) 5.5 V
  - d) 1.5 V
- 43 **Assertion (A):** An electron microscope is based on de Broglie hypothesis. [4]
- Reason (R):** A beam of electrons behaves as a wave that can be converted by electric and magnetic lenses.
- a) Both A and R are true and R is the correct explanation of A.
  - b) Both A and R are true but R is not the correct explanation of A.
  - c) A is true but R is false.
  - d) A is false but R is true.
- 44 In which of the models, the positively charged part of the atom possesses most of the mass? [4]
- a) Bohr model only
  - b) Thomson's model only
  - c) Thomson's model and Rutherford's model
  - d) Rutherford's model only
- 45 In Bohr's model of hydrogen atom, the total energy of the electron in  $n^{th}$  discrete orbit is proportional to [4]

a)  $n^2$

b)  $\frac{1}{n}$

c)  $\frac{1}{n^2}$

d)  $n$

46 If the nuclear force between two protons, two neutrons and between proton and neutron is denoted by  $F_{pp}$ ,  $F_{nn}$  and  $F_{pn}$  respectively, then [4]

a)  $F_{pp} = F_{nn} = F_{pn}$

b)  $F_{pp} \approx F_{nn} \approx F_{pn}$

c)  $F_{pp} \neq F_{nn} \neq F_{pn}$

d)  $F_{pp} \neq F_{nn}$  and  $F_{pp} = F_{nn}$

47 In the terminology related to semiconductors, what is a hole? [4]

a) space which was previously occupied by an electron

b) space which is negatively charged

c) dense area in space which even absorbs light i.e., black hole.

d) a hole in space - time distribution of the universe

48 In forward bias, the width of a potential barrier in a p - n junction diode [4]

a) remains constant

b) increases

c) decreases

d) first remains constant then decreases

49 Which of the following logic gates is a universal gate? [4]

a) NAND

b) NOT

c) AND

d) OR

50 A vessel containing hot water is left to cool in air. It cools from  $75^{\circ}\text{C}$  to  $70^{\circ}\text{C}$  in  $t_1$  minute, from  $70^{\circ}\text{C}$  to  $65^{\circ}\text{C}$  in  $t_2$  minute and from  $65^{\circ}\text{C}$  to  $60^{\circ}\text{C}$  in  $t_3$  minute. Thus: [4]

a)  $t_1 = t_2 = t_3$

b)  $t_1 < t_2 = t_3$

c)  $t_1 < t_2 < t_3$

d)  $t_1 > t_2 > t_3$

# JUPITER ACADEMY

## CHEMISTRY MODEL PAPER 2

### NEET-UG - Chemistry

Time Allowed: 50 minutes

Maximum Marks: 200

#### General Instructions:

Answer any 45 questions

- The molar mass of  $\text{AgNO}_3$  in g/mol is: [4]
  - 159.9
  - 169.9
  - 179.9
  - 189.9
- Molecular mass of glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ ) in gm/mol is [4]
  - 198.162
  - 192.162
  - 186.162
  - 180.156
- Give the number of electrons in the species,  $\text{O}_2$  and  $\text{O}_2^+$ . [4]
  - 32 and 16
  - 16 and 14
  - 16 and 8
  - 16 and 15
- Radio frequency region of the electromagnetic spectrum is used for broadcasting. It is [4]
  - Around  $10^6$  Hz
  - Around  $10^{15}$  Hz
  - Around  $10^{13}$  Hz
  - Around  $10^{10}$  Hz
- The increasing order of bond dissociation energies of the following species is\_\_\_\_\_. [4]
  - $\text{F}_2 < \text{Cl}_2 < \text{O}_2 < \text{N}_2$
  - $\text{N}_2 < \text{O}_2 < \text{F}_2 < \text{Cl}_2$
  - $\text{Cl}_2 < \text{O}_2 < \text{N}_2 < \text{F}_2$
  - $\text{F}_2 < \text{N}_2 < \text{Cl}_2 < \text{O}_2$
- Which of the following is a transuranic element? [4]
  - Pa
  - Th
  - Ac
  - Am
- The shape of a molecule depends on [4]
  - All the electrons
  - number of bonded valence electron pairs. and number of non-bonded valence electron pairs.
  - number of non-bonded valence electron pairs.
  - number of bonded valence electron pairs.
- In acetylene molecule, between the carbon atoms there are [4]
  - one sigma and two pi bonds
  - three sigma bonds
  - two sigma and one pi bonds
  - three pi bonds

