# Jayesh Foundation, Kalwan

## JAYESH FOUNDATION SCHOLARSHIP EXAMINATION 2023

**Multiple Choice Question (MCQ)**

**Time : 2:30 hrs.** **Max. Marks : 400**

## PHYSICS

**1.** Image formed by plane mirror is

a. Real and erect
b. Real and inverted
c. Virtual and erect
d. Virtual and inverted

**2.** The unit of power of lens is

a. Meter b. Centimeter c. Diopter d. $M^{-1}$

**3.** Two lenses of power +3 and -1 diopters are placed in contact. The focal length of the combined lens is :

a. 100 cm b. 25 cm c. 50 cm d. 30.3 cm

**4.** A man runs towards the plane mirror at 2 m/s. The relative speed of his image with respect to him will be:

a. 4 $ms^{-1}$ b. 2 $ms^{-1}$ c. 8 $ms^{-1}$ d. 10 $ms^{-1}$

**5.** A voltmeter is used to find p.d. in any electrical circuit which of the statement given below is true :

a. A voltmeter is a high resistance instrument and is connected in series circuit
b. A voltmeter is a low resistance instrument and is connected in series circuit
c. A voltmeter is a high resistance instrument and is connected in parallel circuit
d. A voltmeter is a low resistance instrument and is connected in series circuit

**6**. A resistor of length l is connected to a battery and current l is given through it. If it is divided into 3 parts by length. And all having the same cross sectional area are connected in series with the same battery, the current flowing through them will be?

a. I/3 b. 3I c. I d. 3I/2

**7.** At a given time, a house is supplied with 100 A at 220 V. How many 75 W, 220 V light bulbs could be switched on in the house at the same time (if they are all connected in parallel)?

a. 93 b. 193 c. 293 d. 393

**8.** The heat produced by passing an electric current through a fixed resistor is proportional to the square of:

a. Magnitude of resistance of the resistor
b. Temperature of the resistor
c. Magnitude of current
d. Time for which current is passed

**9.** A wire of length $\ell$, made of material resistivity ρ is cut into two equal parts. The resistivity of the two parts are equal to,

a. ρ b. ρ/2 c. 2 ρ d. 4 ρ

**10.** The least resistance obtained by using 2 Ω, 4 Ω, 1 Ω and 100 Ω is

a. < 100 Ω
b. < 4 Ω
c. < 1 Ω
d. > 2 Ω

**11.** At noon, the Sun appears white as

a. Blue colour is scattered the most
b. Red colour is scattered the most
c. Light is least scattered
d. All the colours of the white light are scattered away.

**12.** Which of the following is a natural phenomenon which is caused by the dispersion of sunlight in the sky?

a. Twinkling of stars
b. Stars seem higher than they actually are
c. Advanced sunrise and delayed sunset
d. Rainbow.

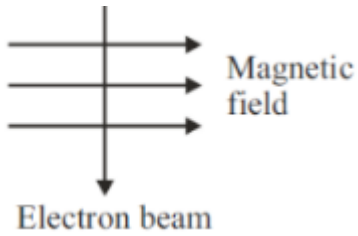
**13.** Which of the following statements is incorrect regarding magnetic field lines?

a. The direction of magnetic field at a point is taken to be the direction in which the north pole of a magnetic compass needle points.
b. Magnetic field lines are closed curves
c. If magnetic field lines are parallel and equidistant, they represent zero field strength
d. Relative strength of magnetic field is shown by the degree of closeness of the field lines.

**14.** The force experienced by a current-carrying conductor placed in a magnetic field is the largest when the angle between the conductor and the magnetic field is:

a. 45$^o$ b 60$^o$ c 90$^o$ d 180$^o$

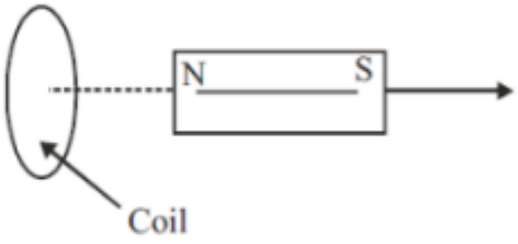
**15**. An electron beam enters a magnetic field at right angles to it as shown in the Figure.




