6053

BOARD DIPLOMA EXAMINATION
MARCH/APRIL - 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. Identify the physical quantities with the dimensional formula
   a. M^0LT^{-1} b. ML^2T^{-3} c. MLT^{-2}
2. A force of 50 N is acting at an angle of 30° with horizontal. Find its horizontal and vertical components
3. Define acceleration due to gravity. What is the average value of acceleration due to gravity on the surface of the earth?
4. Write any three conditions of a body to be in SHM
5. The volume of a gas at 27 °C is 40 cc. Pressure remaining constant, find the temperature at which its volume becomes 80 CC
6. Define reverberation and reverberation time
7. Define strain and name different types of strain?
8. Define capillarity. Give one example
9. Write the formula for magnetic moment of a magnet. State its SI unit
10. Write the Einstein's photo electric equation and write the names of terms involved in the equation

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. State the parallelogram law of addition of vectors and illustrate parallelogram law in case of flying bird 6M

b. Two forces equal in magnitude are acting at right angle. The magnitude of their resultant is 1414 N. Find the magnitude of each force 4M

12. a) Derive expression for time of ascent and horizontal range of a projectile in oblique projection. **7M**

b) A foot ball is projected with a velocity of 29.4 m/s at an angle of 30° with the horizontal. Find its horizontal range **3M**

13. a) Derive the expression for the acceleration of a body moving upwards on a rough inclined surface. **6M**

b) Write any four methods of reducing friction **4M**

14. a) Prove law of conservation of energy in case of a freely falling body. **6M**

b) An engine is used to lift water from a well 100 m deep to fill a tank 2 m x 3 m x 4 m in 10 minutes. Find the power of engine. **4M**

15. a) Derive the expression for velocity of a particle executing SHM. **5M**

b) The displacement of a particle in SHM is given by $y = 5 \sin(\pi t + \pi/6)$. 5M
Find its maximum acceleration and initial displacement

16. a) Show that $C_p - C_v = R$. **7M**

b) An amount of heat energy supplied to a system is 600 J so that its internal energy increases by 100 J. Find the work done on the system **3M**

17. a) Distinguish between echo and reverberation 5M

b) Write any five acoustic conditions of good auditorium 5M

18. a) State and explain Coulomb's inverse square law of magnetism. **3M**

b) Derive an expression for the magnetic induction field strength at a point on the axial line of a bar magnet **7M**

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