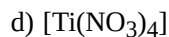
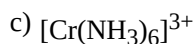
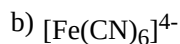
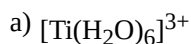
9. When  $O_2$  is converted into  $O_2^+$  [4]
- a) paramagnetic character increases                      b) both paramagnetic character and bond order increase
- c) paramagnetic character decreases and the bond order increases                      d) bond order decreases
10. According to Hess's Law, if a reaction takes place in several steps then its standard reaction enthalpy is: [4]
- a) the sum of the standard enthalpies of the intermediate reactions into which the overall reaction may be divided at the same temperature.                      b) the difference of the standard enthalpies of the intermediate reactions into which the overall reaction may be divided at the same temperature.
- c) the sum of the standard enthalpies of the intermediate reactions into which the overall reaction may be divided at 2 bar.                      d) the sum of the standard enthalpies of the intermediate reactions into which the overall reaction may be divided at  $35^\circ C$ .
11. The enthalpies of elements in their standard states are taken as zero. The enthalpy of formation of a compound is: [4]
- a) is never negative.                      b) may be positive or negative.
- c) is always negative.                      d) is always positive.
12. 0.3g of  $Ca(OH)_2$  is dissolved in water to give 500 mL of solution. The pH of the solution is \_\_\_\_\_. [4]
- a) 11.053                      b) 14.027
- c) 12.33                      d) 10.099
13. 0.023 g of sodium metal is reacted with  $100\text{ cm}^3$  of water. The pH of the resulting solution is \_\_\_\_\_. [4]
- a) 9                      b) 12
- c) 10                      d) 8
14. Hydrogen molecule ( $H_2$ ) can be dissociated into hydrogen atoms (H). Which one of the following changes will not increase the number of atoms present at equilibrium? [4]
- a) increasing the total pressure                      b) increasing the temperature
- c) increasing the volume of the container                      d) adding H atoms
15. In the reaction,  $C(s) + CO_2(g) \rightleftharpoons 2CO(g)$ , when pressure is increased, the reaction goes in the [4]
- a) reverse direction                      b) dynamic equilibrium
- c) forward direction                      d) Static
16. Copper nitrate is a blue coloured solution. Place a strip of metallic zinc in an aqueous solution of copper nitrate for about one hour. What happens? [4]
- a) The zinc strip becomes coated with blue colour                      b) The blue colour of the solution turns to red
- c) The blue colour of the solution becomes more intense blue.                      d) The aqueous solution of copper nitrate turns green in colour and the metallic zinc strip

turns darker in colour.

17. Carbon-60 contains: [4]
- a) 12 pentagons and 20 hexagons                      b) 30 pentagons and 30 hexagons  
c) 20 pentagons and 12 hexagons                      d) 24 pentagons and 36 hexagons
18. Which of the following molecules have zero dipole moment? [4]
- a)  $\text{CCl}_2$     b)  $\text{CH}_2\text{Cl}_2$   
c)  $\text{CO}_2$     d)  $\text{CS}_2$
19. In  $\pi$  ( $\pi$ ) bond formation, one of the below criteria is necessary. Choose the appropriate one. [4]
- a) parallel orientation of the two p orbitals on adjacent atoms.                      b) pentagonal orientation of the two p orbitals on adjacent atoms.  
c) planar orientation of the two p orbitals on adjacent atoms.                      d) trigonal orientation of the two p orbitals on adjacent atoms.
20. Propanal and propanone are [4]
- a) Position isomers    b) Functional group isomers  
c) Chain isomers    d) Stereoisomers
21. Electrophilic addition reactions proceed in two steps. The first step involves the addition of an electrophile. Name the type of intermediate formed in the first step of the following addition reaction. [4]
- $\text{H}_3\text{C}-\text{HC}=\text{CH}_2 + \text{H}^+ \rightarrow ?$
- a)  $2^\circ$  Carbocation    b)  $1^\circ$  Carbocation  
c)  $2^\circ$  Carbanion    d)  $1^\circ$  Carbanion
22. Write the state of hybridisation of carbon in  $\text{H}_2\text{C}=\text{O}$  and mention the molecular geometry also. [4]
- a)  $\text{sp}$  hybridised carbon, linear    b)  $\text{sp}^2$  hybridised carbon, trigonal planar  
c)  $\text{sp}^3$  hybridised carbon, tetrahedral    d)  $\text{sp}^3$  hybridised carbon, trigonal pyramidal
23. The IUPAC name of  $\text{CH}_2 = \underset{\text{CH}_3}{\text{C}} - \text{CH}_3$  is [4]
- a) 2-methylbutene    b) 2-methylbut-2-ene  
c) 2-methylprop-1-ene    d) 1-methylpropene
24. The given structures,  $\text{CH}_3 - \overset{\text{CH}_3}{\text{CH}} - \text{CH}_3$  and  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$  are [4]
- a) chain isomers    b) Functional isomers  
c) conformational isomer    d) Position isomers
25. Phenol dimerises in benzene having van't Hoff factor 0.54. Its degree of association is: [4]
- a) 0.46    b) 0.54  
c) 0.92    d) 0.27
26. A beaker contains a solution of a substance 'A'. Precipitation of substance 'A' takes place when a small amount [4]







