Theory of Machines
(ME-203, Dec. 2003)

Time: 3 Hrs Max Marks: 60

Note: Section A is compulsory. Attempt any four questions from Section B and any two questions from Section C.

Section-A

1. (a) Differentiate between machine and structure.
   (b) What is loose and fast pulleys arrangement? Where is it employed?
   (c) What are V-Belts? Of what materials are they made?
   (d) Explain the term sensitiveness and hunting in connection with governors.
   (e) Discuss the various types of brakes.
   (f) What do you understand by static balance?
   (g) What is a Hooke's joint and where is it used?
   (h) Differentiate between brakes and dynamometers.
   (i) What is a Kinematic Chain?
   (j) How machines and mechanism differ from one another?

Section-B

2. How the mechanism of higher pair is can be replaced by the mechanism of lower pair?
3. Write a note on Ackerman's steering mechanism.
4. What is the difference between a shoe brake and a band brake? Describe a band brake and its practical applications.
5. Explain what is meant by the phenomenon of 'creep' in belts. How is creep under varying conditions of belt material determined?
6. State the different type of governors. What is the difference between centrifugal and inertia type governors? Why is the former preferred to later?

Section-C

7. Discuss the relative merits and demerits of belt, rope and chain drive for transmission of power.
8. Show that in a band and block brake the ratio of maximum and minimum tensions in brake straps is
$$T_O/T_n = [(1+\mu\tan\theta) / (1-\mu\tan\theta)]^n$$
9. Sketch and describe any one type of engine indicator and show clearly how this can be used for finding the pressure variations inside the power cylinder.