

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

Term-End Examination

December, 2019

00541

BET-012 : PHYSICS

Time : 2 hours

Maximum Marks : 70

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

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1. Choose the correct answer from the four alternatives given below : $7 \times 2 = 14$
- (a) Unit of stress is
- (i) N/m
 - (ii) $N \times m$
 - (iii) N/m^2
 - (iv) $N \times m^2$
- (b) Venturimeter works on
- (i) Archimedes' principle
 - (ii) Stokes' law
 - (iii) Principle of Bernoulli's equation
 - (iv) Equation of Continuity

- (c) The root mean square speed of a molecule is proportional
- (i) Directly to temperature
 - (ii) Inversely to temperature
 - (iii) To the square root of temperature
 - (iv) To the square of the temperature
- (d) Loudness of a sound depends upon
- (i) Wavelength
 - (ii) Frequency
 - (iii) Amplitude
 - (iv) Overtones
- (e) The unit for the constant of proportionality K used in Coulomb's law is
- (i) Nm^2
 - (ii) Nm^2C^{-2}
 - (iii) N
 - (iv) $\text{N} - \text{m}$
- (f) Which of the following materials have relative permeability less than one ?
- (i) Diamagnetic
 - (ii) Paramagnetic
 - (iii) Ferromagnetic
 - (iv) Antiferromagnetic
- (g) Mirage is observed in the desert due to the phenomenon of
- (i) Total internal reflection
 - (ii) Refraction
 - (iii) Dispersion
 - (iv) Interference

2. (a) Explain the cause of surface tension on the basis of cohesive forces.
- (b) A copper cube of mass 0.50 kg is weighed in water and its mass is found to be 0.40 kg. Is the cube hollow or solid ? Take the densities of water and copper as 10^3 kg m^{-3} and $8.96 \times 10^3 \text{ kg m}^{-3}$ respectively.
- (c) What is Poisson's Ratio ? Derive the necessary formula used. 5+5+4
3. (a) Explain the transfer of heat through conduction, convection and radiation.
- (b) Calculate the average energy of an air molecule at a temperature of 300 K ($k_B = 1.38 \times 10^{-23} \text{ JK}^{-1}$).
- (c) State any four basic assumptions of the Kinetic theory of gases. 5+5+4
4. (a) Define the intensity of sound. How does it vary with distance from the source ?
- (b) An air column, disturbed by a tuning fork of frequency 256 Hz, gives resonance at column lengths 33.4 cm and 101.8 cm. Calculate the speed of sound in air.
- (c) Explain the effect of pressure and temperature on the speed of sound in a gaseous medium. 4+5+5
5. (a) State the laws of reflection with the help of diagrams.
- (b) Calculate the critical angle for a glass-water interface, if the refractive indices of glass and water are $3/2$ and $4/3$ respectively.
- (c) Define the power of a lens. Write its unit. 5+5+4

6. (a) State Coulomb's law. Write its mathematical formula.
- (b) Calculate the resistivity of the material of a wire 2 m long, 0.2 mm in diameter and having a resistance of 4 ohm.
- (c) Describe the working of a potentiometer. 5+5+4
7. (a) Explain the working of a cyclotron with the help of a diagram.
- (b) Determine the magnitude of the magnetic field at a point 20 cm away from a straight wire which carries a current of 5 A. (Given $\mu_0 = 4\pi \times 10^{-7} \text{ TA}^{-1}\text{m}$)
- (c) Distinguish between diamagnetic and paramagnetic materials. 5+5+4
8. Write short notes on any **four** of the following :
- $$4 \times 3 \frac{1}{2} = 14$$
- (a) Equation of Continuity
- (b) Viscosity
- (c) Stefan's Law
- (d) Simple Microscope
- (e) Galvanometer
- (f) Biot-Savart's Law
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