37. Hydrocarbons having double the number of carbon atoms than present in the original alkyl halide are produced by using: [4]

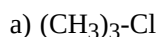
a) Sandmeyer' reaction

b) Williamson's synthesis

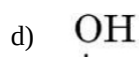
c) Fittig reaction

d) Wurtz reaction

38. Which of the following alkyl halides will undergo  $\text{S}_{\text{N}}1$  reaction most readily ? [4]



39. Which of the following is most acidic? [4]



40. An organic compound containing oxygen, upon oxidation forms a carboxylic acid as the only organic product with its molecular mass higher by 14 units. The organic compound is \_\_\_\_\_. [4]

a) a ketone

b) a primary alcohol

c) an aldehyde

d) a secondary alcohol

41. Aldehydes and ketones react with hydroxylamine to form [4]

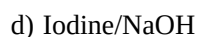
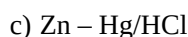
a) cyanohydrins

b) Oxime

c) semicarbazones

d) hydrazones

42. For making a distinction between 2 – pentanone and 3 – pentanone the reagent to be employed is: [4]



43. Phenol on reaction with aqueous bromine at room temperature gives: [4]

a) 2,4,6-tribromophenol

b) 3-bromophenol

c) 2-bromophenol

d) 4-bromophenol

44. Amongst the following, the strongest base in aqueous medium is \_\_\_\_\_. [4]



- c)  $\text{CH}_3\text{NH}_2$  d)  $\text{C}_6\text{H}_5\text{NHCH}_3$
45. Which of the following vitamins is water soluble? [4]  
 a) Vitamin D b) Vitamin C  
 c) Vitamin A d) Vitamin E
46. The sugar constituent of DNA is [4]  
 a) D – ribose b) D – 2 – deoxy ribose  
 c) D – glucose d) D – lactose
47. Which one of the following compounds is used in the estimation of oxygen? [4]  
 a) silver nitrate b) iodine pentoxide  
 c) copper oxide d) sodium peroxide
48. To which the terms stationary phase and mobile phase are associated? [4]  
 a) Chromatography b) Spectroscopy  
 c) Differential Extraction d) Distillation under reduced pressure
49.  $\text{CH}_3 - \overset{\text{O}}{\parallel} \text{C} - \text{H}$  and  $\text{Ph} - \overset{\text{O}}{\parallel} \text{C} - \text{H}$  can be differentiated by: [4]  
 a) Victor meyer's test b) Fehling's solution  
 c) Lucas reagent d) Tollen's reagent
50. By passing  $\text{KMnO}_4$  gas in acidified  $\text{H}_2\text{S}$  solution, we get [4]  
 a)  $\text{MnO}_2$  b)  $\text{K}_2\text{S}$   
 c) S d)  $\text{Mn}^+$









26. Dudhwa National park is situated at: [4]  
a) HP b) UP  
c) MP d) AP
27. Which one of the following is an example of ex situ conservation? [4]  
a) Seed Bank b) National Park  
c) Wild Life Sanctuary d) Sacred Groves
28. The major event that occurs during the anaphase of mitosis, which brings about the equal distribution of chromosomes, is [4]  
a) replication of the genetic material. b) condensation of the chromatin.  
c) splitting of the chromatids. d) splitting of the centromeres.
29. The process of cytokinesis refers to the division of [4]  
a) cytoplasm b) nucleus  
c) organelles d) chromosomes
30. In photosynthesis NADPH is produced by functioning of only: [4]  
a) Both PS-I and PS-II b) PS-I  
c) PS-III d) PS-II
31. The Calvin cycle runs \_\_\_\_\_ times to form one glucose molecule. [4]  
a) 5 b) 1  
c) 2 d) 6
32. The correct sequence of cell organelles during photorespiration is: [4]  
a) Chloroplast-Vacuole-Peroxisome b) Chloroplast-Mitochondria-Peroxisome  
c) Chloroplast-Rough endoplasmic reticulum- Dictyosomes d) Chloroplast-Golgi bodies-Mitochondria
33. Which of the following provides energy to ETS by absorption of sunlight? [4]  
a) Chlorophyll b) ATP  
c) Mitochondria d) Water
34. Respirometer is an instrument used to measure [4]  
a) Both of these b) respiratory quotient.  
c) Heart rate d) rate of respiration.
35. Removal of apical (terminal) bud of a flowering plant (or pruning of a flowering plant) leads to [4]  
a) formation of new apical buds. b) early flowering (or stopping of floral growth).  
c) promotion of lateral branches. d) formation of adventitious roots on the cut side.

