

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

Term-End Examination

June, 2019

00662

BET-012 : PHYSICS

Time : 2 hours

Maximum Marks : 70

- Note :**
- (i) *Question no. 1 is compulsory.*
 - (ii) *Attempt any four questions from the remaining question nos. 2 to 7.*
 - (iii) *Use of scientific calculator is permitted.*

-
- 1. Choose the correct answer from the given four alternatives. 14x1=14**
- (a) Venturimeter works on :
 - (i) Archimede's principle
 - (ii) Stoke's law
 - (iii) Bernoulli's principle
 - (iv) Equation of continuity
 - (b) The rain drop is spherical because of :
 - (i) Viscosity
 - (ii) Surface tension
 - (iii) Atmospheric pressure
 - (iv) Force of gravity
 - (c) Steel is :
 - (i) more elastic than rubber
 - (ii) less elastic than rubber
 - (iii) not elastic, but is plastic
 - (iv) same elastic as rubber

- (d) Two bodies are said to be in thermal equilibrium when they attain equal :
- (i) Temperature
 - (ii) Heat contents
 - (iii) Heat capacity
 - (iv) Specific heat
- (e) The pressure of gas P and its Kinetic Energy . K.E. are related as :
- (i) $P = \frac{1}{2} \text{ K.E.}$
 - (ii) $P = \text{K.E.}$
 - (iii) $P = \frac{3}{2} \text{ K.E.}$
 - (iv) $P = \frac{2}{3} \text{ K. E.}$
- (f) If a gas is at temperature T K, the root mean square speed of its molecules will be proportional to :
- (i) \sqrt{T}
 - (ii) $\frac{1}{\sqrt{T}}$
 - (iii) T
 - (iv) T^2
- (g) From two different musical instruments, the sound produced of same frequency and same intensity are predictable by their :
- (i) loudness
 - (ii) pitch
 - (iii) quality
 - (iv) none of these

- (h) The wave produced in a resonant air column is :
- stationary longitudinal wave
 - stationary transverse wave
 - transverse progressive wave
 - longitudinal progressive wave
- (i) The magnifying power of the simple microscope is :
- $D + f$
 - $D + \frac{1}{f}$
 - $\frac{D}{f} - 1$
 - $1 + \frac{D}{f}$
- (D is the least distance of distinct vision, f is the focal length of the lens)
- (j) For total internal reflection to take place, the relationship between angle of incidence (i) and critical angle (c) should be :
- $i > c$
 - $i = c$
 - $i < c$
 - none of the above
- (k) Two thin lenses of focal lengths f_1 and f_2 are in contact and coaxial. The combination is equivalent to a single lens of power :
- $f_1 + f_2$
 - $\frac{f_1 f_2}{f_1 + f_2}$
 - $1/2 (f_1 + f_2)$
 - $\frac{f_1 + f_2}{f_1 f_2}$

- (l) Kirchoff's first law expresses the conservation of :
- (i) Energy
 - (ii) Charge
 - (iii) Momentum
 - (iv) None of these
- (m) Which of the following amount of charge is not possible ?
- (i) $1.6 \times 10^{-19}\text{C}$
 - (ii) $4.8 \times 10^{-19}\text{C}$
 - (iii) $8 \times 10^{-19}\text{C}$
 - (iv) $6 \times 10^{-19}\text{C}$
- (n) In a paramagnetic material, magnetic susceptibility is :
- (i) small and negative
 - (ii) large and positive
 - (iii) large and negative
 - (iv) small and positive
2. (a) Explain the cause of surface tension on the basis of cohesive forces. 6+4+4
- (b) State and explain the Pascal's law.
- (c) State and prove Bernoulli's equation.
3. (a) Explain thermal equilibrium. State the zeroth law of thermodynamics and explain the concept of temperature on its basis. 6+4+4
- (b) Derive an expression for the pressure exerted by an ideal gas.
- (c) Calculate the average energy of an air molecule at a temperature of 300 K. (KB = $1.38 \times 10^{-23}\text{J/K}$)

4. (a) What is mirror formula ? Define magnification and explain why magnification of a convex mirror is always negative. 6+4+4
- (b) Write the difference between a longitudinal and transverse waves.
- (c) Calculate the critical angle for a glass water interface if the refractive indices of glass and water are $\frac{3}{2}$ and $\frac{4}{3}$, respectively.
5. (a) Derive an expression for the drift velocity of electrons in a conductor. 6+4+4
- (b) Calculate the electric force between two charged spheres having charges $4 \times 10^{-7} \text{C}$ and $6 \times 10^{-7} \text{C}$ and placed 60 cm apart in air $\left(\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2 \text{c}^{-2} \right)$
- (c) Describe the working of Wheat stone bridge.
6. (a) Explain the working of a moving coil galvanometer. 4+10
- (b) Distinguish between diamagnetic, paramagnetic, ferromagnetic materials.
7. Write short notes on **any four** of the following :
- (a) Equation of continuity 4x3½=14
- (b) Critical velocity
- (c) Stefan's law
- (d) Laws of Refraction
- (e) Power of a Lens
- (f) Potentiometer
-