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BIS-002

DIPLOMA IN MANAGEMENT IN INDUSTRIAL SAFETY, HEALTH AND ENVIRONMENT DM(ISHE)

00864

Term-End Examination

June, 2011

BIS-002 : BASIC MECHANICAL ENGINEERING

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Question no. 1 and 2 are **compulsory.***

*(ii) Attempt **five** question in **all.***

*(iii) **All** questions carry **equal** marks.*

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1. Choose the correct answer from the given four alternatives. **14x1=14**

(a) A man weighing 60 kg stands in an elevator. The force exerted by him on the floor of the elevator will be zero when

(i) The elevator goes up at a uniform speed.

(ii) It goes down at a uniform speed.

(iii) The cable of the elevator breaks and it falls freely.

(iv) The elevator goes up at an elevator of 9.8 m/s^2.

(b) Main fuel used in a thermal power plant is :

(i) coal (ii) uranium

(iii) diesel (iv) biomass

(c) The passage way of molten metal into the mould cavity is known as :

(i) Piping system

(ii) Entry system

(iii) Gating system

(iv) Delivery system

(d) Joule is the unit of :

(i) Power (ii) Moment

(iii) Momentum (iv) Work

(e) The dimension of pressure in MLT system is :

(i) $\left[ML^{-1}T^{-1}\right]$ (ii) $\left[ML^{-1}T^{2}\right]$

(iii) $\left[ML^{-1}T^{-2}\right]$ (iv) $\left[ML^{2}T^{2}\right]$

(f) Force can be characterized by :

(i) point of application

(ii) magnitude, direction

(iii) direction

(iv) point of application, magnitude and direction

(g) The resultant of two forces can be defined as a force that :

(i) keeps the system in equilibrium.

(ii) has the greatest magnitude in the system.

(iii) has the same effect as the two forces.

(iv) has the same effect as one force.

(h) The angles between two forces to make their resultant a minimum and a maximum respectively are :

(i) 0° and 90° (ii) 180° and 90°

(iii) 90° and 180° (iv) 180° and 0°

(i) A piece of paper and an iron piece are dropped simultaneously from the same point. They will reach ground simultaneously, if they :

(i) have the same weight

(ii) fall very far

(iii) have the same density

(iv) are in vacuum

(j) The unit of impulse are the same as those of :

(i) energy (ii) momentum

(iii) power (iv) velocity

(k) A bomb of 12 kg explodes into two pieces of masses 4 kg and 8 kg. The velocity of 8 kg mass is 6 ms^{-1}. The kinetic energy of the other mass is :

(i) 48 J (ii) 32 J

(iii) 24 J (iv) 288 J

(l) The moment of inertia comes into play :

(i) in motion along a curved path

(ii) in linear motion

(iii) in rotational motion

(iv) none of the above

(m) The distance travelled by a freely falling body is proportional to the :

(i) mass of the body

(ii) time of fall

(iii) square of the time of fall

(iv) mass and time of fall

(n) Submarine is based on :

(i) Pascal's law

(ii) Archemedes principle

(iii) Bernouill's principle

(iv) None of the above

2. Fill in the blanks : **14x1=14**

(a) The normal temperature of a human body is _____ °F.

(b) The temperature of a gas is increased by 15°C. The corresponding change on Kelvin Scale is _____.

(c) The property of a body that opposes its deformation is known as _____.

(d) The volume of one mole of a gas occupied at NTP is _____.

(e) The work done by a weight - lifter in holding a weight of 100 kg on his shoulders for 40 sec is equal to _____.

(f) The SI unit of Power is _____.

(g) To every action, there is equal and opposite _____.

(h) If the mass of 2 m^3 of oil is 1600 kg, then its density is _____.

(i) Absolute pressure is _____ of atmospheric pressure and gauge pressure.

(j) Water is falling on the blades of turbine at a rate of 6000 kg min^{-1}. The height of fall is 100 m. The power given to the turbine is _____ kW.

(k) A particle of mass m has momentum p. Its kinetic energy (in terms of p and m) will be _____.

(l) The moment of momentum is called as _____.

(m) The weight of a body at the centre of the earth is _____.

(n) Two wires of the same material have lengths in the ratio 1 : 2 and radii in the ratio of 2 : 1. When they are stretched by the same force, elongation produced in them are in the ratio of _____.

3. What is corrosion ? Explain the factors responsible for corrosion. How it can be prevented ? 14

4. Explain the role of lubricants and describe the various types of lubricants used in the industries. 14

5. Explain in detail the manufacturing process of Portland Cement. 14

6. Differentiate between Laminar and Turbulent flow. Give suitable examples. 14

7. State the law of conservation of mass, and conservation of energy. 14

8. Define the following (***any seven***) : 7x2=14

(a) Absorptivity
(b) Reflectivity
(c) Transmissivity
(d) Thermal expansion
(e) Lami's theorem
(f) Newton's first law
(g) Angle of repose
(h) Scalar and vector quantity
(i) Spring constant
(j) Geostationary satellite