**BOTANY (Section-B)**



**Attempt any 10 questions**

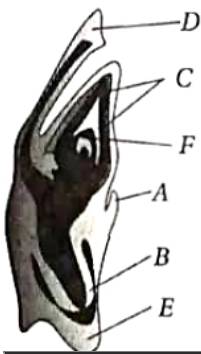
36. Which of the following combinations of statements is correct? [4]
- i. The taxonomic hierarchy for *Brassica campestris* can be written as:  
 Plantae → Phanerogamae → Angiospermae → Dicotyledonae → Parietales → Brassicaceae → Brassica → campestris
  - ii. Tautonym is the taxonomic designation used for certain plants having trinomial nomenclature.
  - iii. A character present in an ancestral species and shared exclusively by its evolutionary descendants is referred to as synapomorphy.
  - iv. Family Fabaceae is divided into three sub-families i.e., Leguminosae, Mimosaceae and Caesalpinaceae.

- a) (i), (iii) and (iv) b) (i) and (ii)  
 c) (iii) and (iv) d) (i) and (iii)

37. Tuberculosis is caused by: [4]
- a) Mycobacterium b) Diplococcus  
 c) Streptomyces d) Salmonella

38. A dominant, independent, photosynthetic, thalloid or erect phase is represented by a haploid gametophyte and it alternates with the short-lived multicellular sporophyte totally or partially dependent on the gametophyte for its anchorage and nutrition is a pattern of: [4]
- a) Bryophytes b) Pteridophytes  
 c) Gymnosperms d) Bryophytes and pteridophytes

39. The image given below represents the embryo of grasses with its parts labelled from A to F. Select the option with correct labels for the parts labelled as A, B, and D. [4]



Option	A	B	D
(a)	Scutellum	Coleoptile	Coleorhiza
(b)	Scutellum	Radicle	Coleoptile
(c)	Epiblast	Radicle	Scutellum
(d)	Radicle	Epiblast	Scutellum

- a) Option (b) is correct. b) Option (d) is correct.  
 c) Option (c) is correct. d) Option (a) is correct.

40. Free-central placentation is found in: [4]
- a) Brassica b) Dianthus

c) Citrus

d) Argemone

41. Match column I with column II.

[4]

Column I	Column II
(A) Codominance	(i) More than two alternative forms
(B) Polygenic inheritance	(ii) Multiple effect of a single gene
(C) Multiple alleles	(iii) Quantitative inheritance
(D) Pleiotropy	(iv) Both gene express their expression independently

a) A - (ii), B - (i), C - (iii), D - (iv)

b) A - (iii), B - (iv), C - (ii), D - (i)

c) A - (iv), B - (iii), C - (i), D - (ii)

d) A - (ii), B - (iv), C - (i), D - (iii)

42. The association of histone H1 with a nucleosome indicates:

[4]

a) DNA replication is occurring

b) The DNA double helix is exposed

c) The DNA is condensed into a chromatin fibre

d) Transcription is occurring

43. The telomeres of eukaryotic chromosomes consist of short sequences of:

[4]

a) Thymine rich repeats

b) Cytosine rich repeats

c) Guanine rich repeats

d) Adenine rich repeats

44. In given figure A and B represents:

[4]



a) Bacteria: (A) Rod-shaped, (B) Spherical shaped

b) Bacteria: (A) Spherical shaped, (B) Rod-shaped

c) Fungus: (A) Rod-shaped, (B) Spherical shaped

d) Virus: (A) Rod-shaped, (B) Spherical shaped

45. In anaerobic respiration, bacteria produce

[4]

a) glutamic acid

b) formic acid

c) acetic acid

d) lactic acid

46. Why are flocs important in biological treatment of waste water?

[4]

