



# Sanjay Ghodawat University, Kolhapur

2017-18

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

FY B Sc

School of Science

Semester I

PHS 101

Physics I

Max Marks: 100

28 Nov 2017

End Semester Examination (ESE)

Time: 3Hrs

- Instructions for Students:**
- 1) Use of non-programmable calculator is allowed
  - 2) All questions are compulsory

Q1	Answer the following questions	Marks	COs
a)	Multiple choice questions	10	All
i)	The sum of two vectors is zero when and only when they have the same length but _____ direction. a) same      b) opposite      c) perpendicular      d) parallel		101.1
ii)	Order and degree of the differential equation $y'' + 3y' + 2y = x^3 + x$ is _____. a) (2,1)      b) (1,2)      c) (2,2)      d) (1,1)		101..1
iii)	Ball thrown at the wall is bounce back is the example of _____. a) Newton's first law of motion b) Newton's Second law of motion c) Newton's third law of motion d) none of these		101.1
iv)	In the absence of external force, the _____ of a partial is conserved. a) linear momentum      b) angular momentum c) energy      d) all of these		101.2
v)	If radius of the spherical shell is doubled then its moment of inertia becomes _____ times of its original value. a) two      b) four      c) half      d) one fourth		101.2
vi)	Dimensions of gravitational constant G is _____. a) $[M^{-1}L^3T^{-2}]$ b) $[M^2L^3T^{-1}]$ c) $[M^{-1}L^{-3}T^{-2}]$ d) $[M^1L^3T^{-2}]$		101.3
vii)	Gravitational constant is essentially a _____ quantity and its maximum value is _____ at infinity. a) positive, infinity      b) positive, zero c) negative, zero      d) negative, infinity		101.3
viii)	In critically damped motion when $\mu_2 = \omega_2$ , the damping force is equal to the _____. a) restoring force      b) dissipative force c) opposing force      d) decreasing force		101.3

1/3

ix)	Beam supported at the one end and loaded at the other end is called _____ a) loaded beam                      b) supported beam c) inverted cantilever              d) cantilever		101.4
x)	If liquid does not wet the solid angle of contact between solid surface and liquid is _____ a) an acute angle b) an obtuse angle c) a right angle d) none of these		101.4
b)	Fill in the blanks	05	All
i)	If $\vec{A}$ and $\vec{B}$ are the two perpendicular vectors then its scalar product is _____		101.1
ii)	A rocket will _____ a mass in its flight.		101.2
iii)	According to Kepler's second law of motion _____ velocity is remains constant.		101.2
iv)	If A is the amplitude of a particle in SHM, the displacement of particle in one time period is _____		101.3
v)	Each planet moves in an _____ path with the sun at focus:		101.3
c)	True or false	05	All
i)	A vector is not changed if it is slide parallel to itself.		101.1
ii)	If the body rotates through equal angles in equal time intervals its angular acceleration is constant.		101.2
iii)	Within elastic limit ratio of a stress to the strain of a material body is constant.		101.4
iv)	When liquid does not wet the solid, then cohesive force must be greater than adhesive force.		101.4
v)	Viscosity of a liquids increases with density.		101.4
<b>Q2</b>	Answer the following questions	Marks	COs
a)	Explain the method to solve first order homogeneous differential equation.	10	101.1
b)	Explain dot and cross products of two vectors.	06	101.1
OR			
b)	State and prove Newton's laws of motion.	06	101.1
c)	Write a note on frames of reference.	04	101.1

Q3	Answer the following questions	Marks	COs
	a) State and explain energy conservation theorem for system of particles.	10	101.2
	b) Obtain the expression for the moment of inertia of a solid cylinder about its own axis of symmetry.	06	101.2
	OR		
	b) State and explain linear and angular momentum conservation theorem for particle.	06	101.2
	c) Obtain the M. I. of a solid cylinder of mass 1kg and radius 10 cm about its own axis of symmetry.	04	101.2
Q4	Answer the following questions	Marks	COs
	a) Obtain the expression for gravitational field and potential due to spherical shell outside it.	10	101.3
	b) What is simple harmonic motion? Obtain differential equation for it.	06	101.3
	OR		
	b) What are the damped oscillatory motion? Obtain the differential equation for damped oscillatory motion.	06	101.3
	c) Calculate the period of revolution of Neptune round the Sun, if its mean distance from the Sun is 30 times that of the Earth. (time period of Earth = 1 year)	04	101.3
Q5	Answer the following questions	Marks	COs
	a) Obtain the relation between excess of pressure, surface tension and radius of curvature.	10	101.4
	b) Define all the modulus of elasticity and obtain the relation between them.	06	101.4
	OR		
	b) Obtain the expression for Young's modulus of a beam supported at the both end.	06	101.4
	c) Explain Jaeger's method to determine surface tension of a liquid.	04	101.4