

# IIT ASHRAM BRINGS...

CLASS

8

PHASE-II

KH J



(2021)

A Hunt for  
young Scientists..!

## SAMPLE PAPER

Time : 1 Hours

Maximum Marks : 280

### IMPORTANT INSTRUCTIONS

*Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.*

#### A. GENERAL :

1. This booklet consists of 70 questions.
2. Blank papers, clipboards, log tables, slide rules, calculators, cellular phones, and electronic gadgets in any form are not allowed to be carried inside the examination hall.
3. The answer sheet, a machine-readable Optical Mark Recognition (OMR), is provided separately.
4. Do not tamper with / mutilate the OMR or the Booklet.
5. Write Name and Address in capital letters on OMR sheet.
6. Submit the OMR Sheet back to Invigilator after examination before leaving the examination hall.
7. Previous year or Term exam's percentage | grade | Marks scored in Maths and Science must be written at the back of OMR Sheet

#### B. QUESTION PAPER FORMAT:

7. The question paper consists of **4 Parts**.  
**Part-I :- Mental Ability (14 Questions)**                      **Part-II :- Mathematics (14 Questions)**  
**Part-III :- Physics/ Chemistry (28 Questions)**                      **Part-IV:- Biology (14 Questions)**

#### C. Marking Scheme :

8. For each question in **Part-I , II, III & IV** you will be **awarded 4 marks** if you have darkened only the bubble corresponding to the correct answer and zero mark if no bubble is darkened. In all other cases where the answer marked is not correct, **minus one (-1) mark** will be awarded.



# IIT ASHRAM

**JEE MAIN & ADVANCED | NEET & AIIMS | PRE-FOUNDATION | FOUNDATION**

**ALKAPURI (H.O.):** UG-1 to 4, Concorde Complex, Above PNB, R.C. Dutt Rd, Alkapuri, Vadodara. Mob.: 9033034152, 9033063022

**MAKARPURA :** SF-1 to 12, Kabir Plaza, Above IDBI Bank, Bhavan's Makarpura Road, Mob.: 9227666620, 9033063028.

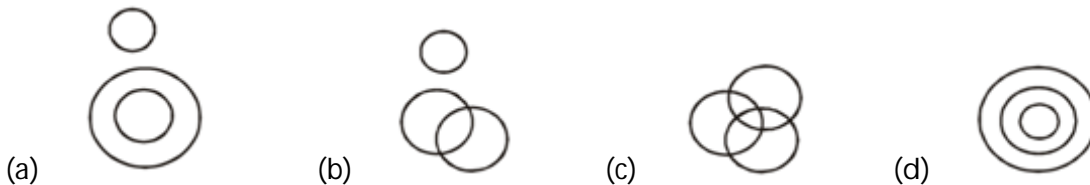
**ANAND :** 2nd Floor, HR Building, Beside Croma Showroom, A.V. Road, Nr. Town Hall, Anand. Mob.: 9227777098, 8460009041.

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# KHOJ SAMPLE PAPER

## PART - I : MENTAL ABILITY

- If it is possible to make a meaningful word from the third, the fourth and the eleventh letters of the word CONTROVERSIAL, write the first letter for that word, if more than one word can be found write S, otherwise write X.  
(a) N (b) S (c) T (d) I
- Four friends were playing a game of cards, See the was to the right of Maithili and Uma to the left of Gouri. Which of the following a pair of partners?  
(a) Maithili and Gouri (b) Uma and Seethe  
(c) Maithili and Seethe (d) Uma and Maithili
- Three of the following four are alike in a certain way. Which one is not like the other four?  
(a) Mica (b) Bird (c) Pair (d) News
- In a certain code CAT is written as SATC and DEAR as SEARD. How is SING written in that code?  
(a) SSING (b) INGS (c) SINGE (d) SINGS
- a a b \_ a a a \_ b b a \_  
(a) b a a (b) a b b (c) b a b (d) a a b
- Two clocks were set right at noon on Sunday. One gains 2 min and the others loses 3 min in 24 hours. What will be the true time when the first clock indicates 3 pm on Wednesday?  
(a) 2.38 pm (b) 2.54 pm (c) 2.23 pm (d) 2.48 pm
- If a man walks to his office at  $\frac{5}{4}$  of his usual rate, he reaches office 30 minutes early than usual. What is his usual time to reach office.  
(a) 2 hr (b)  $2\frac{1}{2}$  hr (c) 1 hr 50 min (d) 2 hr 15 min
- In the following numbers series, how many even numbers are immediately preceded by 6 as well as immediately followed by 3?  
6 6 5 6 8 3 9 4 3 6 7 3 6 4 3 2 8 6 4 6 8 2 6 6 3  
(a) 1 (b) 2 (c) 3 (d) 4
- I went 15 m to the north, then I turned west and covered 10 m, then turned south and covered 5 m, and then turned east and covered 10m. In which direction am I from the starting point?  
(a) East (b) West (c) North (d) South
- Which one of the following figures represents the relationship among 'Judge', Thief' and 'Criminal' ?



