MHT CET 2025 Apr 15 Shift 1 Question Paper

Time Allowed :3 HourMaximum Marks :200Total Questions :200

General Instructions

Read the following instructions very carefully and strictly follow them:

- 1. The test is of 3 hours duration.
- 2. The question paper consists of 200 questions. The maximum marks are 200.
- There are three parts in the question paper consisting of Physics, Chemistry and Biology (Botany and Zoology) having 50 questions in each part of equal weightage.

1. A car of mass 1000 kg is moving with a velocity of 20 m/s. The driver applies the brakes, and the car comes to rest in 10 seconds. Find the average force exerted by the brakes to stop the car.

- (1) 5000 N
- (2) 2000 N
- (3) 10000 N
- (4) 4000 N

2. A 50 kg person climbs a staircase of height 10 m. Calculate the work done by the person against gravity.

- (1) 5000 J
- (2) 1000 J
- (3) 1500 J
- (4) 3000 J

3. A car of mass 800 kg is moving in a circular path with a radius of 50 m at a speed of 20 m/s. Calculate the centripetal force acting on the car.

(1) 6400 N

(2) 3200 N

(3) 8000 N

(4) 4000 N

4. A pipe has a radius of 2 cm at one end and 1 cm at the other end. The velocity of the water at the wider end is 5 m/s. What is the velocity of the water at the narrower end, assuming incompressible flow?

(1) 10 m/s

(2) 20 m/s

(3) 15 m/s

(4) 25 m/s

5. A 200 g sample of water at 80°C is mixed with 100 g of water at 20°C. Assuming no heat loss to the surroundings, what is the final temperature of the mixture?

(1) 50°C

(2) 60°C

(3) 55°C

(4) 45°C

6. A 5-ohm resistor is connected to a 10 V battery. Calculate the current flowing through the resistor.

(1) 1.0 A

(2) 2.0 A

(3) 0.5 A

(4) 0.2 A

7. What is the pH of a 0.001 M hydrochloric acid (HCl) solution?

(1) 3

(2) 4

(3) 7

(4) 10

8. How many grams of sodium chloride (NaCl) are produced when 2.0 moles of sodium (Na) react with excess chlorine gas (Cl₂? The balanced chemical equation for the reaction is:

 $2 \operatorname{Na}(s) + \operatorname{Cl}_2(g) \rightarrow 2 \operatorname{NaCl}(s)$

(1) 58.5 g

(2) 116.9 g

- (3) 117.0 g
- (4) 231.5 g

9. A gas occupies a volume of 5.0 L at 300 K and 1.0 atm pressure. What will be the volume of the gas if the pressure is increased to 2.0 atm while the temperature is kept constant?

- (1) 2.5 L
- (2) 10.0 L
- (3) 5.0 L
- (4) 1.0 L

10. What is the standard electrode potential of the half-reaction:

 $\operatorname{Cu}^{2+} + 2e^{-} \rightarrow \operatorname{Cu}(\operatorname{solid})?$

Given that the standard electrode potential for the half-reaction:

 $Ag^+ + e^- \rightarrow Ag \text{ (solid)} \text{ is } + 0.80 \text{ V}.$

Also, the cell potential for the following reaction is:

$$Cu^{2+} + 2Ag \rightarrow Cu + 2Ag^+$$

is 0.46 V.

(1) 0.34 V

(2) 0.50 V

- (3) 0.46 V
- (4) 1.0 V

11. For a reaction $A \rightarrow B$, the rate law is given by:

Rate = $k[A]^2$

If the concentration of A is increased by a factor of 3, by what factor does the rate of the reaction increase?

(1) 3

(2) 9

- (3) 27
- (4) 6

12. Which of the following is responsible for the production of oxygen during photosynthesis?

A) Calvin cycle

- B) Photolysis of water
- C) Cyclic photophosphorylation
- D) Reduction of NADP+
- (1) A Calvin cycle
- (2) B Photolysis of water
- (3) C Cyclic photophosphorylation
- (4) D Reduction of NADP+

13. In a Mendelian cross between two heterozygous pea plants (Tt x Tt), where "T" is the dominant allele for tall plants and "t" is the recessive allele for short plants, what is the probability of obtaining a short plant?

- (1)0
- $(2) \frac{1}{4}$
- $(3)\frac{1}{2}$
- (4) 1

14. Which part of the human brain is responsible for regulating the body's balance and coordination?

- (1) Cerebrum
- (2) Cerebellum
- (3) Medulla Oblongata
- (4) Thalamus

15. Which of the following is true about transpiration in plants?

- (1) Transpiration helps in the absorption of minerals from the soil.
- (2) Transpiration cools the plant and helps in water regulation.
- (3) Transpiration decreases water absorption from the roots.
- (4) Transpiration occurs only through the roots of the plant.

16. Which hormone is primarily responsible for the development of secondary sexual characteristics in females?

- (1) Estrogen
- (2) Testosterone
- (3) Progesterone
- (4) Oxytocin