

Cantonment Public School and College, Saidpur

Home Test Examination – 1/ 2020

Class: - XI (EV)

Subject: - Physics- 1st and 2nd paper (Creative)

Subject code:
174 and 175

Time - 2 hours 30 minutes

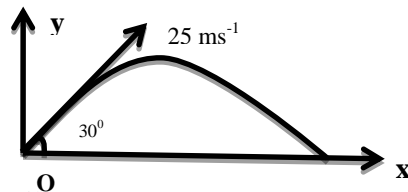
Full Marks - 30

[Note: The figures in the right margin indicate full marks. Read the stems carefully and answer the associated questions. Answer any five questions in total]

1. $\vec{P} = xz^2\hat{i} - 2x^3y\hat{j} + 3yz^3\hat{k}$ is a differentiable vector field. Rafi said that the divergence of the curl of the vector \vec{P} is zero.

- | | |
|--|---|
| a. What is called unit vector? | 1 |
| b. Why $\hat{i} \cdot \hat{j} = 0$? - Explain. | 2 |
| c. Find out the divergence of \vec{P} at point (1,2,-1). | 3 |
| d. Compare the truthiness of the opinion of Rafi mathematically. | 4 |

2.

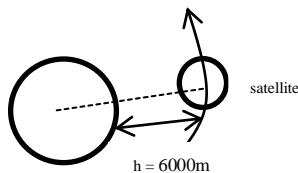


- | | |
|---|---|
| a. What is called projectile? | 1 |
| b. How the range of a projectile will be maximum? – Explain. | 2 |
| c. Find out the maximum height of the projectile. | 3 |
| d. Is it possible for the projectile to hit a wall of height 10m which is situated at the 20m distance? - Analyze mathematically. | 4 |

3. There is a well of depth 30m and radius of 2m. To make the well empty Roni used an engine of 7HP. This engine got damaged after making the well half empty. Roni made the well completely empty by using another engine in 10 min.

- | | |
|--|---|
| a. What is called conservative force? | 1 |
| b. Explain the work done by the gravitational force of the sun on the earth. | 2 |
| c. Find the work done by the first engine. | 3 |
| d. Whether the power of both engines will be same or not? - verify mathematically from the stem. | 4 |

4.



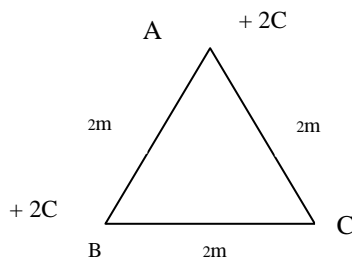
The mass and the radius of the Earth are respectively $M = 6 \times 10^{24} \text{ kg}$ and $R = 6.4 \times 10^6 \text{ m}$.

- | | |
|---|---|
| a. What is called escape velocity? | 1 |
| b. Narrate and explain Kepler's third law. | 2 |
| c. Find out the velocity of the artificial satellite. | 3 |
| d. The satellite will be a geostationary satellite or not? – Give your opinion with mathematical logic. | 4 |

5. A Carnot's engine receives 1200J of heat from a source at 167°C and rejects 900J of heat to the sink.

- a. What is called isothermal process? 1
- b. Explain the change of entropy in adiabatic process . 2
- c. Find out the temperature of the sink. 3
- d. How it possible to increase the efficiency of the engine?- Submit your opinion . 4

6.



- a. What is called electric dipole : 1
- b. What do you mean by the potential of a point is 10V?- Explain. 2
- c. Find out the Coulomb's force between the charges of point A and B. 3
- d. Considering the charge at point B, positive and negative, the equivalent electric intensity at point C will be same or not? - Analyze mathematically. 4

7. The focal length of the objective and the eye-piece of a telescope are respectively 100cm and 5cm.

- a. What is called prism? 1
- b. What do you mean by the minimum deviation of a prism is 36° ? – Explain. 2
- c. Find out the distance of the image of an object 120cm in front of the objective . 3
- d. The magnification of the telescope for near focusing and infinity focusing will be same or not?-Give your opinion analyzing mathematically. 4

8. The area of each plate of a parallel plate capacitor is 1.65m^2 and the distance between the two plates is 2cm. The potential difference between the two plates is 60V.

- a. What is charge density? 1
- b. What do you mean by the quantization of charge ?- Explain 2
- c. Find out the capacitance of the capacitor. 3
- d. If we intakes a medium of dielectric constant $K= 2.3$ between the two plates of the capacitor then the stored energy of the capacitor will change? - Analyze mathematically. 4

Cantonment Public School and College, Saidpur

Home Test Examination-1/2020

Class: -XI (EV)

Subject: - Physics 1st and 2nd papers (MCQ)

Subject code:

174 and 175

Time - 25 minutes

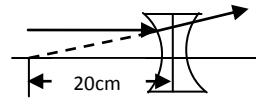
Full Marks - 25

[N.B. Answer all the questions. Each question carries one mark. Block fully, with a ball-point pen, the circle of the letter that stands for the correct /best answer in the 'Answer sheet' for Multiple Choice Questions Examination.]

