# Jayesh Foundation Kalwan

## JAYESH FOUNDATION SCHOLARSHIP EXAMINATION 2023

**Descriptive Paper (PCM)**

**Time : 3:00 hrs.** **Max. Marks : 100**

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## PHYSICS

**General Instructions**

- All questions are compulsory.
- This question paper has three sections: Section A ,Section B & Section C,
- Section A contains five questions of one mark each, Section B contains four questions of two marks each and Section C Contains four Questions of three marks each.

### Section (A)

**1.** Why is tungsten metal used in bulbs but not in fuse wires?

**2.** What connection is used in domestic appliances and why?

**3.** When we see any object through the hot air over the fire, it appears to be wavy, moving slightly. Explain.

**4.** The magnification produced by a plane mirror is +1. What does it mean?

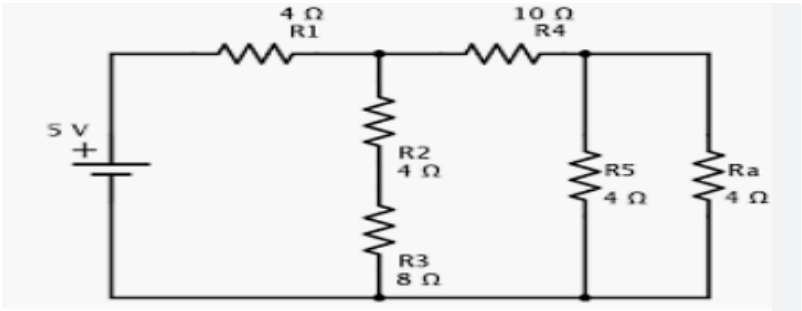
**5.** The radius of curvature of convex mirror is 20cm. find focal length and its power.

### Section (B)

**6.** Calculate the area of cross section of a wire of length 2m, its resistance is 25Ω and the resistivity of material of wire is $1.84*10^{-6}$ Ωm.

**7.** A star sometimes appears brighter and some other times fainter. What is this effect called? State the reason for this effect.

**8.** Find the current in the given circuit.



**9.** A current through a horizontal power line flows in east to west direction. What is the direction of magnetic field at a point directly below it and at a point directly above it? Name the rule you have applied in this case.

## Section (C)

**10.** A torch bulb is rated at 3V and 600mA. Calculate it's

(a) Power b) Resistance c) Energy consumed if it is lighted for 4 Hrs.

**11**. Name three refractive defects of vision with help of diagram. Explain its reasons and correction of these defects.

**12.** A spherical mirror produces an image of magnification -1 on a screen placed at a distance of 50 cm from the mirror.

(a) Write the type of mirror.
(b) Find the distance of the image from the object.
(c) What is the focal length of the mirror?
(d) Draw the ray diagram to show the image formation in this case.

**13.** A student while studying the force experienced by a current carrying conductor in a magnetic Field records the following observation

| | |
|---|---|
| 1 | The force experienced by the conductor is increases as the current in the conductor is decreased |
| 2 | The force experienced by the conductor is decreases as the strength of magnetic field is decreased |
| 3 | Direction of the force on the current carrying conductor is determined suing Fleming Left hand rule |

Which of these observations is correct? Explain each observation.

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# CHEMISTRY

**Each question carries 5 marks**

**1.** Explain mechanism of cleansing action of soap. Write esterification and saponification reaction.

**2.** From the list given below, select words required to complete the blanks (i) to (v).
Words should be used only once.
Hydrogen, hydronium, hydroxide, salt, water.

A solution X turns blue litmus red, so it must contain (i).....ions. Another solution Y turns red litmus blue, so it must contain (ii).....ions. When solution X and Y are mixed, the product will be (iii)..... and (iv)..... . Also, if a piece of magnesium is put into X, (v)..... gas will be released.

**3.** (a) Write one example for each of decomposition reaction carried out with help of
(i) Electricity
(ii) Heat
(iii) Light

(b) Which of the following statements is correct and why?

(i) Copper can displace silver from silver nitrate

(ii) Silver can displace copper from copper sulphate solution.

