

Model Set (C)

Sub. Code:1021

NEB - GRADE XII
2080 (2023)
Physics

Candidates are requested to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Time: 3Hrs
marks:75

Full

Attempt all the questions

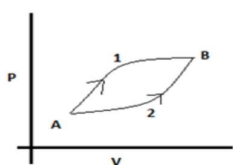
[GROUP A]

[11 × 1 = 11]

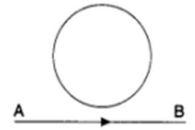
Rewrite the correct options for each question in your answer sheet.

- K_1 and K_2 are the radii of curvature of the uniform rod about the axes passing its center and one end respectively perpendicular to its length. The ratio of K_1 to K_2 is,
 - 1:1
 - 1:2
 - 2:1
 - $1:\sqrt{3}$
- The displacement of an object attached to a spring and executive simple harmonic motion is given by $x = 2 \times 10^{-2} \cos \pi t$ (in meter). The time at which the maximum speed first occurs is,
 - 0.5sec
 - 0.75sec
 - 0.12sec
 - 0.25sec
- Liquid does not wet the surface of solid, if the angle of contact (θ) is:
 - $\theta = 0^\circ$
 - $\theta > 90^\circ$
 - $\theta < 90^\circ$
 - $\theta = 45^\circ$
- A Carnot engine has the same efficiency between 800K to 500K and yK to 600K. The value of y is:
 - 472°C
 - 687°C
 - 846°C
 - 960°C
- What is the relation between the internal energy and heat supplied in processes 1 & 2 shown in the diagram? Both paths start at A and end at B.

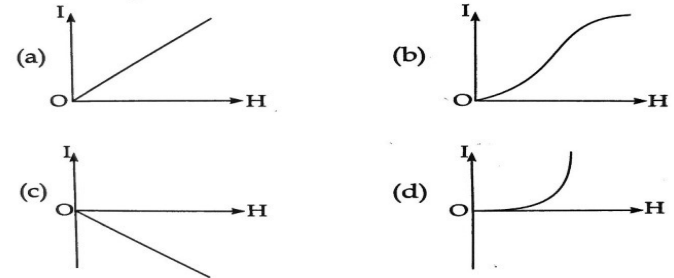
- $U_1 > U_2 ; Q_1 > Q_2$
 - $U_1 < U_2 ; Q_1 > Q_2$
 - $U_1 = U_2 ; Q_1 = Q_2$
 - $U_1 = U_2 ; Q_1 > Q_2$


- The velocity of sound in air is 330m/s. For particular sounds in air, a path difference of 40cm is equivalent to a phase difference of 1.6π . The frequency of the wave is:
 - 165Hz
 - 150Hz
 - 660Hz
 - 330Hz
- A source of sound and listener are moving along the same direction with the same velocity. If the actual frequency of the source is n, the frequency n' heard by the observer will be
 - $n = n'$
 - $n' > n$
 - $n' < n$
 - $n' \geq n$

- The current flows from A to B is increasing as shown in the figure. The direction of the induced current in the loop is
 - Clockwise
 - Anticlockwise
 - Changing
 - No induced emf produced



- Which of the following best represents the ferromagnetic substance?



- For a thermocouple, $\theta_c = 0^\circ C$ and $\theta_n = 275^\circ C$. If θ_c is changed to $20^\circ C$, then θ_n and θ_i will be respectively,
 - 265°C and 550°C
 - 275°C and 550°C
 - 265°C and 530°C
 - 275°C and 530°C
- Which of the following wave travels in solid rocks and liquids?
 - P wave
 - Gravitational wave
 - S wave
 - All of above

[GROUP B]

[8 × 5 = 40]

- In the absence of external torque, the angular momentum of the rotating body remains constant.
 - State and explain the principle of conservation of angular momentum. 1
 - What happens to the angular velocity of a ballet dancer as she stretches her hand from the folded position? 2
 - A ballet dancer spins about a vertical axis at 1rev/sec with her arm outstretched. With her arm folded, her moment of inertia about the vertical axis decreases by 60%. Calculate the new rate of revolution. 2
- A simple pendulum is allowed to swing in a vertical plane with a small amplitude. Write the expression for its time period. 1
 - Derive an expression of the total energy of a simple harmonic oscillator. 3
 - To double the total energy for a mass-spring system oscillating in SHM, by what factor must the amplitude increase? 1

'OR'