1. For which value of the internal angle between two vectors, the value of their dot product will be zero?
 - a. 0° b. 30°
 - c. 90° d. 120°
2. To cross the river within short time what should be the angle between the boat and current?
 - a. 120° b. 45°
 - c. 90° d. 0°
3. Which is the equation of time of flight of a projectile?
 - a. $\frac{v_0 \sin \theta_0}{g}$ b. $\frac{v_0 \sin \theta_0}{2g}$
 - c. $\frac{2v_0 \sin \theta_0}{g}$ d. $\frac{v_0^2 \sin^2 \theta_0}{g}$
4. What is the angular velocity of the second's hand of a clock?
 - a. $\frac{2\pi}{3600} \text{ rads}^{-1}$ b. $\frac{\pi}{3600} \text{ rads}^{-1}$
 - c. $\frac{2\pi}{180} \text{ rads}^{-1}$ d. $\frac{\pi}{30} \text{ rads}^{-1}$
5. What will be the value of gravitational work for the rotation of the earth round the sun?
 - a. Infinity b. Zero
 - c. 360J d. $3.6 \times 10^6 \text{ J}$
6. Work done by any force is-
 - i. dot product of force and displacement
 - ii. product of mass and acceleration
 - iii. is equal to the change of kinetic energy
 Which one is correct?
 - a. i b. ii
 - c. iii d. i, ii and iii
7. Parking orbit is-
 - a. the path along which a plane travels
 - b. orbit of the moon
 - c. orbit of the earth
 - d. orbit of geostationary satellite
8. On the surface of the Mars $g = 3.8 \text{ ms}^{-2}$ and $R = 3 \times 10^6 \text{ m}$. What will be the escape velocity from the surface of the Mars?
 - a. 4 kms^{-1} b. 4.8 kms^{-1}
 - c. 7.8 kms^{-1} d. 11.2 kms^{-1}
9. At the minimum deviation position of a prism-
 - i. $i_1 = i_2$ ii. $r_1 = r_2$ iii. $\delta_m = 2(i_1 - r_1)$
 Which one is correct?
 - a. i, ii b. i, iii
 - c. ii, iii d. i, ii and iii

10. Which ray of light is called the mean ray?
 - a. Red b. Blue
 - c. Yellow d. Orange
11. If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ then $\vec{\nabla} \cdot \vec{r}$?
 - a. 1 b. 2
 - c. 3 d. 4
12. The equation of displacement of a moving object is $x = (4t^2 + 3t)m$. what will be the velocity after 2s?
 - a. 3 ms^{-1} b. 8 ms^{-1}
 - c. 11 ms^{-1} d. 19 ms^{-1}

13.



The power of the lens is-

- a. -2D b. +2D
 - c. -5D d. +5D
14. What is the value of escape velocity in the earth?
 - a. 11.2 ms^{-1} b. 120 ms^{-1}
 - c. 11.2 kms^{-1} d. 112 kms^{-1}
 15. Which one is correct for a capacitor?
 - a. $W = \frac{1}{2} \frac{Q}{C}$ b. $W = \frac{1}{2} CI^2$
 - c. $W = \frac{1}{2} VC^2$ d. $W = \frac{1}{2} CV^2$
 16. An apple in a tree is attracting the earth with force f. The earth is attracting the apple with force F. So-
 - a. $f = F$ b. $f > F$
 - c. $f < F$ d. $f = F^4$
 17. What is the time period of geostationary satellite?
 - a. 12h b. 24h
 - c. 1month d. 12month
 Working substance of a heat engine receives 1200 J of heat at 600 K temperature from the source and rejects 300J of heat in the cold container. Answer questions 18 and 19.
 18. What is the temperature of the cold container?
 - a. 150 K b. 300 K
 - c. 600 K d. 2400 K
 19. What is the efficiency of the engine?
 - a. 44% b. 50%
 - c. 60% d. 75%

a. $99^{\circ}F$
b. $98.4^{\circ}F$
c. $37^{\circ}C$
d. $37.4^{\circ}C$

- i) marked from 95°F to 110°F
- ii) Fahrenheit scale
- iii) Celsius scale

a. i
b. i and iii
c. ii and iii
d. i ,ii and iii

a. Jkg^{-1} b. JK^{-1}
c. $\text{Jkg}^{-1}\text{K}^{-2}$ d. No unit

a. $F\alpha \frac{q_1 q_2}{d}$
c. $F\alpha \frac{q_1 q_2}{d^2}$

b. $F\alpha \frac{d}{q_1 q_2}$
d. $F\alpha \frac{d^2}{q_1 q_2}$

a. 0.0063J b. Erect and larger
c. 0.0675J d. 67.5J

a. Erect and smaller b. Erect and larger
c. Inverted and larger d. Inverted and smaller