a) Microbes present in flocs consume the major part of the organic matter in the effluent

b) Form components of activated sludge

c) Significantly reduces the BOD (Biochemical Oxygen Demand) of the effluent

d) All of these

47. Trophic levels are formed by:

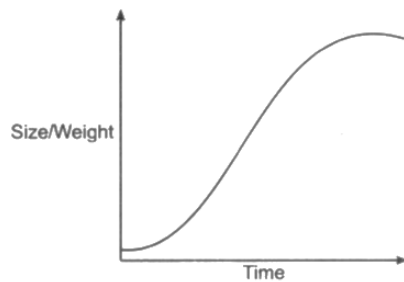
[4]

a) Only carnivores

b) Only plants

- c) Only animals  
d) Organisms linked in food chain
48. Pruning of plants promote branching because the axillary buds get sensitized to [4]
- a) Gibberellin  
b) Ethylene  
c) Indole acetic acid  
d) Cytokinin

49. On plotting the length of the organ against time, a sigmoid curve is obtained, mathematically it is expressed as: [4]



- a)  $W_1 = W_0 e^{rt}$  ( $W_0$  = intitial size,  $W_1$  = final size,  $r$  = growth rate,  $t$  = time of growth,  $e$  = base of natural logarithms)  
b)  $W_1 = W_0 + W_0 e^{rt}$
- c)  $L_t = L_0 e^{rt}$   
d)  $L_t = L_0 + rt$  ( $L_t$  = Length at time 't',  $L_0$  = Length at time 'zero',  $r$  = growth rate)
50. How many statements are wrong about ATP synthesis according to chemiosmotic hypothesis? [4]
- Proton gradient is important because breakdown of this gradient leads to release of energy.
  - The gradient is broken down due to the movement of protons across the thylakoid membrane to the stroma.
  - Movement of protons across the thylakoid membrane to the stroma occurs through the transmembrane channel of the  $F_0$  of the ATPase.
  - The breakdown of the gradient provides enough energy to cause a conformational change in the  $F_0$  particle of the ATPase.
  - Conformational change in the  $F_1$  particle of the ATPase makes the enzyme synthesise several molecules of energy-packed ATP.
  - Energy is used to pump protons across a thylakoid membrane, to create a gradient or a high concentration of protons within the thylakoids lumen.
- a) One  
b) Four  
c) Two  
d) Three

# JUPITER ACADEMY

## ZOOLOGY MODEL PAPER 2

### NEET-UG - Biology

**Time Allowed: 1 hour**

**Maximum Marks: 180**

**General Instructions:**

- For each correct response, the candidate will get 4 marks.
- For each incorrect response, one mark will be deducted from the total scores.

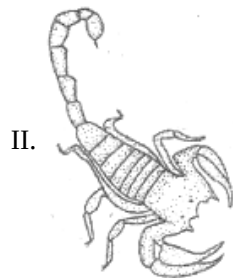
### ZOOLOGY (Section-A)

1. The members of which phylum are exclusively marine, radially symmetrical and diploblastic? [4]
- a) Echinodermata b) Porifera  
 c) Hemidhordata d) Ctenophora
2. Match the following organisms with their respective characteristics: [4]

(a) Pila	(i) Flame cells
(b) Bombyx	(ii) Comb plates
(c) Pleurobrachia	(iii) Radula
(d) Taenia	(iv) Malpighian tubules

Select the correct option from the following:

- a) (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i) b) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)  
 c) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i) d) (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)
3. Identify diagram and select correct option for given diagram I and II from following options. [4]



- a) I-Locust - Gregarious pest, II- Scorpion-  
 Vectors b) I-Locust - Gregarious pest, II- Scorpion-  
 Book lungs  
 c) I-Locust- Gregarious pest, II- Scorpion-  
 Harmful insect d) I-Locust- Gregarious pest, II- Scorpion-  
 Gregarious pest
4. Which cells do not form layer and remains structurally separate? [4]
- a) Nerve cells b) Epithelial cells