The direction of force acting on the electron beam will be:

a. To the left
b. To the right
c. Into the page
d. Out of the page

**16.** A magnet NS is placed along the axis of a circular coil. The magnet is moved away from the coil. The induced current in the coil is:




a. Zero b. Clockwise c. Anti-clockwise d. None of these

**17.** Two heater wires of equal length are first connected in series and then in parallel with a battery. The ratio of heat produced in the two cases is:

a. 2 : 1
b. 1 : 2
c. 4 : 1
d. 1 : 4

**18.** A uniform wire of resistance 50Ω is cut into 5 equal parts. These parts are now connected in parallel. The equivalent resistance of the combination is

a 2Ω
b. 10Ω
c. 250Ω
d. 6250Ω

**19.** The mirrors used in shopping malls are

a. Concave mirror
b. Plane mirror
c. Convex mirror
d. Both a and b

**20.** If a man's face is 25 cm in front of concave shaving mirror producing erect image 1.5 times the size of face, focal length of the mirror would be

a. 75 cm
b. 25 cm
c. 15 cm
d. 60 cm

**21.** In torches, search lights and headlights of vehicles the bulb is placed

a. between the pole and the focus of the reflector
b. very near to the focus of the reflector
c. between the focus and centre of curvature of the reflector
d. at the centre of curvature of the reflector

**22.** Magnifying power of a concave lens is

a. always > 1
b. always < 1
c. always = 1
d. can have any value

**23.** A ray of light is travelling from a rarer medium to a denser medium. While entering the denser medium at the point of incidence, it

a. goes straight into the second medium
b. bends towards the normal
c. bends away from the normal
d. does not enter at all

**24.** In solar furnaces which mirror are used

a. Convex mirror
b. Concave mirror
c. Plane mirror
d. Both a and c

**25.** You are given three media A, B and C of refractive index 1.33, 1.65 and 1.46. The medium in which the light will travel fastest is

a. A
b. B
c. C
d. equal in all three media

**26.**Chemically rust is

(a) hydrated ferrous oxide
(b) only ferric oxide
(c) hydrated ferric oxide
(d) none of these

**27**.On immersing an iron nail in $CuSO_4$ solution for few minutes, you will observe

(a) no reaction takes place
(b) the colour of solution fades away
(c) the surface of iron nails acquire a black coating
(d) the colour of solution changes to green

**28.** Oxides of moderately reactive metals like Zinc, Iron, Nickel, Tin, Copper etc. are reduced by using

(a) Aluminium as reducing agent
(b) Sodium as reducing agent
(c) Carbon as reducing agent
(d) Calcium as reducing agent

**29.** Upto which element, the Law of Octaves was found applicable?

(a) Oxygen (b) Calcium (c) Cobalt (d) Potassium

**30.** What is the atomic number of element of period 3 and group 17 of the Periodic Table?

(a) 10 (b) 4 (c) 17 (d) 21

**31.** Give the IUPAC name of $CH_3CH_2COOC_2H_5$

(a) Ethyl propanoic acid
(b) Ethyl ethanoate
(c) Propyl ethanoate
(d) Ethyl propanoate

**32.** Which one of the following salts does not contain water of crystallization?

(a) Blue vitriol (b) Baking soda (c) Washing soda (d) Gypsum

**33.** Which of the following will undergo addition reactions?

(a) $CH_4$ (b) $C_3H_8$ (c) $C_2H_6$ (d) $C_2H_4$

**34.** Methyl orange is

(a) Pink in acidic medium, yellow in basic medium
(b) Yellow in acidic medium, pink in basic medium
(c) Colourless in acidic medium, pink in basic medium
(d) Pink in acidic medium, colourless in basic medium

**35.** The nature of calcium phosphate is present in tooth enamel is

(a) Basic (b) Amphoteric (c) Acidic (d) Neutral

**36.**The pH of milk of magnesia is

(a) 8 (b) 8.5 (c) 10 (d) 12

**37.**The acid present in Nettle Sting is

(a) Methanoic acid (b) Formic acid (c) Oxalic acid (d) Both a and b

**38.** The electrolytic decomposition of water gives $H_2$ and $O_2$ in the ratio of

(a) 1 : 2 by volume (c) 8 : 1 by mass

(b) 2 : 1 by volume (d) 1 : 2 by mass

**39.** In the decomposition of lead (II) nitrate to give lead (II) oxide, nitrogen dioxide and oxygen gas, the coefficient of nitrogen dioxide (in the balanced equation) is

(a) 1 (b) 2 (c) 3 (d) 4

**40.** Identify the group which is not a Dobereiner triad

(a) Li, Na, K (b) Be, Mg, Cr (c) Ca, Sr, Ba (d) Cl, Br, I

**41.** An element with atomic number will form a basic oxide

(a) 7 (b) 17 (c) 14 (d) 11

**42.** Which of the following is the correct arrangement of the given metals in ascending order of their reactivity?
Zinc, Iron, Magnesium, Sodium

(a) Zinc > Iron > Magnesium > Sodium (c) Sodium > Zinc > Magnesium > Iron
(b) Sodium > Magnesium > Iron > Zinc (d) Sodium > Magnesium > Zinc > Iron

**43.** The highly reactive metals like Sodium, Potassium, Magnesium, etc. are extracted by the

(a) electrolysis of their molten chloride (c) reduction by aluminium
(b) electrolysis of their molten oxides (d) reduction by carbon

**44.** In thermite welding a mixture of …… and …… is ignited with a burning magnesium ribbon which produces molten iron metal as large amount of heat is evolved.

