BSc DEGREE EXAMINATION DECEMBER 2017
(Fourth Semester)

Branch – MATHEMATICS

MECHANICS – II (DYNAMICS)

Time : Three Hours   Maximum : 75 Marks

SECTION-A (20 Marks)
Answer ALL questions
ALL questions carry EQUAL marks (10 x 2 = 20)

1   Define relative velocity.

2   State polygon of velocities.

3   State Newton's third law of motion.

4   Define principle of conservation of linear momentum.

5   Write down the equation of greatest height attained by a projectile.

6   Define range on a plane.

7   Define line of impact.

8   State elasticity and inelasticity.

9   Define radius of gyration.

10   state perpendicular axes theorem.

SECTION - B (25 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5 x 5 = 25)

11 a   Explain resolution of velocities.

OR

    b   To find resultant of several coplanar velocities of a particle.

12 a   Explanations of the third law of motion.

OR

    b   Find the principle of work – energy.

13 a   A stone is thrown with a velocity of 39.2m/sec at $30°$ the horizontal find at what times it will be at a height of 14.7m (g = 9.8m/s^2).

OR

    b   Explain angle of projection and the time of flight.

14 a   Explain Newton's experimental law.

OR

    b   A smooth sphere or particle whose mass is m and whose coefficient of restitution is e impinges obliquely on a smooth fixed plane to find its velocity and direction of motion after impact.

15 a   Pedal equation of the central orbit.

OR

    b   Find the law of force towards the pole under which the curve $r^n = a^n \cos n\theta$.

SECTION - C (30 Marks)
Answer any **THREE** Questions
ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

16 A ship P is sailing due east at a speed of 16km/h when another ship Q which is due north of P at a distance of 10km from it start at a speed of 12km/h in a southern direction. Find the velocity of Q relative to P. What is the least distance apart that Q will attain from P and how long after starting will it attain it.

17 The work done is raising a number of particles from one position to another is wh were w is the weight of the particles and h is the vertical distance through which the centre of gravity of the particle has been raised.

18 To show that the path of a projectile is a parabola.

19 A particle falls from a height h upon a fixed horizontal plane if e be the co.efficient of restitution show that the whole distance described before the particle has finished rebounding is $h\left(\dfrac{1+e^2}{1-e^2}\right)$ and also show that the whole time taken is $\dfrac{1+e}{1-e}\sqrt{\dfrac{2h}{g}}$.

20 Find the moment of inertia rectangular lamina.

Z-Z-Z   END