Practice Question Paper (Term 1)

CLASS 11		
PHYSICS	UNIT AND MEASUREMENT	FM 40

Q1	If frequency (F), velocity (v) and density (D) are considered as fundamental units, the dimensional formula for momentum will be: (a) DVF^2 (b) DV^2F^{-1} (c) $D^2V^2F^2$ (d) DV^4F^{-3}	1
Q2	. During a short interval of time the speed v in m/s of an automobile is given by $v = at^2 + bt^3$, where the time t is in seconds. The units of a and b are respectively, (a) ms^2 ; ms^4 (b) s^3 /m; s^4 /m (c) m/s^2 ; m/s^3 (d) m/s^3 ; m/s^4	1
Q3	Which of the following sets have different dimensions? (a) Pressure, Young's modulus, stress (b) Emf, potential difference, electric potential (c) Heat, work, energy (d) Dipole moment, electric flux, electric field	1
Q4	The largest mass (m) that can be moved by a flowing river depends on velocity and acceleration due to gravity (g). The correct relation is (a) $m \propto \frac{\rho^2 v^4}{g^2}$ (b) $m \propto \frac{\rho v^6}{g^2}$ (c) $m \propto \frac{\rho v^4}{g^3}$ (d) $m \propto \frac{\rho v^6}{g^3}$	1
Q5.	The term $(1/2)\rho v^2$ occurs in Bernoulli's equation, with ρ being the density of a fluid and v its speed. The dimensions of this term are (a) $[M^{-1} L^5 T^2]$ (b) $[M^1 LT^2]$ (c) $[M L^{-1} T^{-2}]$ (d) $[M^{-1} L^9 T^{-2}]$	1
Q 6	**Assertion**: Dimensional constants are the quantities whose values are constant. **Reason**: Dimensional constants are dimensionless. a. If both assertion and reason are true and reason is a correct explanation of the assertion b. If both assertion and reason are true but reason is not a correct explanation of the assertion c. If assertion is true but reason is false. d. If assertion and reason both are false	**1**
Q7	.What are the limitations of dimensional analysis. OR Find the dimensional formula of (i) acceleration due to gravity (ii) gravitational constant	**2**
Q8	Using the dimensional analysis, check whether the following equation is correct or not: $T = 2\pi\sqrt{\frac{R^3}{GM}}$	**2**
Q9	The frequency 'f' of vibration of a stretched string depends upon: (i) Its length 'l' (ii) The mass per unit length 'm'	3

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	(ii) The tension'T' in the string. Obtain dimensionally an expression for frequency 'f'	
Q10	Deduce the dimensional formula for universal gas constant. The velocity of sound waves 'v' through a medium may be assumed to depend on: (a) the density of the medium 'd' (b) The modulus of elasticity 'E' Deduce by the method of dimensions the formula for the velocity of sound. Take dimensional constant K = 1.	3
Q11	Find the dimensional formula of Planck's constant. Find the dimensions of (a/b) in the equation: $P = \frac{a-t^2}{bx}$ where P is pressure, x is distance and t is time.	**3**
Q12	Find the dimensional formulae of (a) coefficient of viscosity η (b) charge q (c) potential V (d) capacitance C and (e) resistance R	3
Q13	For n moles of gas, Van der Waals' equation is $\left(p - \frac{a}{V^2}\right)(V - b) = nRT$ Find the dimensions of a and b, where p = pressure of gas, V = volume of gas and T = temperature of gas.	**3**
Q14	$\frac{\alpha}{t^2} = Fv + \frac{\beta}{x^2}$. Find dimension formula for [α] and [β] (here t = time, F = force, v = velocity, x = distance) Or Show dimensionally that the expression, $Y = \frac{MgL}{\pi r^2 l}$ is dimensionally correct, where Y is Young's modulus of the material of wire, L is length of wire, Mg is the weight applied on the wire and l is the increase in the length of the wire.	**3**
Q15	The expression given below shows the variation of velocity (v) with time (t), $v = \mathrm{At}^2 + \frac{\mathrm{Bt}}{\mathrm{C+t}}$. Find The dimension of ABC	2
Q16.	The position of a particle moving on x-axis is given by $x(t) = A\sin t + B\cos^2 t + Ct^2 + D$, where t is time. The dimension of $\frac{ABC}{D}$ is	3
Q17	If the velocity of light C , universal gravitational constant G and Planck's constant h are chosen as fundamental quantities. The dimensions of mass in the new system is :……..?	**2**
Q18	If momentum [P], area[A] and time [T] are taken as fundamental quantities, then the dimensional formula for coefficient of viscosity is……..?	**3**
Q19	If force (F), length (L) and time (T) are taken as the fundamental quantities. Then what will be the dimension of density ……..?	**2**