Regulation R18 *Subject Code:* 2E2AD

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech II Semester Regular/Supplementary Examinations, November 2020

Engineering Mechanics

(Common to CE & ME)

Maximum Marks: 70 Date:16.11.2020 Duration: 2 hours

Part-A

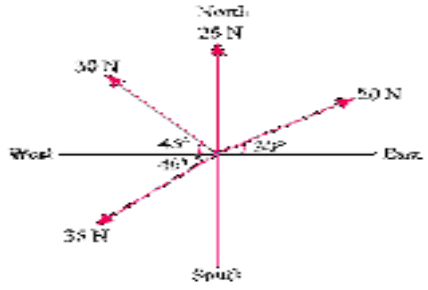
All the following questions carry equal marks **(10x1M = 10 Marks)**

1. State the Lami's theorem. [1M]
2. Define the weight [1M]
3. Define angle of repose [1M]
4. Define the friction [1M]
5. Define the dynamic friction [1M]
6. State the Parallel axis theorem. [1M]
7. State work-energy principle. [1M]
8. Define the term Dynamics. [1M]
9. Define mechanical vibration. [1M]
10. Define the concept of virtual work. [1M]

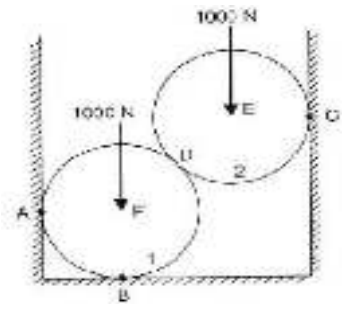
Part-B

Answer any FIVE questions. **(12M X 5 = 60Marks)**

11. The following forces act at a point: (i) 20 N inclined at 30° towards North of East, (ii) 25 N towards North, (iii) 30 N towards North West, and (iv) 35 N inclined at 40° towards South of West. Find the magnitude and direction of the resultant force. [12M]



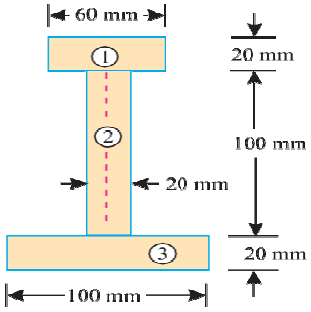
12. Two spheres, each of weight 1000 N and radius 25 cm rest in a horizontal channel of width 90 cm as shown in the Figure. Find the reactions on the points of contact A, B and C. [12M]



13. A ladder 6 m long and with 300N weight is resting against a wall at an angle of 60^0 to the ground. A man weighing 750N climbs the ladder. At what position along the ladder from the bottom does he induce slipping? The coefficient of friction for both the wall and the ground with the ladder is 0.2. [12M]

14. An effort of 200 N is required just to move a certain body up an inclined plane of angle 15°, the force is acting parallel to the plane. If the angle of inclination of the plane is made 20°, the effort required being again parallel to the plane, is found to be 230 N. Predict the weight of the body and coefficient of friction. [12M]

15. An I-section is made up of three rectangles as shown in Fig. Find the moment of inertia of the section about the horizontal axis passing through the center of gravity of the section. [12M]



16. Find the moment of inertia of a hollow rectangular section about its centre of gravity, if the external dimensions are 40 mm deep and 30 mm wide and internal dimensions are 25 mm deep and 15 mm wide. [12M]

17. Derive the mass moment of inertia of thin rod passing through the i) Centroid [6M]
ii) At the end of the rod. [6M]

18. Calculate the moment of inertia and radius of gyration of grinding stone 90cm in diameter and 10cm thickness with respect to its axis of rotation. Stone density is 0.0026Kg/cm³. [12M]

19. State and prove equations of simple harmonic motion. [12M]

20. Derive an expression for simple Pendulum. [12M]