c) Gland cells

d) Muscle cells

5. Which one of the following is the correct pairing of a body part and muscle fibre that moves it? [4]

a) Iris - involuntary smooth muscle

b) Heart wall - involuntary unstriated muscle

c) Abdominal wall - smooth muscle

d) Biceps of upper arm - smooth muscle fibres

6. Mark the correct statement. [4]

a. Human lungs are negative pressure type

b. Avian lungs are non-elastic

c. The right lung in human is 3-lobes

d. All are correct

a) Only B

b) Only C

c) Only D

d) Only A

7. The value of R.Q. is the maximum for: [4]

a) Organic acid

b) Fats

c) Proteins

d) Carbohydrate

8. Which of the following statements about the mechanism of ventilation/breathing is incorrect? [4]

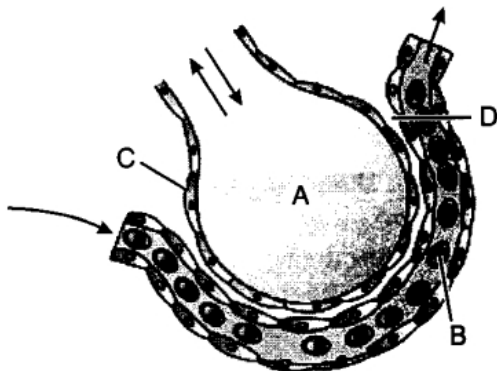
a) As the diaphragm relaxes, air is expelled from the respiratory system.

b) Inspiration is a passive and expiration is an active process.

c) During inspiration the lungs act as suction pump.

d) For quiet breathing, external intercostal muscles and diaphragm play an important role.

9. The figure given below shows a small part of human lung where exchange of gases takes place. Select the option [4] which represents labelled part A, B, C or D correctly identified along with its function.



a) B: Red blood cells - transport of CO<sub>2</sub> mainly

b) D: Capillary wall - exchange of O<sub>2</sub> and CO<sub>2</sub> takes place here

c) A: Alveolar cavity - main site of exchange of respiratory gases

d) C: Arterial capillary - passes oxygen to the tissues

10. Which of the following conditions is responsible for increase in ventilation rate of lungs? [4]

a) Decrease in O<sub>2</sub> content of exhaled air.

b) Increase of CO<sub>2</sub> content in exhaled air.

c) Increase of CO<sub>2</sub> content in inhaled air.

d) Decrease in O<sub>2</sub> Content of inhaled air.

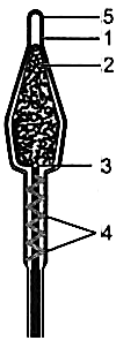
11. Choose the incorrect pair. [4]
- Vas deferens- Loops over the urinary bladder
  - Vasa efferentia and epididymis - Accessory glands
  - Ejaculatory duct - Vas deferens and seminal vesicle
  - Leydig cells - Secrete testicular hormone

- Option (c) is incorrect pair.
- Option (d) is incorrect pair.
- Option (a) is incorrect pair.
- Option (b) is incorrect pair.

12. The diploid stages in gametogenesis are: [4]

- Primary spermatocyte and secondary spermatocyte
- Primary spermatocyte and spermatogonia
- Secondary spermatocyte and spermatids
- Spermatogonia and spermatids

13. In the given diagram identify parts named 1 to 5: [4]



Mature sperm

- 1-Nucleus, 2-Tail, 3-Mitochondria, 4-Acrosome, 5-Centriole
- 1-Acrosome, 2-Centriole, 3-Mitochondria, 4-Plasma membrane, 5-Tail
- 1-Nucleus, 2-Mitochondria, 3-Plasma membrane, 4-Centriole, 5-Neck
- 1-Acrosome, 2-Nucleus, 3-Centriole, 4-Mitochondria, 5-Galea capitis

14. The symptom of trichomoniasis is [4]

- fever
- both (weight loss) and (itching in and around vagina)
- weight loss
- itching in and around vagina

15. The test-tube baby programme employs which one of the following techniques? [4]

- Intra Cytoplasmic Spenn Injection (ICSI)
- Intra Uterine Insemination (IUI)
- Zygote Intra Fallopian Transfer (ZIFT)
- Gamete Intra Fallopian Transfer (GIFT)

16. The lowest capacity of cranium was found in the: [4]

- Neanderthal man
- Cro-magnon man
- Australopithecus
- Java man

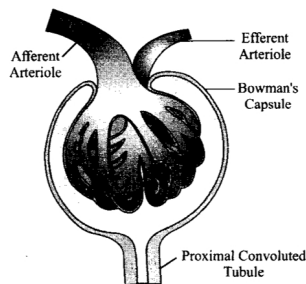
17. From his experiments, S.L. Miller produced amino acids by mixing the following in a closed flask: [4]

