F.Y.B.Sc. Semester II April 2021

Physics Paper I

Sample Questions

1.	If $\vec{A} = \hat{\imath} + 2\hat{\jmath},\ \vec{B} = -\hat{\imath} + 2\hat{k}$ *and* $\vec{C} = 3\hat{\imath} + \hat{\jmath}$. Then $\vec{A}.(\vec{B}\,X\,\vec{C})$ is given by	
	(a)	5
	(b)	20
	(c)	-10
	(d)	10

2.	If $\vec{A} = 3\hat{\imath} + 2\hat{\jmath} + \hat{k}$ *and* $\vec{B} = \hat{\imath} + \hat{\jmath} + \hat{k}$, *then* $3\vec{A} + 2\vec{B}$ *is*	
	(a)	$11\hat{\imath} + 8\,\hat{\jmath} + 5\,\hat{k}$
	(b)	$7\,\hat{\imath} + 8\,\hat{\jmath} + 5\,\hat{k}$
	(c)	$7\,\hat{\imath} + \hat{\jmath} + 5\,\hat{k}$
	(d)	$14\hat{\imath} + 7\,\hat{\jmath} + 12\,\hat{k}$

3	If $\vec{A}$ is a solenoidal vector then	
	(a)	$\vec{\nabla}$X $\vec{A}$ = 0
	(b)	$\vec{\nabla} \cdot \vec{A}$ = 0
	(c)	$\vec{\nabla} \cdot \vec{A}$ = 1
	(d)	$\vec{A}$ = 0

4	If vector $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$, then$\vec{\nabla}.\vec{r}$ is	
	(a)	0
	(b)	3
	(c)	1
	(d)	4

5	If $\overrightarrow{A} = y\hat{\imath} + 3y\hat{\jmath} + xy\hat{k}$ then $\vec{\nabla}$ x $\overrightarrow{A}$ is	
	(a)	$y\hat{\imath} + 3y\hat{\jmath} + xy\hat{k}$
	(b)	$x\hat{\imath} - y\hat{\jmath} - \hat{k}$
	(c)	$-x\hat{\imath} + y\hat{\jmath} - \hat{k}$
	(d)	$y\hat{\imath} - 3y\hat{\jmath} + xy\hat{k}$

6	The order and degree of $\left(\frac{d^3y}{dx^3}\right)^2 + \left(\frac{d^2y}{dx^2}\right)^3 + y = 0$ are ____respectively.	
	(a)	2,2
	(b)	1,2
	(c)	3,2
	(d)	2,3

7	The capacitor (C) is connected in series with the battery of potential (V). The charge (Q) on the capacitor plate when it fully charge	
	(a)	Q = C/V
	(b)	Q = CV
	(c)	Q = V/C
	(d)	zero

8	For series LR circuit, the time constant is the time taken for current to rise to _____ of its final maximum current value.	
	(a)	37%
	(b)	63%
	(c)	26%
	(d)	85%

9	The given equation, $(1+y^2)y'' + xy' + x = e^x$, is _____.	
	(a)	First order non homogeneous nonlinear equation
	(b)	Second order non homogeneous nonlinear equation
	(c)	Second order homogeneous linear equation
	(d)	First order homogeneous linear equation

10	In series CR circuit, the maximum value of charge is given by ___.	
	(a)	CR
	(b)	ER
	(c)	CE
	(d)	C/R

11	The equation of motion of a particle is given by $x = 5 \cos (3.14t + \pi/3)$ in cm. The period of oscillation of the particle is ____.	
	(a)	5 sec
	(b)	1 sec
	(c)	3 sec
	(d)	2 sec

12	The simple harmonic velocity of the oscillator about its equilibrium position is _____.	
	(a)	Linear velocity
	(b)	Phase velocity
	(c)	Particle velocity
	(d)	Group velocity

13	The shape of Lissajous figures is independent of the following	
	(a)	Amplitude of SHM
	(b)	Frequencies of two SHM
	(c)	Initial phase of two SHM
	(d)	Final phase of two SHM

14	The frequency of a forward travelling wave on sting described by $y = 4 \cos (6.28t + 5x)$ is _____.	
	(a)	1 Hz
	(b)	0.5 Hz
	(c)	2 Hz
	(d)	6.28 Hz

15	The wave velocity and the velocity with which the particles of medium are vibrating are _____.	
	(a)	same
	(b)	different
	(c)	uniform
	(d)	parallel