UNIVERSITY OF THE PUNJAB

First Semester – 2019
Examination: B.S. 4 Years Program

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PAPER: Physics-I (Mechanics & Optics)
Course Code: PHY-111 Part-I (Compulsory)

MAX. TIME: 15 Min. MAX. MARKS: 10

Signature of Supdt.:

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

. Encircle the right ans	wer, cutting and o	verwriting is not	allowed.	(1x10=10)
1. The divergence of a vec	tor field $\mathbf{F} = 2x\hat{\imath} + 3y\hat{\jmath}$	$\hat{i} + 4z\hat{k}$ is		
a) 2	b) 3	c) 4	d) 9	
2. Two bodies of masses <i>n</i> and <i>k</i> ₂ are in the ratio	and 2m have same m	omentum. Their resp	ective kinetic er	ergies k_I
a) 1:2	b) 2:1	c) 1: √2	d) 1:4	
A body of moment of in Kinetic energy as a ma	nertia 5 kgm ^{2,} rotating ss of 20 kg, moving w	with angular velocity ith a velocity of	of 6 rad/s, has	the same
a) 1.5 m/s	b) 3 m/s	c) 6 m/s	d) 9 m/s	* -
4. A stone of mass <i>m</i> is mo by the force over half of	the circle is			done
a) $\frac{mv^2}{r} \times \pi r$	b) $\frac{mv^2}{r}$ x $2\pi r$	c) mg x 2πr	d) zero	
5. The coefficient of static	friction is always	coefficien	at of kinetic frict	ion
a) less than The earth revolves round		c) equal to al orbit. Its speed is	d) both a &	t c .
a) Increases continuou	isly	b) Greatest when	it is closest to th	ne sun
c) Greatest when it is fa	orthest from the sun	d) Constant at all	points of orbits	
7. The reference frames wha) Inertial8. A neutron moving with a neutron after collision is	ere Newton's laws ca b) Non-inertial	n be applied are calle c) Non-accelerate	d d) both a &	frames.
a) $-3v/_{5}$	b) $^{3v}/_{5}$	c) $-\frac{2v}{5}$	d) ²	$\frac{2v}{5}$
9. The velocity of light was a) Newton	b) Huygen	c) Michels	on d) Y	oung
 The phase difference π a) λ 	b) $\lambda/2$	ig beams is equal to t c) $\lambda/3$	he path differen d) λ	

UNIVERSITY OF THE PUNJAB

First Semester – 2019 Examination: B.S. 4 Years Program

PAPER: Physics-I (Mechanics & Optics)
Course Code: PHY-111 Part – II

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MAX. TIME: 2 Hrs. 45 Min. MAX. MARKS: 50

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

0.2 Write short answers to the following questions (10x2)1. What do you understand by the curl of a vector function? 2. If $\varphi = 3x^2\hat{\imath} + 2sy^4\hat{\jmath} + xz^3\hat{z}$. Find Curl of φ . 3. Does the value of gravitational acceleration 'g' remain same at the equator and pole of the earth? Justify your answer. 4. How the swing is produced in a moving cricket ball? 5. At what angle of projection the range and height of a projectile becomes equal? 6. How does the viscosity of liquids and gases vary with temperature? 7. Calculate the gravitational force between two bodies each of mass 1 kg and separated by a unit distance. 8. What are uses of diffraction grating? 9. How the fringe spacing in the interference pattern will be affected if you perform Young's double slit experiment under water? 10. How diffraction differs from interference? Give any two points. (Essay-type questions) Q. 3 (a) Define divergence of a vector field. State and prove the Gauss's divergence theorem. (b) A block is at rest on an inclined plane making an angle θ with horizontal. The block start sliding down as the angle of inclination becomes greater than 15°. What is the coefficient of static friction between the block and inclined plane? (a) State parallel axis theorem. Using parallel axis theorem, find the rotational inertia of a solid cylinder about an axis passing through its center and perpendicular to its axis of symmetry. (6)(b) State and prove the equation of continuity. (4)(a) What is Michelson Interferometer? What is its least count? Explain its working. Q. 5 (6)

(b) A slit of width 'a' is illuminated by white light. For what value of 'a' you would

observe the first minima for red light having wavelength $\lambda = 650$ nm fall at $\theta = 15^{\circ}$? (4)