- $\text{CH}_3$ ,  $\text{H}_2$ ,  $\text{NH}_4$  and water vapor at  $800^\circ\text{C}$
- $\text{CH}_4$ ,  $\text{H}_2$ ,  $\text{NH}_3$  and water vapor at  $800^\circ\text{C}$
- $\text{CH}_4$ ,  $\text{H}_2$ ,  $\text{NH}_3$  and water vapor at  $600^\circ\text{C}$
- $\text{CH}_3$ ,  $\text{H}_2$ ,  $\text{NH}_3$  and water vapor at  $600^\circ\text{C}$

18. The outline of principal event of urination is given below in un-order manner. [4]
- i. Stretch receptors on the wall of urinary bladder send signal to the CNS.
  - ii. The bladder fills with urine and becomes distended.
  - iii. Micturition.
  - iv. CNS passes on motor messenger to initiate the contraction smooth muscles of bladder and simultaneous relaxation of urethral sphincter.

The correct order of steps for urination is

- a) (iv) → (iii) → (ii) → (i)                      b) (iii) → (ii) → (ii) → (iv)
- c) (ii) → (i) → (iii) → (iv)                      d) (ii) → (i) → (iv) → (iii)
19. Angiotensin-II increases glomerular blood pressure and GFR as it is a [4]
- a) vasopressin
  - b) vasodilator.
  - c) osmoregulator.
  - d) vasoconstrictor.
20. Refer the given figure of Malpighian body and answer the question. [4]



Which part is considered to be the site where majority (65%) of ions and water in the urinary space is reabsorbed back into the body?

- a) Efferent arteriole                      b) Bowman's capsule
- c) Afferent arteriole                      d) Proximal convoluted tubule
21. In the relaxation of muscles: [4]
- a)  $Ca^{++}$  concentration decreases
  - b) Actin filaments slide over myosin filaments
  - c) Actin filaments form cross-bridges
  - d)  $Ca^{++}$  concentration increases
22. Smallest bone in the human body: [4]
- a) Spinal muscle
  - b) Stapes
  - c) Sartorius
  - d) Stapedius
23. Articulation of the atlas with the axis is an example of: [4]
- a) Pivot joint
  - b) Hinge joint
  - c) Ball and socket joint
  - d) Gliding joint
24. Which of the following does not participate in the formation of brain stem? [4]
- a) Mid brain
  - b) Pons varolii
  - c) Medulla Oblongata
  - d) Cerebellum
25. Outermost meninges is: [4]
- a) Pia mater
  - b) choroidea

- c) Choroid  
d) Dura mater
26. Nodes of Ranvier are: [4]  
a) The point in which the axon is exposed  
b) Area in which the axons swell up  
c) The point in which the axon is disposed  
d) The contact point found over the non-myelinated nerve fibres
27. Steroid hormones regulate gene activity through: [4]  
a) Removing the repressor molecules  
b) Binding with specific DNA sites  
c) Transcription  
d) The formation of a receptor complex
28. Which is master gland in the body? [4]  
a) Pineal  
b) Pituitary  
c) Adrenal  
d) Thyroid
29. Red and white pulp is related with: [4]  
a) Spleen  
b) Teeth  
c) Skeletal muscles  
d) Bone
30. The haemoglobin content per 100 ml of blood of a normal healthy human adult is: [4]  
a) 12-16 mg  
b) 25-30 mg  
c) 5-11 mg  
d) 17-20 mg
31. Fastest distribution of some injectable material/medicine and with no risk of any kind can be achieved by injecting it into: [4]  
a) Arteries  
b) Lymph vessels  
c) Muscles  
d) Veins
32. Consider the following statements. [4]  
i. A soil inhabiting plant bacterium, *Agrobacterium tumefaciens*, is a pathogen of several dicot plants and is able to transfer a piece of DNA known as T-DNA.  
ii. The T-DNA causes tumours.  
iii. Tumour formation induced by Ti plasmid.  
Which of the statements given above are correct?  
a) (i) and (ii)  
b) (i) and (iii)  
c) (ii) and (iii)  
d) (i), (ii), and (iii)
33. DNA precipitation out of a mixture of biomolecules can be achieved by treatment with [4]  
a) chilled chloroform  
b) methanol at room temperature  
c) chilled ethanol  
d) isopropanol
34. Which one of the following is a correct statement: [4]  
a) "Bf" in "Bt-cotton" indicates that it is a genetically modified organism produced through biotechnology  
b) Somatic hybridization involves fusion of two complete plant cells carrying desired genes.



- c) "Flavr Savr" variety of tomato has enhanced the production of ethylene which improves its taste.
- d) The anticoagulant hirudin is being produced from transgenic Brassica napus seeds.

