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Half Yearly Examination – (2019-20)

Class: 11th
Subject : Physics

Full marks :80
Duration : 3 hrs

General Instructions:-

- All questions are compulsory.
- This question booklet contain 37 questions
- Read the questions carefully and write the answers in the answer sheets provided.
- Do not answer the questions randomly. Attempt all the questions of one section before moving on to another section.
- Do not write anything on the question paper.
- All question of Section –A carry 1 marks
- All question of Section – B carry 2 marks
- All questions of Section – C carry 3 marks
- All questions of Section –D carry 5 marks

Or

Calculate the angle between 20 N force and a 30 N force so that their resultant is 40 N.

18. The direction of the oblique projectile become horizontal at the maximum height . What is the cause of it?

Or

Find the angle between $\mathbf{A} = \hat{i} + \hat{j}$ and $\mathbf{B} = \hat{i} - \hat{j}$.

19. What is the dimension of time in power?

Or

Can a body move on a curved path without having acceleration?

20 Which of the following length measurement is most accurate and why ?

(i) 500.0 cm

(ii) 0.005 cm

(iii) 6.00 cm

SECTION –B

21 .What is the systematic error? How can it be removed?

22. Draw the velocity –time graph of a uniform motion of an object along a straight line. What do you study from this graph.

23. Calculate the centripetal acceleration of a point on equator of earth due to rotation of earth about its own axis. Radius of earth = 6400 km.

24. If position of a particle is described by $\mathbf{r} = (3t^3\hat{i} + 2t^2\hat{j} + 3t\hat{k})$, then find the velocity of particle at $t=4$ s.

25. A person travel along a straight road for the first half length with velocity v_1 and the second half length with velocity v_2 . What is the average velocity of person?

Or

Calculate the angular velocity of the minute's hand of a clock.

26. Rain is falling vertically with a speed of 35 ms^{-1} . Wind starts blowing after sometime with a speed of 12 ms^{-1} in East to West direction . In which direction should a boy waiting at bus stop hold his umbrella?

Or

A unit vector is represented by $a\hat{i} + b\hat{j} + c\hat{k}$. If the value of a and b are 0.6 and 0.8 respectively , find the value of c .

27. Find the value of 100 J on a system which has 20 cm, 250 g and half minute as fundamental unit of length , mass and time .

Or

If two forces 30 N and 40 N act on particle making an angle of 45° then find the resultant force acting on the body .

SECTION –C

28. An object is moving with a uniform acceleration. It's velocity after 4 s is 20 ms^{-1} and after 7 s is 29 ms^{-1} . Find the distance travelled by the object in 10^{th} second.

29. Explain the subtraction of two vector with illustration.

30. Show that there are two angle of projection for same maximum horizontal range.

31. Calculate the horizontal distance travelled by a ball thrown with the velocity $20\sqrt{2} \text{ ms}^{-1}$ without hitting the ceiling of an auditorium of height 20 m. Use $g = 10 \text{ ms}^{-2}$.

32. Explain angular acceleration. Establish its relation with linear acceleration.

Or

Write three limitations of dimensional analysis?

33. A man can swim at the rate of 5 kmh^{-1} in still water. A river 1 km wide flows at the rate of 3 kmh^{-1} . A swimmer wishes to cross the river straight.

(a) Along what direction must he strike?

(b) What should be his resultant velocity?

(c) How much time he would take to cross?

Or

What is projectile? Give its examples. Show that the path of projectile is a parabolic path when projected horizontally from a certain height.

34. Check the correctness of the relation, $S_{nth} = u + a/2 (2n - 1)$, where u is the initial velocity, a is acceleration and S_{nth} is the distance travelled by the body in n th second.

Or

The diagonals of a parallelogram are represented by $d_1 = 2\hat{i} + 3\hat{j} - 5\hat{k}$ and $d_2 = 6\hat{i} + 5\hat{j} - 5\hat{k}$. Find the area of the parallelogram.

SECTION-D

35. Deduce the equation of uniformly accelerated motion in one dimension by following calculus method.

36. Find (i) the time of flight (ii) maximum height (iii) horizontal range of a projection for angular projectile.

37. Explain the principle of homogeneity of dimensions. What are its uses? Illustrate giving one example of each.

Or

State triangle law of vector addition. Find analytically the magnitude and direction of resultant vector