

## FINAL NATIONAL STANDARD EXAMINATION - 2019

(Held On Sunday 24<sup>th</sup> November, 2019)

### PHYSICS

### TEST PAPER WITH ANSWER

1. A pendulum is made by using a thread of length 300 cm and a small spherical bob of mass 100 g. It is suspended from a point S. The bob is pulled from its position of rest at O to the point A so that the linear amplitude is 25 cm. The angular amplitude in radian and the potential energy of the bob in joule at A are respectively

(a) 0.10 and 0.10      (b) 0.083 and 0.01      (c) 0.251 and 2.94      (d) 0.083 and 0.24

**Ans. (b)**

2. Consider the following physical expressions

(I)  $\rho v^2$  ( $\rho$  : density,  $v$  : velocity)

(II)  $\frac{Y\Delta L}{L}$  ( $Y$  : Young's modulus,  $L$  : length)

(III)  $\frac{\sigma^2}{\epsilon_0}$  ( $\sigma$  : surface density of charge)

(IV)  $h\rho r g$  ( $h$  : rise of a liquid in a capillary tube of radius  $r$ )

(a) I and II only      (b) II and III only      (c) II, III and IV only      (d) I, II and III only

**Ans. (d)**

3. Two simple pendulums of lengths 1.44 m and 1.0 m start swinging together in the same phase. The two will be in phase again after a time of

(a) 6 second      (b) 9 second      (c) 12 second      (d) 25 second

**Ans. (c)**

4. A home aquarium partly filled with water slides down an inclined plane of inclination angle  $\theta$  with respect to the horizontal. The surface of water in the aquarium

(a) remains horizontal

(b) remains parallel to the plane of the incline

(c) forms an angle  $\alpha$  with the horizon where  $0 < \alpha < \theta$

(d) forms an angle  $\alpha$  with the horizon, where  $\theta < \alpha < 90$

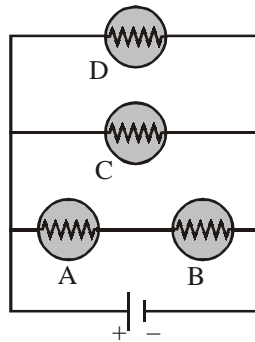
**Ans. (b or c)**

5. A sound source of constant frequency travels with a constant velocity past an observer. When it crosses the observer the sound frequency sensed by the observer changes from 449 Hz to 422 Hz. If the velocity of sound is 340 m/s, the velocity of the source of sound is

(a) 8.5 m/s      (b) 10.5 m/s      (c) 12.5 m/s      (d) 14.5 m/s

**Ans. (b)**

6. Identify the rank in order from the dimmest to the brightest when all the identical bulbs are connected in the circuit as shown below .



- (a)  $A = B > C = D$  (b)  $A = B = C = D$   
 (c)  $A > C > B > D$  (d)  $A = B < C = D$

Ans. (d)

7. The unit of magnetizing field is

- (a) tesla (b) newton  
 (c) ampere (d) ampere turn/meter

Ans. (d)

8. A star undergoes a supernova explosion. Just after the explosion, the material left behind forms a uniform sphere of radius 8000 km with a rotation period of 15 hours. This remaining material eventually collapses into a neutron star of radius 4 km with a period of rotation.

- (a) 14 s (b) 3.8 h  
 (c) 0.021 s (d) 0.0135 s

Ans. (d)

9. A number of identical absorbing plates are arranged in between a source of light and a photo cell. When there is no plate in between, the photo current is maximum. Under the circumstances let us focus on the two statements -

- (1) The photo current decreases with the increase in number of absorbing plates.**  
**(2) The stopping potential increases with the increase in number of absorbing plates.**

- (a) Statement (1) and (2) are both true and (1) is the cause of (2)  
 (b) Statement (1) and (2) are both true but (1) and (2) are independent  
 (c) Statement (1) is true while (2) is not true and (1) and (2) are independent  
 (d) Statement (1) is true while (2) is not true and (2) is the effect of (1)

Ans. (c)



























