



Date: 21-04-2016

Dept. No.

Max. : 100 Marks

Time: 01:00-04:00

Part A

Answer ALL questions

(10 x 2 = 20 marks)

1. State the law of Conservation of linear and angular momentum?
2. Explain centre of mass.
3. Define moment of a couple.
4. Draw a solid tetrahedron and indicate the point of centre of gravity.
5. State Fick's law of diffusion.
6. What is velocity of effusion?
7. What are generalised coordinates? Give an example.
8. Define virtual work.
9. State Law of areas and Law of elliptical orbit proposed by Kepler.
10. Explain parking orbits.

Part B

Answer any FOUR questions

(4 x 7.5 = 30 marks)

11. Prove that the oscillations of a torsional pendulum is simple harmonic .
12. Determine the meta centric height of a ship.
13. An engine pumps water from a tank at the rate of 5 kgm/sec and ejects from a nozzle 6 meters above the surface of the tank with a velocity of 10 meters per sec. Calculate the pressure difference between the surface and the nozzle.
14. Find the centripetal acceleration in a bead sliding on an uniformly rotating wire.
15. Define velocity of escape and hence deduce the formula to calculate it.

Part C

Answer any FOUR questions

(4 x 12.5 = 50 marks)

16. Derive the angular acceleration of a bifilar pendulum by non – parallel threads **(8)** and find the time period of a bifilar pendulum when it is suspended by parallel threads. **(4.5)**
17. Obtain the centre of pressure of a triangular lamina immersed in a liquid with its (i) vertex on the surface **(6)**  
(ii) one side on the surface **(6.5)**
18. State and prove Bernoulli's theorem. **(8)** Hence apply it to find the velocity of efflux of a liquid using Torricelli's theorem. **(4.5)**
19. Explain the significance of D'Alembert's principle **(4)** and hence deduce the Lagrange's equation from it. **(8.5)**
20. Explain with a neat diagram how 'G' can be measured by Boy's method.

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