

**DIPLOMA IN CIVIL ENGINEERING (DCLE(G)) /  
DIPLOMA IN MECHANICAL ENGINEERING  
(DME) / DCLEVI / DMEVI / DELVI / DECVI /  
DCSVI / ACCLEVI / ACMEVI / ACELVI /  
ACECVI / ACCSVI**

00263

**Term-End Examination**

**June, 2018**

**BET-012 : PHYSICS**

*Time : 2 hours*

*Maximum Marks : 70*

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**Note :** *Question no. 1 is compulsory. Attempt any four questions from questions no. 2 to 8. Use of scientific calculator is permitted.*

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1. Choose the correct answer from the given four alternatives.  $7 \times 2 = 14$

(a) The resistances of a conductor are  $2 \Omega$ ,  $3 \Omega$  and  $5 \Omega$ . These resistors are connected in parallel. The equivalent resistance of parallel combination is

(i)  $\frac{31}{30} \Omega$

(ii)  $\frac{30}{31} \Omega$

(iii)  $10 \Omega$

(iv)  $30 \Omega$

- (b) A block of wood floats in water with a fraction of its volume outside water. The upthrust on the block is
- (i) equal to the weight of the block
  - (ii) less than the weight of the block
  - (iii) more than the weight of the block
  - (iv) determined by the fraction of the volume inside water
- (c) Atmospheric pressure is measured by
- (i) Hydrometer
  - (ii) Thermometer
  - (iii) Calorimeter
  - (iv) Barometer
- (d) Sudden fall of atmospheric pressure by a large amount indicates
- (i) storm
  - (ii) rain
  - (iii) fair weather
  - (iv) cold wave
- (e) Two wires of the same material have lengths in the ratio 1 : 2 and radii in the ratio 2 : 1. When they are stretched by the same force, elongations produced in them are in the ratio
- (i) 1 : 8
  - (ii) 1 : 4
  - (iii) 1 : 2
  - (iv) 1 : 1

- (f) The S.I. unit of resistivity is
- (i) ohm  $m^{-1}$
  - (ii) ohm $^{-1} m^{-1}$
  - (iii) ohm – m
  - (iv) ohm $^{-1} m$
- (g) The light through an optical fibre suffers a series of
- (i) reflections
  - (ii) refractions
  - (iii) total internal reflections
  - (iv) dispersion
2. (a) Write the relation for temperature between Celsius scale and Fahrenheit scale. At what temperature is the numerical value same on both the Celsius and Fahrenheit scales? 4
- (b) Define intensity of sound. What is its SI unit? 4
- (c) Derive Newton's formula for speed of sound. How was it corrected by Laplace? 6
3. (a) A sound of wavelength 16.5 m has a frequency of 20 Hz. Calculate the velocity of sound in air. 6
- (b) State laws of refraction. 4

(c) Two thin lenses are in contact and the focal length of the combination is 100 cm. If the focal length of one lens is 20 cm, calculate the power of the other lens. Which type of lens is it ?

4

4. (a) State Faraday's laws of electrolysis.

6

(b) State Biot-Savart's law.

4

(c) What is a galvanometer ? How can a galvanometer be converted into a voltmeter ?

4

5. (a) What is a Cyclotron ? Show that the maximum kinetic energy of the ion in the circular path is given by

$$E_{\max} = \frac{1}{2} \frac{B^2 q^2 r^2}{m}$$

where symbols have their usual meanings.

7

(b) How many ice cubes (at 0°C) must be added to a bowl containing a litre of boiling water at 100°C, so that the resulting mixture reaches a temperature of 40°C ? Assume that each ice cube has a mass of 20 g and that the bowl and the environment do not exchange heat with the water.

7

6. (a) Define the molar heat capacity of a substance. Also differentiate between specific heat at constant pressure and volume.

6

- (b) Explain how sound travels through a medium. 4
- (c) An ocean wave has a wavelength of 120 m and a period of 8.77 sec. Calculate the frequency and speed of the wave. 4
7. (a) An object of size 3.0 cm is placed at a distance of 14 cm in front of a concave lens of focal length 28 cm. Calculate the distance of the image formed. What type of image will it be? 7
- (b) What is a "Mirage" and why does it occur? Explain in detail with the help of a neat diagram. 7
8. Write short notes on any *four* of the following :  $4 \times 3 \frac{1}{2} = 14$
- (a) Venturimeter
- (b) Luminous Intensity
- (c) Specific Heat Capacity
- (d) Compound Microscope
- (e) Bernoulli's Equation
- (f) Joule's Experiment for Mechanical Equivalent of Heat
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