

Enrollment No.....



Faculty of Engineering
End Sem (Odd) Examination Dec-2017
EN2BS03 Physics-I

Programme: Diploma

Branch/Specialisation: All

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1
- i. Which of the following is not a dimensional constant? 1
(a) G (b) π (c) h (d) R
 - ii. The process of measurement is basically 1
(a) The process of comparison (b) A process of estimation
(c) A process of ease (d) None of these
 - iii. Why do blades of an fan continue to rotate for some time, after 1
the current is switched off
(a) Inertia of motion (b) Inertia of rest
(c) Friction (d) Momentum
 - iv. Newton's first law defines: 1
(a) Force (b) Inertia only
(c) Both force and inertia (d) None of these
 - v. Stress is defined as 1
(a) Force/area
(b) Force/volume
(c) Change in length/original length
(d) Force/length
 - vi. The phenomenon of rise or fall of a liquid in a capillary tube is 1
(a) Viscosity (b) Surface tension
(c) Elasticity (d) Capillarity
 - vii. The force between two similar charges 1
(a) attractive (b) repulsive (c) zero (d) infinite

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- viii. The value of elementary charge **1**
(a) $1.6 \times 10^{-19} \text{ C}$ (b) $1.6 \times 10^{-11} \text{ C}$
(c) $1.0 \times 10^{-19} \text{ C}$ (d) $1.6 \times 10^{-29} \text{ C}$
- ix. Two blankets are warmer than one single thick blanket because **1**
(a) Air is bad conductor of heat
(b) Air is good conductor of heat
(c) Air is transparent
(d) None of these
- x. Why mercury is used in thermometer **1**
(a) It is transparent
(b) Good conductor of heat
(c) Non-uniform thermal expansion
(d) Specific heat is high
- Q.2 i. Why is length, mass and time chosen as fundamental quantities in mechanics? **2**
ii. What are the advantages of SI unit system? **3**
iii. Check the correctness of the relation $t = 2\pi\sqrt{l/g}$, where l is length and t is time period of a simple pendulum; g is acceleration due to gravity. **5**
- OR iv. What do you mean by dimension? Give the uses of dimensional equations. Write the dimension of following physical quantities: **5**
a) Velocity b) Force c) Pressure d) Work
- Q.3 i. State and explain Newton's second law of motion. **4**
ii. What do you mean by moment of inertia and radius of gyration? Derive the expression for radius of gyration. **6**
- OR iii. Define the following term: **6**
(a) Inertia (b) Linear Momentum
- Q.4 i. What is the difference between cohesive and adhesive force? **2**
ii. Define surface tension with its unit and dimensions. **3**
iii. What is elasticity? Explain Hooke's Law. **5**
- OR iv. What is critical velocity? Give the difference between stream line and turbulent flow? **5**

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- Q.5 i. What is electric field? **2**
ii. What is Coulomb's Law? Give its important properties. What do you mean by quantization of charge? **8**
- OR iii. What is electric potential? Find the expression of potential due to a point charge. **8**
- Q.6 i. Explain the various modes of heat transmission. **4**
ii. State Newton's Law of cooling. Show that it can be derived from Stefan's law. **6**
- OR iii. On what factors does the conduction of heat in a solid depend? Define coefficient of thermal conductivity. **6**

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Marking Scheme

Q.1	i.	(b) π	1		iii.	Elasticity Phenomenon	1
	ii.	(a) the process of comparison	1			Explain Hooke's Law.	4
	iii.	(a) inertia of motion	1	OR	iv.	Critical velocity	2
	iv.	(c) both force and inertia	1			Difference between stream line and turbulent flow (3 diff)	3
	v.	(a) force/area	1	Q.5	i.	Definition of Electric field	2
	vi.	(d) Capillarity	1		ii.	Coulomb's Law	3
	vii.	(b) repulsive	1			Important properties	3
	viii.	(a) $1.6 \times 10^{-19} \text{ C}$	1			Quantization of charge	2
	ix.	(a) air is bad conductor of heat	1	OR	iii.	Electric potential with unit	3
	x.	(b) good conductor of heat	1			Expression of potential due to a point charge.	5
Q.2	i.	Length, mass and time not converted to each other. These are the basic units	2	Q.6	i.	3 modes of heat transmission Conduction, Convention and radiation	1
	ii.	1 marks for 1 advantage (1 * 3 = 3 marks)	3			Small Explanation of each	3
	iii.	From dimension of homogeneity Dim LHS =Dim RHS	1		ii.	Newton's Law of cooling	2
		For Dim LHS	2			Derivation from Stefan's law.	4
		For Dim RHS	2		iii.	Conduction of heat in a solid depend :	3
OR	iv.	Definition of dimension	1			proportional to area of cross section, proportional to diff of temp, inversely proportional to distance between plates	
		Uses of dimensional equations	2			Coefficient of thermal conductivity and formula	3
		a) Velocity LT^{-1} b) Force M LT^{-2} c) Pressure $\text{M L}^{-1}\text{T}^{-2}$ d) Work $\text{M L}^2\text{T}^{-2}$	2				
Q.3	i.	Statement	2				
		Explanation of Newton's second law of motion.	2				
	ii.	Moment of inertia and radius of gyration?	3				
		Derivation of the expression for radius of gyration.	3				
OR	iii.	Define the following term:	3 marks				
		(a) Inertia (b) Linear Momentum	each				
Q.4	i.	Cohesive: Force between similar molecules and adhesive force between dissimilar molecules	2				
	ii.	Define surface tension	1				
		Unit	1				
		Dimensions.	1				