(a) iron (III) oxide and aluminium powder (c) iron (III) chloride and aluminium powder
(b) iron (II) oxide and aluminium powder (d) iron (III) sulphate and aluminium powder

**45.** Copper objects lose their shine and form green coating of

(a) Copper oxide (c) Basic Copper carbonate
(b) Copper hydroxide and Copper oxide (d) Copper carbonate

**46.** The number of isomers of pentane is

(a) 2 (b) 3 (c) 4 (d) 5

**47.** On reaction of NaOH with $Al_2O_3$, the compound formed is

(a) $NaAlO_4$ (b) $NaAlO_3$ (c) $NaAlO_2$ (d) NaAlO

**48.**The molecular formula of alcohol derived from pentane is

(a) $C_5H_9OH$ (b) $C_5H_{10}OH$ (c) $C_5H_{11}OH$ (d) $C_5H_{12}OH$

**49.** The iron metal in $Fe_3O_4$ is present as

(a) Fe(II) ion
(b) Fe(III) ion
(c) Combination of Fe(II) ion and Fe(III) ion
(d) Fe atom

**50.** Acid required for dehydration of ethanol is

(a) Nitric acid
(b) Concentrated sulphuric acid
(c) Hydrochloric acid
(d) Dilute sulphuric acid

# MATHEMATICS

**51.** In an A.P. the sum of 'n' terms is $5n^2 - 5n$. Find the $10^{th}$ term of the A.P.

(a) 80 (b) 90 (c) 100 (d) 110

**52.** If $\frac{a}{x+y} = \frac{b}{y+z} = \frac{c}{z-x}$, then which of the following is true?

(a) $a = b + c$ (b) $c = a + b$ (c) $b = a \times c$ (d) $b = a + c$

**53.** The difference between the two roots of a quadratic equation is 2 and the difference between the cubes of the roots is 98, then which of the following is that quadratic equation?

(a) $x^2 - 8x + 15 = 0$
(b) $x^2 + 8x - 15 = 0$
(c) $x^2 + 5x + 15 = 0$
(d) $x^2 - 5x - 15 = 0$

**54.** From a pack of 52 playing cards, face club cards are removed. The remaining cards are well shuffled, and a card is drawn at random. Find the probability that the card drawn is a heart card.

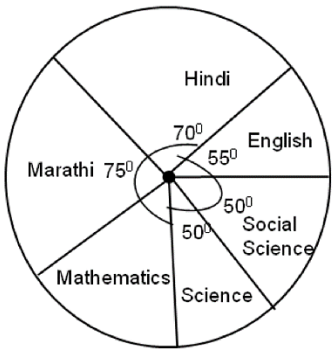
(a) $\frac{1}{4}$ (b) $\frac{13}{49}$ (c) $\frac{3}{52}$ (d) $\frac{49}{52}$

**55.** A boat takes 7 hours to travel 30 km upstream and 28 km downstream. It takes 5 hours to travel 21 km upstream and to return. Find the speed of the boat in still water.

(a) 10 km/hr (b) 20 km/hr (c) 14 km/hr (d) 6 km/hr

**56.** The marks scored by a student in an examination of 600 marks is shown in the following pie diagram. If he scored 60 marks in Mathematics, then find the percentage of marks that he secured in the examination.

(a) 60%
(b) 50%
(c) 75%
(d) 5%




**57.** $\sqrt{m^4n^4} \times \sqrt[6]{m^2n^2} \times \sqrt[3]{m^2n^2} = (mn)^k$, then find the value of $k$.

(a) 6 (b) 3 (c) 2 (d) 1

**58.** The cost of 20 guavas and 5 apples is same as that of 12 guavas and 7 apples then how many times the cost of an apple is to that of a guava?

(a) Two times (b) Half times (c) Four times (d) Five times

**59.** In a group of students, 10% students scored marks less than 20, 20% students scored marks between 20 to 40, 35% students scored marks between 40 to 60 and 20% students scored marks between 60 to 80. Remaining 30 students scored marks between 80 to 100. Find the mode of marks.