35. The applications of biotechnology include: [4]

- a) Diagnostics and therapeutics use
- b) Processed food, bioremediation, waste treatment, and energy production
- c) Genetically modified crops for agriculture
- d) All are correct

### ZOOLOGY (Section-B)

#### Attempt any 10 questions

36. Which of the following is not correct for platyhelminthes? [4]

- a) Sexes are not separate
- b) Fertilisation is internal and development is through many larval stages
- c) Some members like Taenia possess high regeneration capacity
- d) Flame cells help in osmoregulation and excretion

37. Which statement for the frog is correct? [4]

- a) The female reproductive organ is testis.
- b) The ovary produces 250 - 300 ova at a time.
- c) Fertilization is internal.
- d) None of these

38. Which of the following statements is correct? [4]

- a. The T-wave in an ECG represents excitation of ventricles.
- b. The sum of P and T waves in a given time period can determine the heart beat rate of an individual.
- c. The end of the P-wave marks the end of the systole.
- d. In a standard ECG, a person is connected to the machine with three electrical leads.

- a) Statement (a) is correct.
- b) Statement (b) is correct.
- c) Statement (d) is correct.
- d) Statement (c) is correct.

39. Which of the following statements is incorrect regarding respiratory system? [4]

- a) The lungs are covered by a double-layered membrane.
- b) Each terminal bronchiole gives rise to a network of bronchi.
- c) The pleural fluid reduces friction on the lung surface.
- d) The alveoli are highly vascularised.

40. Which cells in the testis secrete androgen binding protein? [4]

- a) Germ cells
- b) Leydig cells
- c) Spermatogonia
- d) Sertoli cells

41. A childless couple can be assisted to have a child through a technique called GIFT. The full form of this technique is: [4]

- a) Gamete internal fertilization and transfer
- b) Gamete intra-fallopian transfer
- c) Germ cell internal fallopian transfer
- d) Gamete inseminated fallopian transfer

42. Forelimbs of the cat, lizard used in walking, forelimbs of a whale used in swimming and forelimbs of bats used [4]

in flying are an example of:

- a) Convergent evolution
- b) Homologous organs
- c) Analogous organs
- d) Adaptive radiation

43. Main function of glomerulus is: [4]

- a) Concentration of urine
- b) Filtration of blood
- c) Reabsorption of  $\text{Na}^+$
- d) Reabsorption of  $\text{H}_2\text{O}$

44. Sliding filament theory can be best explained as : [4]

- A. When myo filaments slide pass each other, Myosin filaments shorten while Actin filaments do not shorten
- B. When myo filaments slide pass each other Actin filaments shorten while Myosin filament does not shorten
- C. Actin and Myosin filaments shorten and slide pass each other
- D. Actin and Myosin filaments do not shorten but rather slide pass each other

- a) Only B
- b) Only D
- c) Only C
- d) Only A

45. Cerebral hemisphere is the centre of: [4]

- a) Will power
- b) All of these
- c) Reasoning
- d) Thinking

46. The endocrine gland which degenerates in adult human being is: [4]

- a) Pineal
- b) Thyroid
- c) Pituitary
- d) Pancreas

47. Organ secreting secretin hormone: [4]

- a) Pancreas
- b) Liver
- c) Duodenum and jejunum
- d) Whole intestine

48. A red blood cell, entering the right side of the heart passes by or through the following structures. [4]

- i. Atrioventricular valves
- ii. Semilunar valves
- iii. Right atrium
- iv. Right ventricle
- v. SAN

Which of the following options represents the correct sequence?

- a) (ii) → (iii) → (i) → (iv) → (v)
- b) (v) → (iii) → (i) → (iv) → (ii)
- c) (iii) → (v) → (i) → (ii) → (iv)
- d) (iii) → (i) → (v) → (ii) → (iv)

49. Following statements describe the characteristics of the enzyme Restriction Endonuclease. Identify the incorrect statement. [4]

- a) The enzyme cuts the sugar-phosphate backbone at specific sites on each strand.
- b) The enzyme cuts DNA molecules at an identified position within the DNA.
- c) The enzyme recognizes a specific
- d) The enzyme binds DNA at specific sites and

palindromic nucleotide sequence in the DNA.

cuts only one of the two strands.

50. Transgenic plants are the ones

[4]

- a) generated by introducing foreign DNA into a cell and regenerating a plant from that cell.
- c) produced by a somatic embryo in artificial medium.

- b) grown in artificial medium after hybridisation in the field.
- d) produced after protoplast fusion in artificial medium.