FIRST YEAR HIGHER SECONDARY EXAMINATION

Part III

PHYSICS

Maximum: 60 Score

Answer any 5 questions from 1 to 7. Each carries 1 score	**[5 x 1 = 5]**

1	Number of significant figures in 0.050 is [4,2,3,1]
2	The slope of velocity time graph is……. (Displacement, acceleration,momentum,force)
3	At the highest point of motion of projectile the horizontal and vertical component of velocity (a)0,u*sin* θ (b)0,u*cos* θ ©u*sin* θ ,0 (d)u*cos* θ,0
4	What is the frequency of a wave having period 5 s. (a)0.5 Hz. (b) 0.1 Hz. ©0.2 Hz. (d)5Hz
5	A car is moving with a constant speed on a straight road.The net work done by external force on the car is (a) Positive (b) negative © zero
6	What is the value of acceleration due to gravity at the centre of earth (a)g. (b)0. © Infinity (d) not defined
7	Can a body move with velocity without any external force as per Newton's law on a horizontal surface

Answer any 5 questions from 7 to 14. Each carries 2 score [5 x 2 = 10]

8	If | **A**×**B** | = **A. B** what is the angle between **A** and **B**
9	Calculate the work done in lifting a body of mass 10 Kg to a height of 10m above the ground(g=10 m/s^2)
10	Obtain the relation connecting torque and angular acceleration.
11	a) What is meant by escape velocity? (1) b) Write the escape velocity of Earth. (1)
12	a) What is the relation between pressure and volume of a gas when temperature kept constant ? b) What happens to the gas if it is heated by keeping the pressure constant?
13	In railway tracks gaps are provided between the rails. Why?
14	Write any four postulates of kinetic theory of gases.

Answer any 6 questions from 15 to 21. Each carries 3 scores [6 x 3= 18]

15	Derive the expression for excess pressure inside spherical drop
16	a) State Newton's second law of motion(1) b) Prove law of conservation of linear momentum using this law.(2)
17	State and prove law of conservation of mechanical energy for a freely falling body
18	a) Draw the different modes of standing waves produced in an open pipe (1) b) Obtain the frequencies of harmonics possible in an open pipe(2)
19	a) Name and state the law relating stress and strain(1) b) A steel wire 1.00 m long with diameter 1 mm has a 10 kg mass hung from one end of it (i) what is the stress on the wire? (ii) Find the strain produced?
20	Draw velocity time graph for a uniformly accelerated motion. Derive relation between time and displacement of the body
21	a) Define moment of inertia of a body. What is radius of gyration? b) What are factors on which moment of inertia depends?

Answer any 3 questions from 22 to 25. Each carries 4 scores [3 x 4 = 12]

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Time in seconds	Displacement in metre
0	0
2	3
4	6
6	9
8	12
10	15

a) Draw position-time graph from the given data (2)
b) What is the distance travelled by the body in each interval ? (1)
c) Identify the name of this type of motion. (1)

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a) State homogeneity principle. (1)
b) Using this principle check the correctness of the equation mv^2=mas , where m is the mass of the body, v is the velocity, a is the acceleration and s is the displacement. (3)

24	The outer side of a circular track of radius 200 m is raised to make an angle of 15° with the horizontal. a) Which force provides the necessary centripetal force for a car taking a circular track (1) b) Name the process by which the outer side of the curved track is raised a little above the inner side (1) c) Using the data given determine the maximum permissible speed to avoid skidding. (2)
25	a) Derive an expression for period of oscillation of a spring. (2) b) Is there any change in the period of oscillation of a given spring and mass when amplitude is changed ? (1) c) What happens to the period when spring of greater spring constant is used? (1)

Answer any 3 questions from 26 to 29. Each carries 5 scores [3 x 5 = 15]

26	a) What is Projectile? (1) b) Which component of projectile motion has acceleration? (1) c) Derive expression for (i) Time of flight (ii) Maximum height of a projectile (3)
27	a) Write the expression for gravitational force of attraction on a body of mass m situated on the surface of earth using universal law of gravitation (1) b) What type of energy is associated with a mass located above the surface of earth? (1) c) Derive an expression for amount of work needed to bring the mass from infinity to a distance r from the centre of the earth. 2) d) What is the work done to bring a unit mass to the point? (1)
28	a) Is it possible to transfer heat from a body at lower temperature to a body at high temperature without the help of external work? (1) b) Name the law associated with the above statement. (1) c) Write the four processes involved in Carnot cycle? (2) d) What is the efficiency of a carnot engine? (1)
29	a) Differentiate between streamline flow and turbulent flow. (2) b) State and prove Bernouli's principle. (3)

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