# KHOJ SAMPLE PAPER

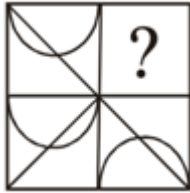
11. At what angle are the hands of a clock inclined at 30 minutes past 6 ?

- (a)  $7\frac{1}{2}^{\circ}$                       (b)  $11\frac{1}{2}^{\circ}$                       (c)  $15^{\circ}$                       (d)  $23^{\circ}$

12. If GIVE is coded 5137 and BAT is coded as 924, how can GATE be coded?

- (a) 5247                      (b) 5724                      (c) 7254                      (d) 2547


13.



- (a)                       (b)                       (c)                       (d) 

14.



- (a)                       (b)                       (c)                       (d) 

# KHOJ SAMPLE PAPER

## PART – II : MATHEMATICS

- Find the greatest four digit number which when divided by 18 and 12 leaves a remainder of 4 in each case.  
(a) 9976 (b) 9940 (c) 9904 (d) 9868
- If  $x$  and  $y$  are whole numbers such that  $y^x = 19,683$  and  $y > x$  and  $1 < x < 4$ , then  $\sqrt[3]{y}$  is \_\_\_\_\_.  
(a) 13 (b) 17 (c) 3 (d) 9
- Which is the greatest among  $2^{156}$ ,  $4^{79}$ ,  $128^{23}$  and  $8^{54}$ ?  
(a)  $4^{79}$  (b)  $128^{23}$  (c)  $2^{156}$  (d)  $8^{54}$
- The polynomial  $x^4 + 12x^2 + 64$  on factorization gives \_\_\_\_\_.  
(a)  $(x^2 - 2x + 8)(x^2 + 2x - 8)$  (b)  $(x^2 - 2x - 8)(x^2 + 2x + 8)$   
(c)  $(x^2 + 2x - 8)(x^2 - 2x - 8)$  (d)  $(x^2 - 2x + 8)(x^2 + 2x + 8)$
- If  $a = (2^{-2} - 2^{-3})$ ,  $b = (2^{-3} - 2^{-4})$ , and  $c = (2^{-4} - 2^{-2})$  then find the value of  $a^3 + b^3 + c^3$ .  
(a)  $\frac{-9}{1024}$  (b)  $\frac{-9}{2048}$  (c) 0 (d) 1
- If  $x = \frac{4\sqrt{2}}{\sqrt{2} + 1}$ , then find the value of  $\frac{x+2}{x-2} - \frac{x+2\sqrt{2}}{x-2\sqrt{2}}$ .  
(a) 2 (b)  $12 + 8\sqrt{2}$  (c)  $12 - 8\sqrt{2}$  (d) -2
- A manufacturer purchases a second-hand machine for ₹ 60,000 and spends some amount towards repairs then its value goes up to ₹ 90,000. If depreciation is 10% per annum, then what will be the value of the machine after two years?  
(a) ₹ 48,600 (b) ₹ 81,000 (c) ₹ 67,200 (d) ₹ 72,900
- Sushma and Harika started a business with investments of ₹ 4500 and ₹ 5500, respectively. After 6 months, Sai joined them with an investment of ₹ 7000. Find the total share of Sushma and Harika in the annual profit of ₹ 27,000.  
(a) ₹ 11,000 (b) ₹ 15,000 (c) ₹ 20,000 (d) ₹ 16,000
- Karthik marked an article at 60% above its cost price. He sold it at a profit after 2 successive discounts of 10% each. Find the profit percentage.  
(a) 40% (b) 35.5% (c) 20% (d) 29.6%

