



# I PUC ANNUAL EXAMINATION - 2016

**I**

Time : 3.15 Hours

PHYSICS - 33

Max. Marks : 70

**General Instructions:**

- 01) All the parts are compulsory.
- 02) Draw relevant diagram / figure wherever necessary.
- 03) Numerical problems should be solved with relevant formulae.

**PART - A****I Answer ALL the following questions****10×1=10**

- 1) Write the dimensional formula for momentum.
- 2) Define Projectile.
- 3) Define Power.
- 4) Is moment of inertia, a scalar or a Vector Quantity?
- 5) What is deforming force?
- 6) On what principle does the Venturimeter work?
- 7) Mention the S-I unit of pressure.
- 8) What is regelation?
- 9) State first law of thermodynamics.
- 10) How many degrees of freedom does a monoatomic gas molecule have?

**PART - B****II Answer any FIVE of the following questions.****5×2 = 10**

- 11) Mention any two concepts unified by Einstein.
- 12) Give two limitations of dimensional analysis.
- 13) Distinguish between average velocity and instantaneous velocity.
- 14) A player throws a ball upwards with an initial speed of 29.4 m/s. What is the direction of acceleration during upward motion? Find the velocity at highest point of the motion.
- 15) Define impulse of a force with an example.
- 16) Mention the general conditions for equilibrium of a rigid body.
- 17) Write stoke's law and express the symbols.
- 18) Define periodic motion with an example.

**PART - C****III Answer any FIVE of the following questions.****5×3=15**

- 19) Obtain an expression for maximum height using projectile.
- 20) State Newton's laws of motion.
- 21) Prove that change in Kinetic energy of a particle is equal to the work done by a variable force.
- 22) Mention equations for Kinematics of rotational motion about a fixed axis.
- 23) State Keplers laws of motion.
- 24) Draw a typical stress - strain graph and give its important features.
- 25) State and explain the law of equipartition of energy.
- 26) Explain the different modes of transmission of heat.

(P.T.O.)

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**PART - D**

**IV Answer any TWO of the following questions.**

**2×5=10**

- 27) What is Velocity - time graph? Derive an equation  $x = V_0 t + \frac{1}{2} a^2$  using velocity - time graph.
- 28) State and prove the law of conservation of linear momentum.
- 29) Distinguish between linear motion and rotational motion.

**V Answer any TWO of the following questions.**

**2×5=10**

- 30) What is Carnot's engine? Explain the different parts of the engine.
- 31) Define simple harmonic motion? Obtain an expression for acceleration using simple harmonic motion.
- 32) Explain the modes of Vibration in an open pipe.

**VI Answer any THREE of the following questions.**

**3×5=15**

- 33) The position of a particle  $r = 3t\hat{i} - 2t^2\hat{j} + 4\hat{k}$  m where t is in second and r in metre.
- a) Find velocity and acceleration of the particle.
- b) What is the magnitude of velocity and acceleration at t= 2 seconds and t=4 seconds.
- 34) From what height should a body of mass 40 kg fall in order to have same kinetic energy as a body of mass 1.96 kg travelling at 12 m/s ?
- 35) Calculate acceleration due to gravity
- a) at a height 20 km above the surface of earth.
- b) at a depth 16.6 km below the earths surface. if radius of earth is 6400 km and acceleration due to gravity on earth is 10 m/s<sup>2</sup>.
- 36) A slab of stone of area 0.36 sqm and thickness 0.1m is exposed at the lower surface to steam at 100°C. A block of ice at 0°C rests on the upper surface of the slab. In one hour, if 4.8 kg of ice is melted. Calculate the thermal conductivity of stone. If Latent heat of ice is  $3.36 \times 10^5$  J/Kg.
- 37) A train blows a whistle of frequency 400 Hz in air.
- (1) what is the frequency of the whistle for platform observer when
- a) train approaches with a speed of 10 m/s.
- b) recedes with a speed 10 m/s.
- (2) What is the speed of sound in each case if velocity of sound is 340 m/s?