Faculty of Science and Humanities			
Ramaiah University of Applied Sciences			
Department	PHYSICS	Programme	B. Tech.
Semester/Batch	2nd /2017		
Course Code	BSC102B	Course Title	Engineering Physics
Course Leader(s)	Dr. Suguna M, Dr. Vikas S, Dr. Manjunatha SO, Dr. Ravikumar BS, Dr. Premakumar HB, Dr. Murali K, Dr. Sidling Matteppanavar		

Assignment - 01

Reg. No.			Name of Student	

Sections		Marking Scheme	Max Marks	First Examiner Marks	Second Examiner Marks
Part-A	A1.1	LASER Lithotripsy	5		
	A1.2	LASER Angioplasty	5		
		Part-A Max Marks	10		
Part B1	B1.1	Calculation of deceleration	6		
	B1.2	Calculation of time	4		
		Part-B1 Max Marks	10		
Part B2	B2.1	Calculation of MI along the axis of the rod	4		
	B2.2	Calculation of CM and MI perpendicular to the axis of the rod	4 + 2		
		Part-B2 Max Marks	10		
Part B3	B3.1	Estimation of distance	4		
	B3.2	Calculation of coefficient of static friction	3		
	B3.3	Free body diagrams	3		
		Part-B3 Max Marks	10		
Part B4	B4.1	Calculation of the ratio of populations N_2/N_1	4		
	B4.2	Estimation of temperature	4		
	B4.3	Computation of life time	2		
		Part-B 4 Max Marks	10		
		Total Assignment Marks	50		

Course Marks Tabulation				
Component-1 (B) Assignment	First Examiner	Remarks	Moderator	Remarks
A				
B.1				
B.2				
B.3				
B.4				
Marks (Max 50)				
Marks (out of 25)				

Signature of First Examiner   Signature of Moderator

Please note:

1. Documental evidence for all the components/parts of the assessment such as the reports, photographs, laboratory exam / tool tests are required to be attached to the assignment report in a proper order.
2. The First Examiner is required to mark the comments in RED ink and the Second Examiner's comments should be in GREEN ink.
3. The marks for all the questions of the assignment have to be written only in the **Component – CET B: Assignment** table.
4. If the variation between the marks awarded by the first examiner and the second examiner lies within +/- 3 marks, then the marks allotted by the first examiner is considered to be final. If the variation is more than +/- 3 marks then both the examiners should resolve the issue in consultation with the Chairman BoE.

<u>Assignment-1</u>
<u>Term - 1</u>

Instructions to students:

1. The assignment consists of **5** questions: Part A – **1** Question, Part B- **2** Questions.
2. Maximum marks is **50**.
3. The assignment has to be neatly word processed as per the prescribed format.
4. The maximum number of pages should be restricted to **20**.
5. Restrict your <u>report for Part-A to 3 pages only.</u>
6. Restrict your <u>report for Part-B to a maximum of 17 pages</u>.
7. The printed assignment must be submitted to the course leader.
8. **Submission Date:12/03/2018**
9. **Submission after the due date is not permitted.**
10. **IMPORTANT**: It is essential that all the sources used in preparation of the assignment must be suitably referenced in the text.
11. Marks will be awarded only to the sections and subsections clearly indicated as per the problem statement/exercise/question

Preamble

This course intends to impart concepts of Physics and its application to solve engineering problems. Students are taught the basic topics in modern physics which include wave particle duality, uncertainty principle, Schrodinger's wave equation, lasers and fiber optics. Electrical and mechanical properties of materials will be discussed in relation to the crystal structure.

Part A   10 Marks

LASER is a monochromatic, highly directional and energetic light. LASER's are of great interest due to their diverse applications in industries, defense, research, medical field, etc.

Discuss the applications of LASER's in medical field

Your essay should include principle, merits and limitations of

A1.1 LASER Lithotripsy

A1.2 LASER Angioplasty

Part B   40 Marks

In solving the following numerical problems, assign the following values to X and Y.

N = last 2 digits of your Roll no.

X =1, 2, 3, 4 and 5 for sections G, H, I, J, and K respectively

B1.   10 Marks

The wheel of a van makes N+10 revolutions as it reduces speed from 120 km/hr to 45 km/hr. Radius of the wheel is 0.30 m.

B1.1 Calculate the angular deceleration of each wheel.

B1.2 Calculate the time required to stop the wheel with this deceleration.

B2.   10 Marks

Two solid metal spheres each with a diameter of 2 cm and mass of N+10 gm, are joined by weightless rod. The distance between the centers of sphere is 20 cm.

B2.1 Calculate the moment of inertia of this system about a line passing through the axis of the rod.

B2.2 Locate the center of mass and calculate the moment of inertia of this system about a line perpendicular to the axis of the rod.

B3.   10 Marks

A (150 + X * 10) g block is projected up a ramp with an initial speed of (7+ N*0.05) ms^{-1}.The coefficient of kinetic friction between the ramp and the block is 0.2+ X * 0.01. The ramp is inclined at 25° with the horizontal.

B3.1 Determine the slide distance on the surface of the ramp by the block before coming to a stop.

B3.2 Calculate the minimum coefficient of static friction between the block and the ramp, for the block to be stationary on the ramp.

B3.3 Draw free body diagram for both *B3.1* and *B3.2*.

B4. **10 Marks**

The LASER system has three energy level E_1, E_2 and E_3. The energy levels E_1, E_2 and E_3 are at 0 eV, 2 eV and 2.5 eV respectively.

B4.1. Calculate the ratio of populations N_2/N_1 at a temperature of (300 + X + 0.1*N) K.

B4.2. Calculate the temperature for which the ratio of population N_3/N_1 be (0.01 + 0.01*X).

B4.3. Compute the life time of excited states E_2 and E_3.