Code No. 1028
CLASS : 11th (Eleventh) Series : 11-M/2019
Roll No. □□□□□□□□□□□

भौतिक विज्ञान
PHYSICS
[ हिंदी एवं अंग्रेजी माध्यम ]
[ Hindi and English Medium ]
(Only for Fresh/School Candidates)

Time allowed : 3 hours ] [ Maximum Marks : 70

• कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित प्रश्न 16 तथा प्रश्न 21 है।

Please make sure that the printed pages in this question paper are 16 in number and it contains 21 questions.

• प्रश्न-पत्र में सबसे ऊपर दिखे गये कोड नंबर को छात्र उत्तर-पुस्तिका के मुख्य-पुष्ट पर लिखें।

The Code No. on the top of the question paper should be written by the candidate on the front page of the answer-book.
Before beginning to answer a question, its Serial Number must be written.

Don’t leave blank page/pages in your answer-book.

Except answer-book, no extra sheet will be given. Write to the point and do not strike the written answer.

Candidates must write their Roll Number on the question paper.

Before answering the question, ensure that you have been supplied the correct and complete question paper, no claim in this regard, will be entertained after examination.
General Instructions:

(i) All questions are compulsory.

(ii) There are 21 questions in all.

(iii) Question No. 1 is objective type questions. It consists of fourteen (i-xiv) questions of 1 mark each.
(iv) Question numbers 2 to 11 are Very Short Answer Type Questions and carry 2 marks each.

(v) Question numbers 12 to 18 are Short Answer Type Questions and carry 3 marks each.

(vi) Question numbers 19 to 21 are Long Answer Type Questions and carry 5 marks each.

(vii) There is no overall choice. However, internal choice is given in all three long answer type questions and carry 5 marks each. You have to attempt only one of the given choice is such questions.

(viii) Use of calculators is not permitted. If required, you may use logarithmic tables.

1. (i) एक किन्द्र पर दो बल प्रत्येक 5 न्यूटन के परस्पर 120° पर हैं। इन बलों के संगम योग का परिणाम है : 1

(a) शून्य (b) 5 न्यूटन
(c) $5\sqrt{3}$ न्यूटन (d) 10 न्यूटन

Two forces of 5 Newton each act at a point inclined at 120° with each other. The magnitude of vector addition of these forces is:

(a) Zero (b) 5 Newton
(c) $5\sqrt{3}$ Newton (d) 10 Newton
(ii) A force of 98 N is just able to move a block of mass 20 kg on a rough horizontal surface. Coefficient of friction is \( g = 9.8 \text{ m/sec}^2 \):

(a) .4  
(b) .5  
(c) .6  
(d) Zero

(iii) When the momentum of body is increased by three times, its K.E. becomes:

(a) Twice  
(b) Half  
(c) Four times  
(d) Nine times

(iv) S. I. प्रक्रिया में जड़ो-अंतर्गत का मात्रक है:

(a) किग्रा-मीटर  
(b) किग्रा-मीटर  
(c) किग्रा-मीटर  
(d) किग्रा-मीटर/सेक
Unit of Moment of Inertia in S. I. system is:
(a) kg/meter\(^2\)  (b) kg-meter\(^2\)
(c) kg-meter  (d) kg-meter/sec\(^2\)

The time of revolution around the earth of Communication Satellite INSAT-11B is:
(a) 12 hours  (b) 24 hours
(c) 48 hours  (d) 30 days

Work done by a person in lifting a bucket out of a well by means of a rope tied to the bucket is positive or negative?
The bob A of a pendulum released from 30° to the vertical hits another bob B of the same mass at rest on a table as shown in Fig. How high does the bob A rise after the collision? Neglect the size of the bobs and assume the collision to be elastic.
What is the mathematical form of Kepler's third law?

Write the value of orbital velocity of Satellite revolving near the surface of Earth.

The Young's modulus of steel is greater than that of rubber. Give reason.

When two sound sources are sounded together, then 2 beats are produced in .20 Second. Find the frequency of the beats.

How much will be the Kinetic Energy of a gas at the absolute zero?

What is the relation of internal energy of an ideal gas with gas temperature?
1. Is coefficient of performance of a refrigerator constant?

2. विभिन्न रीति से समीकरण $v = u + at$ का परीक्षण कीजिए।
   जहाँ $v = अंतिम वेग, u = आरंभिक वेग$
   $a = त्वरण, t = समय$
   Check the equation $v = u + at$ by the method of dimensions.
   where $v = फाइनल वेग, u = इनिशियल वेग$
   $a = आकारण, t = समय$

3. एक वस्तु एक निश्चित दिशा में एक निश्चित वेग से गतिशील है।
   इस गति का समय-वेग एवं समय-विस्थापन ग्राफ बनाए।
   An object is moving in a given direction with a definite velocity. Draw time-velocity and time-displacement graphs for the object.

