6053
BOARD DIPLOMA EXAMINATION
JUNE - 2019
DIPLOMA IN MECHANICAL ENGINEERING
ENGINEERING PHYSICS
FIRST YEAR EXAMINATION

Time: 3 Hours **Total Marks: 80**

PART - A (3m x 10 = 30m)

Note 1:Answer all questions and each question carries 3 marks

2:Answers should be brief and straight to the point and shall not exceed 5 simple sentences

1. **Write any three advantages of S.I unit system**
2. A body is thrown with some velocity at an angle of 30° with the horizontal. If its horizontal component is 100 m/s what is the actual velocity and its vertical component
3. **Write equations of motion of a body moving with uniform acceleration**
4. A particle executing SHM has a time period $\frac{\pi}{6}$ second and amplitude 4 cm. Find the maximum velocity
5. State the Charles' law at constant volume and write an equation
6. **Write any three acoustic conditions of a Good auditorium.**
7. Give any three examples of surface tension
8. Define stress and strain. How they are related to each other?
9. Define uniform magnetic field and non-uniform magnetic field
10. Explain the phenomenon total internal reflection with a neat diagram

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PART - B (10m x 5 = 50m)

Note 1:Answer any five questions and each carries 10 marks

2:The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

11. **a) Define scalar product. Write any four properties of scalar product.** **6M**

    b) Two forces 30N and 40N act at a point simultanceosly at right angles to each other. Find the magnitude and direction of the resultant. **4M**

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12. a) Define the terms time of flight, maximum height reached and range of a projectile. 6M
    b) Two similar stones are projected from the same point with same velocities at angles 30° and 60°. Which stone will have more horizontal range? Explain 4M

13. a) Define angle of friction and angle of repose. 4M
    b) Derive expression for acceleration of a body moving downwards on a rough inclined plane 6M

14. a) Define work, power and energy. Derive the relation between kinetic energy and momentum. 6M
    b) A pump can hoist 7200 kg of coal per hour from a mine of 90 m deep. Find the power, if its efficiency is75%. 4M

15. a. Derive an expression for velocity of a particle executing SHM. At which position, the velocity is maximum? 6M
    b. The displacement of a particle in SHM is given by $y = 5 \sin(\frac{\pi}{2}t + \pi/6)$. Find its initial displacement and its displacement when $t = 1$ s. 4M

16. a) Derive a relationship between C_p and C_v. 6M
    b) A gas at a pressure of 250 N m^{-2} is compressed to half of its original volume. Calculate the final pressure, if the compression is adiabatic ($\gamma = 1.4$) 4M

17. a) Write any four differences between musical sound and noise 4M
    b) What is Doppler effect and write any three applications of it. 6M

18. a) Define magnetic induction field strength write its unit. 3M
    b) Derive an expression for the magnetic induction field strength at a point on the equatorial line of a short bar magnet 7M

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