F.Y.B. Sc. SEM II
Physics Paper I
Sample Questions

1) If y_1 =10 sin (314 t – 4x) cm and y_2 = 10 Sin (9.42 t – 3.5 x) cm are two component waves in a wave disturbance travelling along negative direction. The group velocity………..
    (a) 3 π cm/sec   (b) 4 π cm/sec   (c) 2 π cm/sec   (d) 5 π cm /sec

2) In progressive wave the disturbance propagates with definite …………
    (a) velocity   (b) displacement   (c) acceleration   (d) time

3) The wave which propagates through a medium in which the particle vibrates perpendicular to the direction of propagation is called as _____.
    (a) Transverse wave   (b) Longitudinal wave   (c) Stationary wave   (d) None

4) If the differential equation of the SHM of a body is given by then its natural frequency
    is given by $\frac{d^2x}{dt^2}$ + ω^2x=0 then its natural frequency is given by ----------
    (a) ω   (b) ω/2π   (c) ω/π   (d) 2π/ ω

5) The sound waves are ------------.
    (a) mixed wave   (b) transverse wave
    (c) sometime transverse and sometime longitudinal wave   (d) the longitudinal wave

6) The periodic time of two oscillators are T and 5T/4 respectively. Both oscillators starts their oscillation simultaneously from the midpoint of their path of motion. When the oscillator having periodic time T completes one oscillation, the phase difference between the two oscillators will be,
    a)90^0 b) 120^0 c) 72^0 d) 45^0

8) If div $\vec{V}$ = 0, then $\vec{V}$ is called as _____
    (a) solenoidal vector   (b) irrotational vector
    (c) coplanar vector   (d) None of the above

9) If the sum of two vectors is a unit vector then the magnitude of difference is -------------.
    (a) 1   (b) $\sqrt{2}$ (c) $\sqrt{3}$ (d) none of these

10) If Ø=$x^3 y^2 z$, find $\vec{\nabla}$Ø at (1, 1, 1),
        a) $3\hat{i}-2\hat{j}+\hat{k}$ b) $2\hat{i}+3\hat{j}+\hat{k}$ c) $2\hat{i}-3\hat{j}-\hat{k}$ d) $3\hat{i}+2\hat{j}+\hat{k}$

11) The minimum number of non co-planar vectors, of unequal magnitudes which can be added so that their resultant is equal to zero, is
        (a) 1   (b) 2   (c) 3   (d) 4

12) If $\overline{A}$ = $2\hat{i}-4\hat{j}+4\hat{k}$, then vector of magnitude 12 and parallel to $\overline{A}$ is ------
        a) 2 $\overline{A}$ b) 4 $\overline{A}$ c) 6 $\overline{A}$ d) 12 $\overline{A}$

13) If $\overline{A} = 3\,x^2\,y\,\hat{\imath}$, div ($\overline{A}$) at (1,-1,0) = --------

        a) 6   b) 0   c) 1   d) -6

14) The degree of the equation is $x^2\,\dfrac{d^3y}{dx^3} + y = 0$ is

        (a) 1   (b) 2   (c) 0   (d) 3

15) The degree of the differential equation $I\,\dfrac{d^2\theta}{dt^2} + MH\theta = 0$ is ………..

        a) 0   b) 1   c) 2   d) θ

16) The order of differential equation $R\dfrac{dq}{dt} + \dfrac{q}{C} = 0$ is

        a) 0   b) 1   c) 2   d) q

17) The degree of differential equation $y'' = (1+y)^{3/2}$ is ---------------

        a) 0   b) 1   c) 2   d) 3

18) The degree and order of differential equation $\dfrac{d^2y}{dx^2} + 16y = 0$

        (a) 1,2   (b) 2,1   (c) 2,3   (d) None

19) The minimum numbers of vectors of equal magnitude required to produced zero resultant is –

        a) two   b) three   c) four   d) more than four

20) The unit vector parallel to the resultant of the vectors $2\,\hat{\imath} + 3\,\hat{\jmath} - \hat{k}$ $4\,\hat{\imath} - 3\,\hat{\jmath} + 2\,\hat{k}$ is

  a) $\dfrac{1}{\sqrt{37}}\,(6\,\hat{\imath} + \hat{k})$ b) $\dfrac{1}{\sqrt{37}}\,(6\,\hat{\imath} + \hat{\jmath})$ c) $\dfrac{1}{\sqrt{37}}\,(6\,\hat{\jmath} + \hat{k})$ d) none of these

21) The vector sum of two forces is perpendicular to their vector difference. In that case the forces are –

        a) equal to each other   b) equal to each other in magnitude

        c) not equal to each other in magnitude   d) cannot be predicted

22) The divergence of a vector field is ----

        a) a vector   b) a scalar   c) either a vector or or a scalar   d) a tensor

23) The curl of the vector field is --------

        a) a vector   b) a scalar   c) either a vector or or a scalar   d) a tensor

24) The general solution of the differential equation $y' = ky$ is

        a) –xC   b) xC   c) Ce^{-kx} d) Ce^{kx}

25) CR has the dimension of

        a) s   b) 1/s   c) H/s   d) s/H