4. क्रिकेटर का खिलाड़ी गेंद को लपकते समय अपने हाथ गेंद के साथ पीछे की ओर खींचता है। क्यों?
   A cricketer moves his hands backwards while holding a catch. Why?

5. कोई बलबाज किसी गेंद की आरंभिक चाल जो 12 मीटर/सेकंड है, मैने बिना परिवर्तन किए उस पर बल लगाकर सीधे गेंदबाज की दिशा में वापस भेज देता है। यदि गेंद की संहृति .15 kg है, तो गेंद को दिशा गया आवेग ज्ञात कीजिए।
   (गेंद की गति रेखिक मानिए)

P. T. O.
A batsman hits back a ball straight in the direction of the bowler without changing its initial speed of 12 ms\(^{-1}\). If the mass of the ball is .15 kg, determine the impulse imparted to the ball. (Assume linear motion of the ball.)

6. **Gurutvai sthitij urja ki paribhasha dijje.**
   Define Gravitational Potential Energy.

7. **Purdhi ki sathe se d gharai par purdhi ke gurutvai tvaran ke liye vyakj, purdhi par gurutvai tvaran thana purdhi ki trigya ke rup me prata kijje.**
   Obtain the expression for acceleration due to gravity at depth \(d\) below the Earth’s surface, in terms of acceleration due to gravity at Earth’s surface and the radius of Earth.

8. **Saral avartta gati ki samikaran \(y = 5 \sin 100\pi t\) se dole-\(\\text{aayam thana aarutil ke maan btaia}\. \text{yadhin vishayaan mitre mein thana samay sekund mein vyakt hain.}\)**
   Find out the amplitude and the frequency from the equation of SHM \(y = 5 \sin 100\pi t\). The displacement has been expressed in meters and the time in seconds.
9. Write two differences between Isothermal and Adiabatic process.


11. What do you understand by Capillarity? Write down the formula for the rise of water in a capillary tube.

12. In an experiment of simple pendulum, a student made several observations for the period of oscillations. His reading turned out to be: 2.63 sec, 2.56 sec, 2.42 sec, 2.71 sec and 2.80 sec. With the help of above observations calculate absolute errors and relative error.
13. What do you understand by Centripetal Force?
A particle of mass $m$ is moving in a circular orbit of radius $r$ with uniform speed $v$. Write the formula and direction of Centripetal Force acting on the particle.


15. 1 gram, 2 grams and 3 grams to the three of which this problem is set, 1 meter in a vacuum is the same to be set in a vacuum and the same to be set in a vacuum with the same weight of the center of gravity.

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What do you understand by Centripetal Force?
A particle of mass $m$ is moving in a circular orbit of radius $r$ with uniform speed $v$. Write the formula and direction of Centripetal Force acting on the particle.

Show that mechanical energy of a freely falling body justifies the Law of Conservation of Mechanical Energy.

1 gram, 2 grams and 3 grams to the three of which this problem is set, 1 meter in a vacuum is the same to be set in a vacuum and the same to be set in a vacuum with the same weight of the center of gravity.
Locate the centre of mass of a system of three particles of masses 1 gram, 2 gram and 3 gram placed at the corners of an equilateral triangle of 1 meter side.


17. State the Law of Equipartition of Energy. Prove that for an ideal gas \( r = 1 + \frac{2}{f} \), where \( f \) is the number of degree of freedom of gas molecules.
18. State the Law of Conservation of Angular Momentum. Explain it by giving any one example.

19. Obtain an expression for the time-period of a simple pendulum.

OR

What is meant by Stationary Wave? Prove that in an open organ pipe, both odd and even harmonics are produced.

20. Assume a wave motion $\alpha$ at a particular point. Assume an incident wave $u$ and the transmitted wave $v$. The relation between the waves is given by $v^2 = u^2 + 2\alpha S$. 

5
Define uniformly accelerated motion. A particle is moving with uniform acceleration $a$ in a straight path. Its initial velocity is $u$, displacement $S$ and final velocity $v$. Using calculus method show that:

$$v^2 = u^2 + 2aS$$

OR

A projectile is thrown at an angle $\theta$ from the horizontal with velocity $u$ under the gravitational field of Earth. Find expression for Time of flight and Horizontal Range.

State and prove Bernoulli’s Theorem.