



# 11 Physics

Name: \_\_\_\_\_

Roll #: \_\_\_\_\_

T2 chap4,5,6 23/04/2020

Time: 2h40m; Marks: 85

Wasim Tahir physics center

**Q1) Choose the most appropriate option. Cutting / overwriting is not allowed:**

17 Marks

- i) The maximum drag force on falling sphere is 9.8N, its weight is \_\_\_\_
  - A) 1N
  - B) 9.8N
  - C) 19.8N
  - D) 4.9N
- ii) International Telecommunication Satellite Organization operates at \_\_\_\_ microwave frequencies
  - A) 4, 6, 8, 10 Hz
  - B) 4, 6, 11, 14 GHz
  - C) 4, 6, 8, 12 Hz
  - D) 4, 8, 11, 16 GHz
- iii) The systolic pressure of a normal healthy person is:
  - A) 120 torr
  - B) 125 torr
  - C) 115 torr
  - D) 130 torr
- iv) A man of mass 5kg is falling freely, the force acting on it will be \_\_\_\_
  - A) 5N
  - B) 9.8N
  - C) 19.6N
  - D) zero
- v) Escape velocity of a body of mass 1000 kg is  $11 \text{ kms}^{-1}$ . If the mass of the body is doubled then its escape velocity will be
  - A)  $5.5 \text{ kms}^{-1}$
  - B)  $11 \text{ kms}^{-1}$
  - C)  $22 \text{ kms}^{-1}$
  - D)  $44 \text{ kms}^{-1}$
- vi) A stone is thrown up from the surface of earth when it reaches at maximum height. Its K.E. is equal to \_\_\_\_
  - A)  $mgh$
  - B)  $\frac{1}{2}mv^2$
  - C) zero
  - D)  $2mgh$
- vii) The device used for the measurement of liquid flow is \_\_\_\_
  - A) Manometer
  - B) Barometer
  - C) Hydrometer
  - D) Venturimeter
- viii) The apparent weight of a man in a lift moving down with an acceleration of  $9.8 \text{ m/s}^2$  is \_\_\_\_
  - A) 9.8N
  - B) 19.6N
  - C) Infinity
  - D) Zero
- ix)  $\text{kWm}^{-2}$  is the unit of \_\_\_\_
  - A) Power
  - B) Intensity
  - C) Energy
  - D) Energy per unit area
- x) Venturimeter is used to measure:
  - A) Speed of fluid
  - B) Pressure of fluid
  - C) Volume of fluid
  - D) Mass of fluid
- xi) The S.I. units of angular momentum is \_\_\_\_
  - A)  $\text{J.S}^{-2}$
  - B)  $\text{J.S}^{-1}$
  - C) J.S.
  - D) J.m
- xii) The dimensions of angular velocity are \_\_\_\_
  - A)  $[\text{LT}^{-1}]$
  - B)  $[\text{LT}^{-2}]$
  - C)  $[\text{L}^{-1}\text{T}]$
  - D)  $[\text{T}^{-1}]$
- xiii) If a car moves with a uniform speed of 2m/sec, in a circle of radius 0.4m its angular speed is \_\_\_\_
  - A) 4 rad / sec
  - B) 5 rad / sec
  - C) 1.6 rad / sec
  - D) 2.8 rad / sec
- xiv) Original source of energy for biomass is \_\_\_\_
  - A) Earth
  - B) Moon
  - C) Sun
  - D) Star
- xv) An orbital speed of a satellite can be determined by the equation:
  - A)  $\sqrt{2gR}$
  - B)  $\sqrt{\frac{2GM}{R}}$
  - C)  $\sqrt{gR}$
  - D)  $\sqrt{\frac{GM}{R}}$
- xvi) Power can be defined as the product of \_\_\_\_
  - A) force and displacement
  - B) force and velocity
  - C) force and time
  - D) force and mass
- xvii) The apparent weight of a man in an ascending lift moving with acceleration "a" is \_\_\_\_
  - A) Increases
  - B) decreases
  - C) Remains constant
  - D) becomes zero

**Q2) Write short ans of the following:**

44 Marks

- i) What is geothermal energy? How is it generated?
- ii) How can you get energy from tides?
- iii) Calculate the work done in kilo joules in lifting the mass of 10kg (at a steady velocity) through a vertical height of 10m.

- iv) A person holds a bag of groceries while standing still. A car is stationary with its engine running. How are the two situations similar from the point of view of work?
- v) A boy uses catapult to throw a stone which accidentally smashes a green house window. What energy changes are involved?
- vi) Define power. Write its S.I. unit.
- vii) In which case is more work done? When a 50 kg bag of books is lifted through 50 cm, or when a 50 kg crate is pushed through 2m across the floor with a force of 50 N?
- viii) Define conservative and non-conservative forces.
- ix) Why does a diver change his body positions before and after diving in the pool? Write applications of communication satellites.
- x) Define angular momentum and give its dimensions.
- xi) A disc and a hoop start moving down from the top of an inclined plane at the same time. Which one will be moving faster on reaching the bottom?
- xii) An object orbiting around the earth is said to be a freely falling body. Why?
- xiii) What is meant by angular momentum?
- xiv) What is meant by moment of inertia? Explain its significance.
- xv) What is geo-stationary satellite?
- xvi) State the direction of the following vectors in simple situations, angular momentum and angular velocity
- xvii) Considering Bernoulli's principle, explain working of a carburetor of a motor car.
- xviii) Explain the difference between laminar flow and turbulent flow.
- xix) Explain briefly how the swing is produced in a fast moving cricket ball with figure.
- xx) Write few lines on blood flow.
- xxi) Explain what do you understand from the term viscosity. Give its S.I. Unit.
- xxii) A person is standing near a fast moving train. Is there any danger that he will fall towards it?

**Give explanatory answer of the following:**

24 Marks

- 3A) Two blocks of masses 2kg and 0.5kg are attached at two ends of a compressed spring. The elastic potential energy stored in the string is 10J. Find the velocities of the blocks if the spring delivers its energy to the blocks when released.
- 3B) A 1000 kg car at the top of an incline 10m and 100m long is released and rolls down the hill. What is its speed at the bottom of the incline if the average retarding force due to friction is 480N?
- 4A) What are geostationary satellites? Derive the relation for radius of geostationary orbit.
- 4B) A body of moment of inertia ( $I = 0.80 \text{ kgm}^2$ ) about a fixed axis rotates with constant angular velocity of  $100 \text{ rad s}^{-1}$ . Calculate its angular momentum "L" and torque to sustain its motion.
- 5A) Certain globular protein particle has a density of  $1246 \text{ kgm}^{-3}$ . It falls through pure water ( $\eta = 8.0 \times 10^{-4} \text{ Nms}^{-2}$ ) with a terminal speed of  $3.0 \text{ cmh}^{-1}$ . Find radius of particle.
- 5B) Water flows through a hose whose internal diameter is 1cm, at a speed  $1 \text{ ms}^{-1}$ . What should be the diameter of the nozzle of the water is to emerge at  $21 \text{ ms}^{-1}$ ?

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