## KHOJ SAMPLE PAPER

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10. ₹ 2800 was split into two parts. One part was lent at 20% per annum simple interest for 10 years. The other part was lent at 25% per annum simple interest for 20 years. Each part yielded equal interest. Find the lower part (in ₹).
- (a) 800                      (b) 900                      (c) 1000                      (d) 1200
11. ₹ 6000 was lent at compound interest for 2 years. The rates of interest for the first and second years were 10% per annum and 30% per annum, respectively. If the rate of interest each year had been 20% per annum, then the additional amount obtained would have been (in ₹).
- (a) 60                      (b) 30                      (c) 90                      (d) 120
12. In a fort, there are 1500 soldiers and they have provisions for 90 days. If 600 soldiers leave the fort and the remaining soldiers increase their consumption rate by 50%, then for how many days will the provisions last?
- (a) 80                      (b) 90                      (c) 100                      (d) 120
13. Two filling pipes P and Q are fitted to a tank. P is first opened for half the time taken by Q alone to fill the tank and then closed. Q is then opened for half the time taken by P alone to fill the tank. If the tank is full after a total of 6 h after P was opened, then for how long was Q opened? (in hours)
- (a) 5                      (b) 4                      (c) 3                      (d) 2
14. A train P takes 40 s to cross a train 800 m long and having a speed of 30 m/s, in the opposite direction. It takes 120 s to cross another train twice its length and having the same speed and moving in the opposite direction to it. Find the length of the train P in metres.
- (a) 600                      (b) 800                      (c) 1000                      (d) 1200

# KHOJ SAMPLE PAPER

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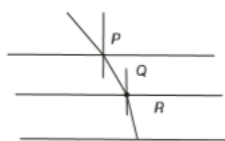
## PART – III : PHYSICS/ CHEMISTRY

- Assertion (A): The work done by the gravity on an ascending body is negative.  
Reason (R): The displacement and gravitational force are opposite in direction.
  - A and R are true and R is the correct explanation of A.
  - A and R are true, but R is not the correct explanation of A.
  - A is true but R is false.
  - Both A and R are false.
- Assertion (A): When a person swims, he pushes the water in the same direction as his motion. Reason (R): Both action and reaction act on the same body.
  - A and R are true and R is the correct explanation of A.
  - A and R are true, but R is not the correct explanation of A.
  - A is true but R is false.
  - Both A and R are false.
- Assertion (A): When a person steps out of a boat, the boat moves backwards.  
Reason (R): The reaction force acting on the boat is in the opposite direction to the direction of movement of the person.
  - A and R are true and R is the correct explanation of A.
  - A and R are true, but R is not the correct explanation of A.
  - A is true but R is false.
  - Both A and R are false.
- If the velocity of a wave is  $200 \text{ m s}^{-1}$  and the time period of its source is  $0.001 \text{ s}$ , then its wave length is \_\_\_\_\_.
  - 2 m
  - 20 cm
  - 2 cm
  - 2 mm
- The time taken to complete 100 waves is 50 s. The frequency of the wave is \_\_\_\_\_ Hz.
  - 1
  - 2
  - 0.5
  - 5

## KHOJ SAMPLE PAPER

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6. Two persons are talking behind the wall. We can differentiate their voices by \_\_\_\_\_ even if their pitch and amplitude are equal.
- (a) loudness      (b) quality      (c) timbre      (d) Both (b) and (c)
7. A light ray incident on a reflecting surface with an angle of incident of  $30^\circ$ . The angle of deviation is \_\_\_\_\_.
- (a)  $60^\circ$       (b)  $30^\circ$       (c)  $120^\circ$       (d)  $90^\circ$
8. A light ray travels from medium P to Q and R as shown below. If  $\mu_P$ ,  $\mu_Q$  and  $\mu_R$  are the refractive indices of the media P, Q and R, respectively, then find the relation between them.



- (a)  $\mu_P > \mu_Q$       (b)  $\mu_R < \mu_Q$       (c)  $\mu_R > \mu_P$       (d)  $\mu_P > \mu_Q$
9. The periscopes in which mirrors are used, \_\_\_\_\_ takes place
- (a) reflection      (b) total internal reflection  
(c) refraction      (d) scattering
10. Assertion (A): Insulators cannot conduct electricity.  
Reason (R): The electricity flowing through the solids is due to the flow of free electrons in them and insulators have less number of free electrons.
- (a) A and R are true and R is the correct explanation of A.  
(b) A and R are true, but R is not the correct explanation of A.  
(c) A is true but R is false.  
(d) Both A and R are false.
11. Match the statements of Column A with those of Column B
- | Column A              | Column B                           |
|-----------------------|------------------------------------|
| (A) Gold conering     | (a) Heating effect of electricity  |
| (B) Button Cell       | (b) Chemical effect of electricity |
| (C) EMF               | (c) Volt                           |
| (D) An electric stove | (d) Zinc acts as anode             |





## KHOJ SAMPLE PAPER

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16. Few characteristics of three fuels X, Y and Z are given below

X	Y	Z
Not easily stored or transported	Can be stored in tanks and transported through pipes	Can be stored in tanks and transported through pipes
Extremely polluting	Produce almost no pollutants	Moderately polluting