(a) 30 (b) 50 (c) 60 (d) 70

**60.** One of the roots of a quadratic equation is $\left(3-\sqrt{2}\right)$, then which of the following is that equation.

(a) $x^2-6x-7=0$ (b) $x^2+6x-7=0$

(c) $x^2+6x+7=0$ (d) $x^2-6x+7=0$

**61.** In $\triangle ABC$, $m\angle B=90°, AB=4\sqrt{5}. BD\perp AC, AD=4$, then Area$(\triangle ABC)$ =?

(a) 96 sq. units (b) 80 sq. units (c) 120 sq. units (d) 160 sq. units

**62.** Side of a cube is increased by 50%, then what percent increase will be in the area of the vertical faces of the cube?

(a) 125% (b) 150% (c) 100% (d) 50%

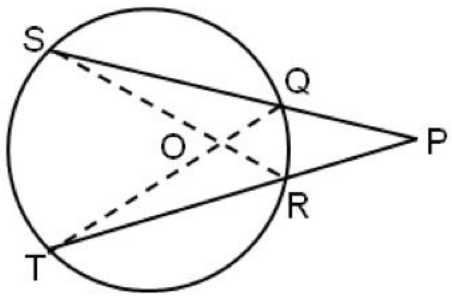
**63.** $\sin x=\frac{6\sin 30°-8\cos 60°+2\tan 45°}{2(\sin^2 30°+\cos^2 60°)}$, then $x=$ how much?

(a) 30° (b) 45° (c) 60° (d) 90°

**64.** $P\equiv(1,-9), Q\equiv(2,5)$ and $R\equiv(6,7)$ are the co-ordinates of the vertices of $\triangle PQR$, then find the co-ordinates of the centroid from the following alternatives given:

(a) $\left(\frac{10}{3},\frac{-17}{3}\right)$ (b) (1,3) (c) (3,1) (d) $(-3,1)$

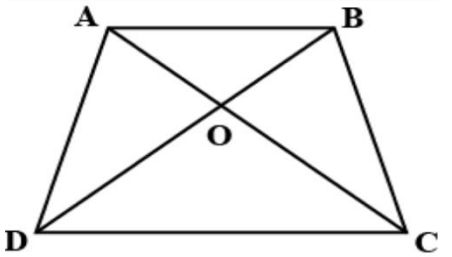
**65.** In the following figure secants QS and TR intersect each other at point P, which is outside the circle. O is the point of intersection of chords SR and TQ. If OS = 5cm, OT = 10cm, TR = 12cm, PR = 8cm, then find $l$(PQ).




(a) 6 cm (b) 10 cm

(c) 12 cm (d) 16 cm

**66.** In the following figure, segAB ∥ segCD. Diagonals AC and BD intersect at point O. If AO: OC = 1: 3, then $\frac{A(\triangle AOB)}{A(\triangle ABD)}$ =?




(a) $\frac{1}{4}$ (b) $\frac{1}{9}$

(c) 16 (d) 116

**67.** In △ ABC points P and Q trisect side AB. Points T and U trisect side AC and points R and S trisect side BC. Then perimeter of hexagon PQRSTU is how many times of the perimeter of △ ABC?

(a) $\frac{1}{3}$ times (b) $\frac{2}{3}$ times (c) $\frac{1}{6}$ times (d) $\frac{1}{2}$ times

**68.** $\frac{\sin^4\theta-\cos^4\theta}{1-\sin^2\theta}=?$

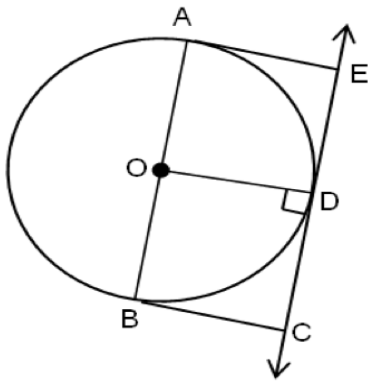
(a) $1-\cot^2\theta$ (b) $1-\tan^2\theta$ (c) $\tan^2\theta-1$ (d) $\cot^2\theta-1$

**69.** The radius of a cylindrical vessel is 7 cm, and its height is 12 cm. $\frac{2}{3}$ of the vessel is filled with water. A sphere having radius 6 cm is dropped into the water. Find the volume of the water that will come out of the vessel.

(a) 196π $cm^3$ (b) 92π $cm^3$ (c) 288π $cm^3$ (d) 588π $cm^3$

**70.** Radius of circle with centre 'O' is $4\sqrt{5}$ cm. 'AB' is the diameter of the circle. AB ∥ EC, BC = 8 cm. Line EC is tangent at point D. Find the length of DE.

