



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

2019-20

EXM/P/09/00

TY B. Sc

School of Science

PHS 301

Classical Mechanics

Even

Day & Date:- Tuesday
19/11/19

Section-A.

Sem. V

Examination: ESE, Max Marks: 20, Time 30 minutes 10:30 am to 11 am

Seat No.:

PRN No.:

Student Sign:

Invigilator Sign:

Examiner Sign:

Marks Obtained:

Instructions:

- 1) All Questions are compulsory.
- 2) Mark $\sqrt{\quad}$ to the correct option. Do not circle.
- 3) More than one options marked will not be considered for assessment.
- 4) Rough calculations on paper are not allowed.
- 5) Use non-programmable calculator is allowed.

Q.1 Select the correct alternative

Marks BL CO

According to inverse square law, the force of attraction between two bodies

01 1 CO1

1. varies inversely as ----- between them.

- | | |
|---------------------|----------------------------|
| a) distance | b) square of distance |
| c) cube of distance | d) square root of distance |

2. All the planets move around the sun in ----- orbit

01 1 CO1

- | | |
|----------------|-----------------|
| a) a circular | b) an elliptic |
| c) a parabolic | d) a hyperbolic |

ESE

01 1 CO2

9. Energy transfer in coupled oscillations is periodic with period equal to ----- 01 2 CO3

- a) a) $T = 4\pi / w_1 + w_2$ b) $T = 4\pi / w_1 . w_2$
- c) a) $T = 4\pi / (w_1 + w_2)^2$ d) $T = 4\pi / (T = 4\pi / w_1 + w_2)^3$
10. In an elastic collision total Kinetic Energy before and after collision is 01 2 CO3
- a) not same b) same
- c) zero d) infinite
11. Rutherford experiment is scattering of ----- particles. 01 2 CO3
- a) α b) β
- c) γ d) e
12. Concept of nucleus is introduced by the scientist ----- 01 1 CO3
- a) Einstein b) Newton
- c) Rutherford d) Bose
13. Number of particles scattered in a solid angle is proportional to----- 01 1 CO3
- a) an intensity of incident particles and magnitude of solid angle b) square root of intensity of incident particles and magnitude of solid angle
- c) square of intensity of incident particles and magnitude of solid angle d) intensity of incident particles and square of magnitude of solid angle
14. Total energy E of Harmonic oscillator is given by 01 2 CO4
- a) $\frac{x^2}{2E/mw^2} - \frac{p^2}{2mE} = 1$ b) $\frac{x^2}{2E/mw^2} + \frac{p^2}{2mE} = 1$
- c) $\frac{x^2}{2E/mw^2} + \frac{p^2}{2mE} = 0$ d) $\frac{x^2}{2E/mw^2} - \frac{p^2}{2mE} = 1$
15. A rod of length 1 meter moving with a velocity $V = 0.8 C$ in the direction of velocity of light then its length in motion is -----, where C is velocity of light. 01 1 CO4
- a) 0.6 m b) 0.8 m

- | | | | | | | |
|-----|---------------------------------------------------------------------------------------------------------------------------------|----|------------------|----|---|-----|
| c) | 0.1 m | b) | 0.3 m | | | |
| 16. | A point mass 0.1 gm moving with velocity $V = 0.6 C$ then it's mass in motion is -----gm | | | 01 | 1 | CO4 |
| a) | 1.166 | b) | 2.166 | | | |
| c) | 0.166 | d) | 3.166 | | | |
| 17. | Linear speed of earth while moving round the sun is ----- m/s | | | 01 | 1 | CO4 |
| a) | 3×10^4 | b) | 33×10^4 | | | |
| b) | 9×10^7 | c) | 3×10^5 | | | |
| 18. | According to special theory of relativity the velocity of light is constant and is equal to -----m/s | | | 01 | 1 | C04 |
| a) | 3×10^{10} | b) | 33×10^4 | | | |
| c) | 9×10^7 | d) | 13×10^5 | | | |
| 19. | Mass energy relation is nothing but ----- | | | 01 | 1 | C04 |
| a) | $E = mC^4$ | b) | $E = mC$ | | | |
| c) | $E = mC^2$ | d) | $E = mC^3$ | | | |
| 20. | In Michelson –Morley experiment the distance of mirror M1 and mirror M2 from the centre of semi silvered glass plate is -----m. | | | 01 | 1 | C04 |
| a) | 10 | b) | 9 | | | |
| c) | 11 | d) | 50 | | | |



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2019-20
EXM/P/09/01

Year and Program:

School of Science

Department of Physics

Course Code: PHS 301

Course Title: Classical
Mechanics

Semester – V

Day and Date: Tuesday
19/11/19

End Semester Examination
(ESE)

Time: 11am to 1:30pm
Max Marks: 100

Section - B.

Instructions:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Non-programmable calculator is allowed.

Q.N		Marks	Bloom's Level	CO
Q.2	a) Give reduction of two body problem into a single body problem.	8	L2	CO1
	b) State and prove Kepler's second law of planetary motion. OR	4	L2	CO1
	c) What do you mean by central force? Give some examples.	4	L2	CO1
Q.3	a) Give theory of energy transfer in coupled oscillations.	8	L3	CO3
	b) Explain concept of differential cross-section. OR	4	L3	CO3
	b) State and prove Kepler's third law of planetary motion	4	L2	CO1
Q. 4	a) Give kinematics of elastic collision	12	L4	CO4
	b) Obtain mass-energy relation in the theory of relativity. Or	8	L4	CO4
	b) Describe experimental arrangement of Michelson-Morley	8	L4	Co4
	c) What is distance of closest approach? Give its	4		

ESE

	physical significance.			
	d) Give two differences between elastic and in elastic collision.	4	L3	CO3
	a) Obtain Lorentz transformation equations.	12	L4	CO4
Q. 5	b) Give kinematics of elastic collision	8	L3	CO#
	OR			
	b) Obtain Rutherford Formula for scattering of α particles	8	L3	CO3
	c) What is second postulate of special theory of relativity? Apply it to addition of velocity in relativity.	4	L4	CO4
	d) Give two differences between elastic and in elastic scattering.	4	L3	CO3