**4.** (a) Define a balanced chemical equation. Why should an equation be balanced?

(b) Write the balanced chemical equation for the following reaction:
(i) Phosphorus burns in presence of chlorine to form phosphorus pentachloride.
(ii) Burning of natural gas.
(iii) The process of respiration.

**5.** (a) Mention the pH range within which our body works. Explain how antacids give relief from acidity. Write the name of one such antacid.
(b) Fresh milk has a pH of 6. How does the pH will change as it turns to curd? Explain your answer.
(c) A milkman adds a very small amount of baking soda to fresh milk. Why does this milk take a longer time to set as curd?
(d) Mention the nature of toothpastes. How do they prevent tooth decay?

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# MATHEMATICS

**Instructions:**

- This paper contains 3 sections.
- **Section A** contains **7 Questions** of **2 Marks** each.
- **Section B** contains **7 Questions** of **3 Marks** each.
- **Section C** contains **3 Questions** of **5 Marks** each.
- There is no internal choice in any section.
- All Questions are compulsory.

## Section (A)

**1.** If the value of a quadratic polynomial p(x) is 0 only at x = –1 and p(–2) = 2, then find the value of p(2).

**2.** If the line segment joining (2, 3) and (–1, 2) is divided internally in the ratio 3 : 4 by the graph of the equation x + 2y = k, then find the value of 'k'.

**3.** Two circles with centres P and R touch each other externally at O. A line passing through O cuts the circles at T and S respectively. Then, which of the following is true? Explain your answer with diagram.

(a) PT and RS are of equal length
(b) PT and RS are perpendicular to each other.
(c) PT and RS are intersecting
(d) PT and RS are parallel

**4.** If Anish is moving along the boundary of a triangular field of sides 35 m, 53 m and 66 m and you are moving along the boundary of a circular field whose area is double the area of the triangular field, then find the radius of the circular field. (Take $\pi = \frac{22}{7}$)

**5.** Express $0.\overline{34} + 0.3\overline{4}$ as a single decimal.

**6.** How many points (x, y) with integral co – ordinates are there whose distance from (1, 2) is two units? Explain with co – ordinate plane.

**7.** The value of cos x° – sin x°$(0 \le x < 45)$ is:

(1) 0 (2) positive
(3) negative (4) sometimes negative and sometimes positive

## Section (B)

**8.** On dividing a natural number by 13, the remainder is 3 and on dividing the same number by 21, the remainder is 11. If the number lies between 500 and 600, then find the remainder on dividing the number by 19.

**9.** If the graphs of the equations $x - y = 2$ and $kx + y = 3$ , where k is a constant, intersect at the point (x, y) in the first quadrant, then find the interval in which 'k' lies.

**10.** If $\alpha$ and $\beta$ are the roots of the quadratic equation $x^2 - 6x - 2 = 0$ and if $a_n = \alpha^n - \beta^n$ then find the value of $\frac{a_{10} - 2a_8}{2a_9}$.

**11.** A person walks towards a tower. Initially when he starts, angle of elevation of the top of the tower is 30°. On traveling 20 metres towards the tower, the angle changes to 60°. How much more he has to travel to reach the tower?

**12.** A calf is tied with a rope of length 12 m at a corner of a rectangular field of dimensions 35m x 25m. If the length of the rope is increased to 23 m, then find the additional grassy area in which the calf can graze. (Take $\pi = \frac{22}{7}$)

**13.** ABC is a triangle in which AB = 4 cm, BC = 5 cm, and AC = 6 cm. A circle is drawn to touch side BC at P, side AB extended at Q and side AC extended at R. Then, find AQ.

**14.** Three dice are thrown simultaneously. What is the probability of getting a total of at least 5, of the numbers appearing on their tops?

## Section (C)

**15.** If $\text{cosec}x - \sin x = a$ and $\sec x - \cos x = b$, then $(a^2b)^{\frac{2}{3}} + (ab^2)^{\frac{2}{3}} = ?$

**16.** Find the centre of the circle passing through the points (6, –6), (3, –7) and (3, 3).

**17.** ABCD is a square of side 8 cm. P is the midpoint of AD and is joined with vertex B. A perpendicular is drawn from the vertex C on BP, which intersects BP at point E. Find the area of the triangle BEC.