(a) $4\sqrt{5}$ cm (b) $6\sqrt{5}$ cm
(c) 8 cm (d) 10 cm




**71.** How many numbers between 10 to 300, when divided by 4, leave remainder 3?

(a) 71 (b) 72 (c) 73 (d) 74

**72.** If the polynomial $x^3+2x^2-ax-12$ is divided by $x-4$ the remainder is 52. Find the value of $'a'$.

(a) $\frac{11}{2}$ (b) $-5$ (c) 8 (d) $-8$

**73.** The probability of a sure or certain event is:

(a) $\frac{1}{2}$ (b) 1 (c) 0 (d) $\frac{1}{4}$

**74.** Find the ratio of the volume to total surface area of a sphere of radius $\sqrt{7}$ cm.

(a) $\frac{\sqrt{7}}{3}$ (b) $\frac{7}{3}$ (c) $\frac{7\sqrt{7}}{3}$ (d) $\frac{\sqrt{7}}{\sqrt{3}}$

**75.** What is the probability of scoring 100 marks out of 100 marks in Mathematics exam, assuming that there is no partial marking, and one can get marks only as whole numbers?

(a) 0 (b) 1 (c) $\frac{1}{100}$ (d) $\frac{1}{101}$

# BIOLOGY

**76**. Opening and closing of pores is a function performed by

a. Stomata b. Chlorophyll c. Chloroplast d. Guard cells

**77**. Which element is used in the synthesis of proteins?

a. Hydrogen b. Oxygen c. Nitrogen d. Carbon dioxide

**78**. Which of these juices is secreted by pancreas?

a. Trypsin b. Pepsin c. Bile juice d. Both I and II

**79**. One cell-thick vessels are called

a. Arteries b. Veins c. Capillaries d. Pulmonary artery

**80**. Which of the following is totally impossible outcome of Mendel's Experiment?

a. 3 tall 1 short plant b. 24 tall and 8 short plants

c. 8 tall and 0 short plants d. 4 tall plants and 1 medium height plant.

**81**. Which section of DNA provides information for one protein

a. Nucleus b. Chromosomes c. Trait d. Gene

**82**. What is the probability that the male progeny will be a boy?

a. 50% b. 56% c. 47.43% d. It varies

**83**. Who have a perfect pair of sex chromosomes?

a. Girls only b. Boys only

c. Both girls and boys d. It depends on many other factors

**84**. Homologous organ have

a. Same structure, same function b. Different structure, different function

c. Same structure, different function d. different structure, same function

**85**. Which of the following disease is transmitted sexually?

a. Kala azar b. Jaundice c. Cholera d. Syphilis

**86**. Where does fertilization occur in human females?

a. Uterus b. Cervix c. Oviduct d. None of these

**87**. Floods can be prevented by

a. Afforestation b. Removing top soil c. Deforestation d. Agriculture

**88**. What is coliform?

a. Group of bacteria b. Group of viruses

c. Group of microorganisms d. Group of diseases

**89**. The functional unit of environment is

a. Ecosystem b. Nitrogen c. Carbon d. Oxygen

**90**. Which of the following is artificial ecosystem?

a. A natural forest b. A lake c. A pond d. An aquarium

**91**. Cell enlargement and differentiation is promoted by which of the following plant hormone

a. Gibberellins b. Auxin c. Cytokinin d. Abscisic acid

**92**. Opening of stomata is controlled by which of the following hormone

a. Gibberellins b. Auxin c. Cytokinin d. Abscisic acid

**93**. All parts of the organ of a plant are affected equally irrespective of the direction of the stimulus.

a. Phototropism b. Chemotropism c. Thigmonasty d.Hydronasty

**94**. Main site of photosynthesis

a. Leaf b. Stem c. Chloroplast d. Guard cells

**95**. Photosynthesis is a

a. Amphibolic process b. Parabolic process

c. Catabolic process d. Photochemical lprocess

**96**. …. Is an indeterminate species

a. Red panda b. Lion c. Lion tailed monkey d. Giant squirrel

**97**. With whom you can associate theory of evolution?

a. Charles Darwin b. Mendel c. Stanley miller d. Harold Urey

**98**. Neuron to muscle connection is made by

a. Acetone b. Citric acid c. Sodium Chloride d. Acetyl Choline

**99**. Product of partial aerobic respiration is

a. Citric acid b. Lactic acid c. Ethanol d. Butanol

**100**. Penicillium is a

a. Bacteria b. Algae c. Fungi d. Protozoa