



**NITP**

**SAMPLE PAPER**

# for 11<sup>th</sup> App./11<sup>th</sup> Passed [Engg./Medical]

*Time: 3 Hours*

*Maximum Marks: 360*

*Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.  
You are not allowed to leave the Examination Hall before the end of the test.*

## **INSTRUCTIONS**

1. The question paper consists of **4 parts (Mental Ability, Physics, Chemistry and Maths/Biology)**.
2. The test is of **3 hours** duration and consists of **120 questions**. Each question has 4 / 5 choices (A), (B), (C), (D) and (E), out of which **ONLY ONE** is correct.
3. Each question carries **3 marks**. For each correct response the candidate will get **3 marks**. For each incorrect response, **one mark** will be deducted.
4. Use **HB+ pencil** only for writing particles on the page / marking responses.
5. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
6. **On completion of the test, the candidate must handover the Test Booklet & Answer Sheet to the invigilator in the Room/Hall.**
7. Use of Electronic /Manual Calculator is prohibited.

Name of the Candidate (in Capitals): \_\_\_\_\_

Father / Guardian Name (in Capitals): \_\_\_\_\_

Present Address: \_\_\_\_\_

\_\_\_\_\_

Ph. No. (Guardian): \_\_\_\_\_

Ph. No. (Student): \_\_\_\_\_

Candidate's Signature: \_\_\_\_\_

Invigilator's Signature \_\_\_\_\_

**Admission for :**  Ranchi Centre  Patna Centre  
(✓ relevant)

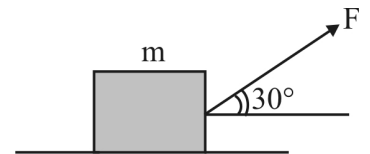
**SECTION – I [MENTAL ABILITY]**

**Directions** — In questions 1-5 each has five terms. Four terms are alike in some way while one term is different from the others. Find out the term, different from the others.

1. (a) H G E D (b) Q P M L (c) V U S R (d) J I G F  
(e) W X Z A
2. (a) Q P N K (b) A Z X U (c) S R P M (d) K J H E  
(e) U T R N
3. (a) E 12 G (b) D 16 L (c) J 23 M (d) P 37 R  
(e) H 28 T
4. (a) D W (b) H S (c) J Q (d) L O  
(e) F T
5. (a) Y F 19 (b) U L 9 (c) V H 16 (d) N K 3  
(e) R M 5.

**SECTION – II [PHYSICS]**

6. A block of mass 5 kg is accelerated from rest to 60 m/s in 1 sec. What force acts on it?  
(a)  $5 \times 60N$  (b)  $(5/60) \times 98N$  (c)  $60^2 \times 52N$  (d)  $(5/2) \times 60^2 \times 981N$ .
7. Two blocks of masses 2 kg and 1 kg are in contact with each other on a frictionless table. When a horizontal force of 3.0 N is applied to the block of mass 2 kg, the value of the force of contact between the two blocks is:  
(a) 4 N (b) 3 N (c) 2 N (d) 1 N.
8. A string of length  $L$  and mass  $M$  is lying on a horizontal table. A force  $F$  is applied at one of its ends. Tension in the string at a distance  $x$  from the end at which force is applied is:  
(a) Zero (b)  $F$  (c)  $F(L-x)/L$  (d)  $F(L-y)/M$ .
9. A mass  $m$  rests on a horizontal surface. The coefficient of friction between the mass and the surface is  $\mu$ . If the mass is pulled by a force  $F$  as shown in fig. the limiting friction between the mass and the surface will be:  
(a)  $\mu mg$  (b)  $\mu [mg - (\sqrt{3}/2)F]$  (c)  $\mu [mg - (F/2)]$  (d)  $\mu [mg + (F/2)]$ .



10. A ball weighing 10 g hits a hard surface vertically with a speed of 5 m/s and rebounds with the same speed. The ball remains in contact with the surface for 0.01 sec. The average force exerted by the surface on the ball is:
- (a) 100 N                      (b) 10 N                      (c) 1 N                      (d) 0.1 N.

