

FINAL JEE-MAIN EXAMINATION – FEBRUARY, 2021

(Held On Thursday 25th February, 2021) TIME : 3 : 00 PM to 6 : 00 PM

PHYSICS

TEST PAPER WITH ANSWER & SOLUTIONS

SECTION-A

1. For extrinsic semiconductors; when doping level is increased;

(1) Fermi-level of p-type semiconductor will go upward and Fermi-level of n-type semiconductors will go downward.

(2) Fermi-level of p-type semiconductors will go downward and Fermi-level of n-type semiconductor will go upward.

(3) Fermi-level of both p-type and n-type semiconductors will go upward for $T > T_F$ K and downward for $T < T_F$ K, where T_F is Fermi temperature.

(4) Fermi-level of p and n-type semiconductors will not be affected.

Official Ans. by NTA (2)

Sol. (2) conceptual

2. In a ferromagnetic material, below the curie temperature, a domain is defined as :

(1) a macroscopic region with zero magnetization.

(2) a macroscopic region with consecutive magnetic dipoles oriented in opposite direction.

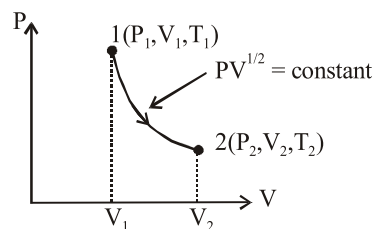
(3) a macroscopic region with randomly oriented magnetic dipoles.

(4) a macroscopic region with saturation magnetization.

Official Ans. by NTA (4)

Sol. (4) conceptual

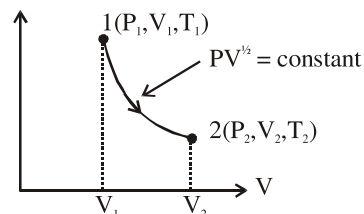
3. Thermodynamic process is shown below on a P-V diagram for one mole of an ideal gas. If $V_2 = 2V_1$ then the ratio of temperature T_2/T_1 is :



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

Official Ans. by NTA (3)

Sol.



$$PV^{1/2} = c$$

$$\frac{nRT}{V} V^{1/2} = c$$

$$T = c^1 V^{1/2}$$

$$\frac{T_2}{T_1} = \left(\frac{V_2}{V_1}\right)^{1/2} = \left(\frac{2V_1}{V_1}\right)^{1/2}$$

$$\frac{T_2}{T_1} = \sqrt{2}$$

4. A stone is dropped from the top of a building. When it crosses a point 5 m below the top, another stone starts to fall from a point 25 m below the top. Both stones reach the bottom of building simultaneously. The height of the building is :

- (1) 35 m (2) 45m (3) 50 m (4) 25m

Official Ans. by NTA (2)