Identify X, Y and Z respectively

- (a) LPG, Biogas, Coal (b) Coal, Natural gas, Petroleum  
(c) Petroleum, LPG, Coal (d) Natural gas, Cow dung cake, LPG
17. Which of the following antiknocking agents added to petrol to avoid knocking in vehicles?  
(a) White (b) Carbon monoxide  
(c) Tetraethyl lead (d) Indole
18. Gold and silver are called noble metals because  
(a) They do not, normally, react in their natural environment  
(b) Ladies of royalty wear them as jewellery  
(c) They are worn by noblemen  
(d) Even acids cannot dissolve them without strong heat
19. Arrange the following fuels in the increasing order of their calorific value.  
(i) Petrol, (ii) Wood, (iii) Coal, (iv) Natural gas  
(a) i, ii, iii and iv (b) ii, iii, iv and i (c) ii, i, iii and iv (d) ii, iii, i and iv
20. Shyamkumar went to tailor shop to get a shirt stitched from him. He wanted a fabric that doesn't get wrinkled quickly. Help him to choose the correct fiber.  
(a) polyester (b) Nylon (c) Cotton (d) Silk
21. 2 mL each of concentrated HCl, HNO<sub>3</sub> and a mixture of concentrated HCl and concentrated HNO<sub>3</sub> in the ratio of 3 : 1 were taken in test tubes labeled as A, B and C. A small piece of metal was put in each test tube. No change occurred in test tubes A and B but the metal got dissolved in test tube C respectively. The metal could be  
(a) Al (b) Cu (c) Au (d) Fe
22. Which of the following is correct for tea?  
(a) Acidic and nicotine (b) Alkaline and caffeine  
(c) Alkaline and nicotine (d) Acidic and caffeine

## KHOJ SAMPLE PAPER

23. Nickel and cadmium are used in combination
- (a) As a catalyst
  - (b) In alloys that can resist high pressure
  - (c) In electric batteries having a very long life
  - (d) In cooking utensil
24. Mr. Garg, a science teacher showed the following experimental set up to the students. Which of the following is the correct observation and its explanation?



- (a) The paper pan catches fire and the water spills all over the wire mesh because paper is inflammable.
  - (b) The paper pan has a very high ignition temperature so it does not catch fire.
  - (c) The water in the pan absorbs heat from the candle flame and thus prevents the paper to reach the ignition temperature
  - (d) The paper pan helps the water vapours to condense back to water.
25. Graphite is used in pencils. It leaves a black trace of writing on paper because it consists of layers of carbon atoms that
- (a) Are wound inside, like a long thread
  - (b) Are attracted by paper material
  - (c) Fall easily
  - (d) Slide over each other

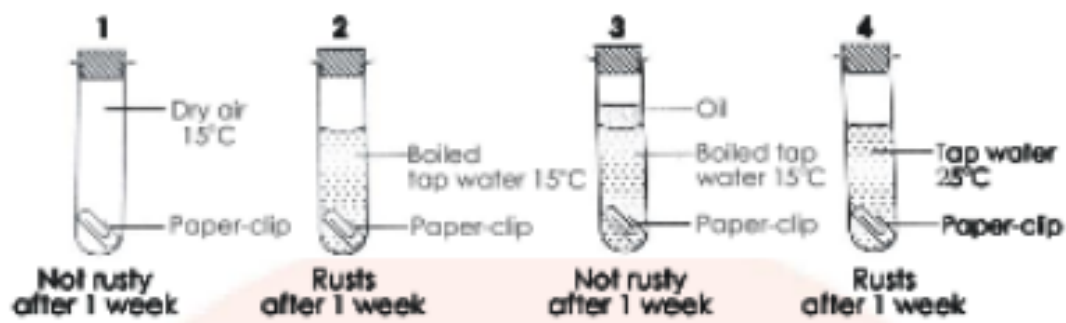
26. Match the following :

Column I	Column II
1. Rapid combustion	(p) Materials get ignited without any apparent cause
2. Spontaneous	(q) Fuel burns rapidly and produces heat and light
3. Explosion	(r) Fire extinguisher
4. Sodium bicarbonate	(s) Evolution of large amount of heat, light and sound

- (a) 1 – q, 2 – p, 3 – s, d – r
- (b) 1 – p, 2 – q, 3 – r, 4 – s
- (c) 1 – r, 2 – s, 3 – q, 4 – p
- (d) 1 – s, 2 – r, 3 – q, 4 – p

## KHOJ SAMPLE PAPER

27. Four experiments on rusting are shown below :



Which two experiments can be used to show that air is needed for iron to rust?

