



NITP

SAMPLE PAPER

for 12th App./12th 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)

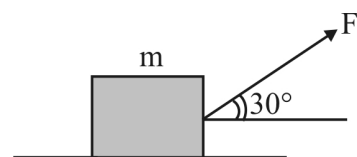
SECTION – I [MENTAL ABILITY]

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 5 kg weight 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 μ . 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) μmg (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 NH₃, 25 litres N₂, 20 litres H₂ (b) 10 litres NH₃, 25 litres N₂, 15 litres H₂
 (c) 20 litres NH₃, 10 litres N₂, 30 litres H₂ (d) 20 litres NH₃, 25 litres N₂, 15 litres H₂.
12. A drop (0.05 ml) of 12.0 HCl is spread over a sheet of thin aluminium foil. Assuming that all the acid dissolves through the foil, what will be the area of the hole produced? (Density of Al = 2.70 g cm⁻³; thickness of the foil = 0.20 mm):
- (a) 0.0001 cm (b) 0.01 cm (c) 0.02 cm (d) 0.002 cm.
13. Number of atoms is 560 g of Fe (atomic mass = 56 g mol⁻¹):
- (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, Mg₃(PO₄)₂ will contain 0.25 mole of oxygen atoms?
- (a) 3.125×10^{-2} (b) 1.25×10^{-2} (c) 2.5×10^{-2} (d) 0.02.
15. How many moles of electrons weigh one kilogram? (Mass of electron = 9.108×10^{-31} kg, Avogadro number = 6.022×10^{23}):
- (a) 6.022×10^{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. The equation of the plane passing through the line $\frac{x-1}{5} = \frac{y+2}{6} = \frac{z-3}{4}$ and the point (4, 3, 7) is:
- (a) $4x + 8y + 7z = 41$ (b) $4x - 8y + 7z = 41$ (c) $4x - 8y - 7z = 41$ (d) $4x - 8y + 7z = 39$.
17. If 1, a and P are in A.P and 1, g and P are in G.P. then:
- (a) $1 + 2a + g^2 = 0$ (b) $1 + 2a - g^2 = 0$ (c) $1 - 2a - g^2 = 0$ (d) $1 - 2a + g^2 = 0$.

18. If r and s are the roots of the equation $lx^2 + mx + n = 0$, then the value $\frac{1}{r^2} + \frac{1}{s^2}$ is:
- (a) $m^2 - 2ln$ (b) $\frac{m^2 - 2ln}{2l}$ (c) $\frac{m^2 - 4ln}{n^2}$ (d) $\frac{m^2 - 2ln}{n^2}$.
19. The sum of first n terms of the series $\frac{1}{2} + \frac{3}{4} + \frac{7}{8} + \frac{15}{16} + \dots$ is equal to:
- (a) $2^n - n - 1$ (b) $1 - 2^{-n}$ (c) $n + 2^{-n} - 1$ (d) $2^n - 1$.
20. A five digit number divisible by 3 is to be formed using the numbers 0, 1, 2, 3, 4 and 5 without repetition. The total number of ways in which this can be done is:
- (a) 216 (b) 240 (c) 600 (d) 3125.

SECTION – V [BIOLOGY]

21. *Rhizophora* has:
- (a) prop roots (b) stilt root (c) pneumatophores (d) modified roots.
22. Conjoint and closed vascular bundles with no phloem parenchyma may be observed in:
- (a) monocot stem (b) monocot root (c) dicot stem (d) dicot root.
23. Axoneme having 9 + 2 doubled microtubule arrangement is found in:
- (a) cilia (b) flagella (c) cilia and flagella (d) centriole.
24. The fixation and reduction of CO_2 occur in presence of :
- (a) ATP (b) ATP and NADPH
(c) NADPH, chlorophyll and water (d) ATP, NADPH and light.
25. *Laminaria* and *Fucus* belong to:
- (a) chlorophyceae (b) rhodophyceae (c) phaeophyceae (d) cyanophyceae.