

**DIPLOMA IN CIVIL ENGINEERING (DCLE(G)) /
DIPLOMA IN ELECTRICAL AND MECHANICAL
ENGINEERING (DEME)**

**DCLEVI / DMEVI / DELVI / DECVI / DCSVI /
ACCLEVI / ACMEVI / ACELVI / ACECVI / ACCSVI**

Term-End Examination

June, 2014

01340

BET-012 : PHYSICS

Time : 2 hours

Maximum Marks : 70

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

1. (a) The unit of pressure is 7×2=14
- (i) $\text{kg m}^{-1} \text{s}^{-1}$
 - (ii) $\text{kg m}^{-2} \text{s}^{-1}$
 - (iii) $\text{kg m}^{-1} \text{s}^{-2}$
 - (iv) $\text{kg m}^{-2} \text{s}^{-2}$
- (b) The process through which heat is transferred from one body to another through a connecting medium is known as
- (i) conduction
 - (ii) convection
 - (iii) radiation
 - (iv) None of these

- (c) The audible range of sound is
- (i) 10 Hz – 100 Hz
 - (ii) 10 Hz – 1000 Hz
 - (iii) 20 Hz – 200 Hz
 - (iv) 20 Hz – 20000 Hz
- (d) If two lenses of power P_1 and P_2 are placed in contact with each other, the power of this combination (P) is given by
- (i) $P = P_1 P_2$
 - (ii) $P = P_1 / P_2$
 - (iii) $P = P_1 + P_2$
 - (iv) $P = P_2 / P_1$
- (e) Two resistances R_1 and R_2 are in parallel combination. The equivalent resistance (R_{eq}) is given by
- (i) $\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$
 - (ii) $R_{eq} = \frac{1}{R_1} + \frac{1}{R_2}$
 - (iii) $R_{eq} = R_1 + R_2$
 - (iv) $R_{eq} = \frac{1}{R_1 + R_2}$
- (f) The SI unit of conductivity (σ) is
- (i) ohm
 - (ii) $\text{ohm}^{-1} \text{m}^{-1}$
 - (iii) $\text{ohm}^{-1} \text{m}$
 - (iv) ohm m

- (g) Cyclotron is used to accelerate
- (i) protons
 - (ii) electrons
 - (iii) neutrons
 - (iv) None of these
2. (a) Define surface tension of a liquid. How is it related to surface energy ? 4
- (b) Derive an equation of continuity for a fluid flowing through a tube of different cross-sectional areas. 6
- (c) State Hooke's law. Calculate the longitudinal stress of a long copper wire of cross-sectional area 1.2 cm^2 stretched by a force of $4.8 \times 10^3 \text{ N}$. 4
3. (a) Define molar heat capacity of a substance. Write its unit. 4
- (b) State Kirchoff's law of blackbody radiation. Write its mathematical formula. 5
- (c) Calculate the root mean square speed for one gram molecule of hydrogen at STP. (Take the density of hydrogen at STP = 0.09 kg m^{-3}). 5
4. (a) Differentiate between longitudinal wave motion and transverse wave motion. 4
- (b) Write any four factors on which loudness of a sound depends. 4
- (c) Define pitch of a sound. Velocity of sound in air is 330 ms^{-1} . Calculate the frequency of sound of wavelength 16.5 m . 6

5. (a) Define refractive index of a medium. Write its mathematical formula. 4
- (b) With the help of ray diagrams, determine the location and nature of images formed by a concave mirror when 6
- (i) the object is kept at infinity from the mirror.
- (ii) the object is kept beyond the centre of curvature.
- (c) Calculate the focal length of the convex lens used for obtaining a magnified image of an object on the screen placed at a distance of 10 m from the lens. Take the desired magnification to be 19. 4
6. (a) State Coulomb's law. Calculate the electric force between two charged spheres having charges 4×10^{-7} C and 6×10^{-7} C and placed 60 cm apart in air. 6
- (b) Differentiate between Primary cells and Secondary cells. 4
- (c) State Joule's law of heating. Write its mathematical form. 4
7. (a) What is a galvanometer ? How can it be converted into an ammeter ? 4
- (b) Derive an expression for the time period of a charged particle in a magnetic field when V is perpendicular to B. 6
- (c) What are diamagnetic substances ? 4

8. Write short notes on any **four** of the following :

$$4 \times 3 \frac{1}{2} = 14$$

- (a) Bernoulli's equation
 - (b) Avogadro's law
 - (c) Effect of pressure and temperature on speed of sound
 - (d) Compound microscope
 - (e) Faraday's laws of electrolysis
 - (f) Magnetic permeability
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