- (a) 1 and 3            (b) 1 and 4            (c) 2 and 3            (d) 2 and 4
28. Which of the following properties of nylon are most convenient for its use?
- (a) it is soft, strong and heavy            (b) It is strong, elastic and light  
(c) It is soft, inexpensive and strong            (d) It is expensive, soft and light

### PART – IV : BIOLOGY

1. Which one of the following is the correct order of structural organisation of an organism?
- (a) Cells → Organs → Tissues → Organ system → Organisms  
(b) Cells → Tissues → Organs → Organ system → Organisms  
(c) Organs → Tissues → Organ system → Organisms → cells  
(d) None of these
2. Name the cell which has been shown in the following figure.



- (a) Muscle cells            (b) Nerve cells            (c) Bone cells            (d) White blood cell
3. In which one of the following options, the various stages in the development of a silk moth, has been correctly arranged?
- (a) Egg → Pupa → Caterpillar → Silk moth            (b) Egg → Caterpillar → Pupa → Silk moth  
(c) Egg → Silk moth → Pupa → Caterpillar            (d) Egg → Silk moth → Caterpillar → Pupa

## KHOJ SAMPLE PAPER

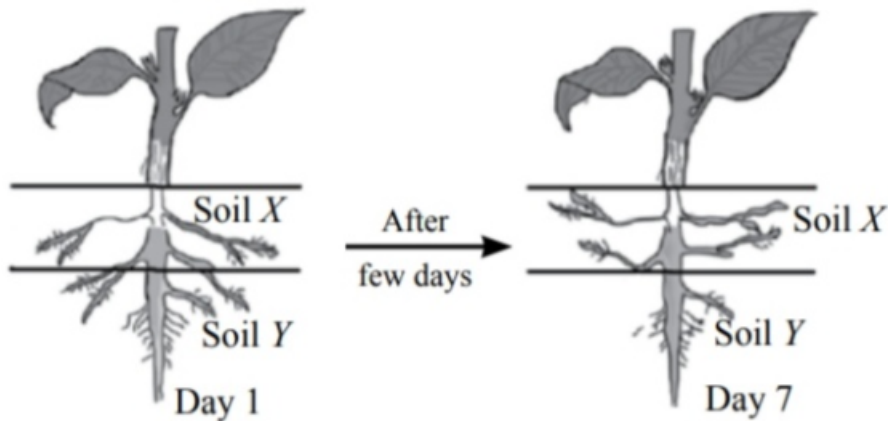
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4. The disease chickenpox is caused by which one of the following microorganisms?  
(a) Bacteria                      (b) Virus                      (c) Protozoa                      (d) Fungi
5. Which one of the following microorganisms is an example of algae?  
(a) Lactobacillus                      (b) Rhizobium  
(c) Chlamydomonas                      (d) Entamoeba
6. Preventive and control measures adopted for the storage of grains include  
(a) strict cleaning                      (b) proper disjoining  
(c) fumigation                      (d) all of the above
7. The posterior pituitary stores and releases :  
(a) Growth hormone and prolactin  
(b) Prolactin and oxytocin  
(c) Oxytocin and Antidiuretic hormone (ADH).  
(d) ADH and growth hormone.
8. Biogas is a better fuel than animal dung cake because  
(a) biogas has the lower calorific value.  
(b) animal dung cake has high calorific value  
(c) biogas burns smoke and leaves no residue  
(d) biogas is used as a fuel for cooking only whereas dung cake can be used for cooking, illuminating the lanterns
9. Synthetic material/chemical which depletes Ozone layer is  
(a) CFCs                      (b) CFLs                      (c) CO<sub>2</sub>                      (d) None of these
10. What is coliform?  
(a) Group of bacteria                      (b) Group of viruses  
(c) Group of microorganisms                      (d) Group of diseases
11. What is the name given for replenishment of forest?  
(a) Afforestation                      (b) Silviculture                      (c) Deforestation                      (d) Sericulture
12. Why should we conserve forest and wild life?  
(a) To protect biodiversity                      (b) To maintain ecosystem  
(c) To maintain balance                      (d) To continue food chain

## KHOJ SAMPLE PAPER

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13. Tarun sets up a plant as shown in the figure. After a few days, the observed upward growth in the roots of the plant.



Based on his observations what can you conclude?

- (a) Soil X is clayey while soil Y is loamy
  - (b) Soil X is sandy while soil Y is clayey
  - (c) Soil X is loamy while soil Y is sandy
  - (d) It is not possible to tell
14. Which of these is not an endocrine gland?
- (a) Pancreas
  - (b) Testes
  - (c) Salivary gland
  - (d) Parathyroid