**SECTION – III [CHEMISTRY]**

11. In Haber process, 30 litres of dihydrogen and 30 litres of dinitrogen were taken for reaction which yielded only 50% of the expected product. What will be the composition of the gaseous mixture under the aforesaid condition in the end?
- (a) 20 litres NH<sub>3</sub>, 25 litres N<sub>2</sub>, 20 litres H<sub>2</sub>                      (b) 10 litres NH<sub>3</sub>, 25 litres N<sub>2</sub>, 15 litres H<sub>2</sub>  
 (c) 20 litres NH<sub>3</sub>, 10 litres N<sub>2</sub>, 30 litres H<sub>2</sub>                      (d) 20 litres NH<sub>3</sub>, 25 litres N<sub>2</sub>, 15 litres H<sub>2</sub>.
12. Find the charge present on 3 mg CO<sub>3</sub><sup>2-</sup> ion:
- (a)  $\frac{10^{-3}}{2} F$                       (b)  $\frac{F}{2}$                       (c)  $\frac{10^{-4}}{2} F$                       (d) F.
13. Number of atoms in 560 g of Fe (atomic mass = 56 g mol<sup>-1</sup>):
- (a) is twice that of 70 g N                      (b) is half that of 20 g H  
 (c) both are correct                      (d) none is correct.
14. How many moles of magnesium phosphate, Mg<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> will contain 0.25 mole of oxygen atoms?
- (a)  $3.125 \times 10^{-2}$                       (b)  $1.25 \times 10^{-2}$                       (c)  $2.5 \times 10^{-2}$                       (d) 0.02.
15. How many moles of electrons weight one kilogram? (Mass of electron =  $9.108 \times 10^{-31}$  kg, Avogadro number =  $6.022 \times 10^{23}$ ):
- (a)  $6.022 \times 10^{23}$                       (b)  $\frac{1}{9.108} \times 10^{31}$                       (c)  $\frac{6.022}{9.108} \times 10^{54}$                       (d)  $\frac{1}{9.108 \times 6.022} \times 10^8$

**SECTION – IV [MATHS]**

16. For any  $z \in C$ , which of the following is not true?
- (a)  $\text{Re}(z) = \frac{z + \bar{z}}{2}$                       (b)  $\text{Im}(z) = \frac{z - \bar{z}}{2i}$   
 (c)  $z \bar{z} = \{\text{Re}(z)\}^2 + \{\text{Im}(z)\}^2$                       (d)  $|\text{Re}(z)| < \sqrt{(\text{Re}(z))^2 + (\text{Im}(z))^2}$ .

17. For all  $z_1, z_2 \in C$ ,
- (a)  $|z_1 z_2| = |z_1| |z_2|$  (b)  $\arg(z_1 z_2) = (\arg z_1)(\arg z_2)$   
 (c)  $|z_1 + z_2| = |z_1| + |z_2|$  (d)  $|z_1 - z_2| \leq |z_1| + |z_2|$ .
18. The value of  $p$  and  $q$  ( $p \neq 0, q \neq 0$ ), for which  $p, q$  are roots of the equation  $x^2 + px + q = 0$ , are:  
 (a)  $p = 1, q = 2$  (b)  $p = -1, q = 2$  (c)  $p = -1, q = -2$  (d)  $p = 1, q = -2$ .
19. If  $r, s$  are the roots of  $ax^2 + bx + c = 0$  then the equation whose roots are  $r + 2$  and  $s + 2$  is:  
 (a)  $ax^2 + x(4a - b) + 4a - 2b + c = 0$  (b)  $ax^2 + x(4a - b) + 4a + 2b + c = 0$   
 (c)  $ax^2 + x(b - 4a) + 4a + 2b + c = 0$  (d)  $ax^2 + x(b - 4a) + 4a - 2b + c = 0$ .
20. If  $\tan r = \frac{1}{7}$  and  $\tan s = \frac{1}{3}$ , then  $\cos 2r$  is equal to:  
 (a)  $\sin 2s$  (b)  $\cos 2s$  (c)  $\sin 4s$  (d) none of these.

**SECTION – V [BIOLOGY]**

21. Which of the following is not a snake?  
 (a) Viper (b) Krait (c) Rattle snake (d) Glass snake
22. Fluid mosaic model of cell membrane was proposed by  
 (a) Robertson (b) Danielli and Davson  
 (c) Singer and Nicolson (d) Watson and Crick
23. Typical 'lub-dup' sounds heard in heart beat are due to  
 (a) Closing of bicuspid and tricuspid valves  
 (b) Closing of semilunar valves  
 (c) Blood flowing under pressure through aorta  
 (d) Closure of bicuspid-tricuspid valves followed by semilunar valves
24. The respiratory quotient (RQ) is  
 (a)  $RQ = \frac{\text{Vol. of O}_2 \text{ evolved}}{\text{Vol. of CO}_2 \text{ consumed}}$  (b)  $RQ = \frac{\text{Vol. of O}_2 \text{ consumed}}{\text{Vol. of CO}_2 \text{ evolved}}$   
 (c)  $RQ = \frac{\text{Vol. of CO}_2 \text{ consumed}}{\text{Vol. of O}_2 \text{ evolved}}$  (d)  $RQ = \frac{\text{Vol. of CO}_2 \text{ evolved}}{\text{Vol. of O}_2 \text{ consumed}}$
25. Which of the following aril is the edible part:  
 (a) Pomegranate (b) Apple (c) Litchi (d) Orange.