

TTL321 Mechanics of Spinning Machines- Major Test
22nd Nov 08 (Sat); 3.30-5.30PM; Venue: II-378; Max Marks – 40
Part I (15 marks)

- 1) Reverted gear train is not used for driving drafting rollers. Why?
- 2) What is winding rpm in speed frame?
- 3) Top and bottom cones in speed frames are ----- and ----- shaped.
- 4) In a carding machine, where do you use crossed flat belt drive?
- 5) In an open flat belt drive, the motor is at left side. The pulleys of motor and main shaft are in the same horizontal plane. Suggest for the direction of rotation of the motor.
- 6) -----belt drive is used to run ERM opener.
- 7) Name three variable speed drives used in textiles machine
- 8) Write the difference between the correction- and trail-weights
- 9) What is the importance of semi-cone angle in cone clutches?
- 10) Where do you use pivoted double block brake on a textile machine?
- 11) Under what circumstances do you use tapered roller bearings?
- 12) Test the validity of the statement, 'Statically balanced main shaft of a ring frame is dynamically balanced'.
- 13) Coefficient of friction in needle bearing is ----- than that in roller bearing.
- 14) Load carrying capacity ----- as rotational speed increases in hydrostatic bearings.
- 15) What is yield point?

Part II Maximum marks 25 (3 x 8.33)

- 16) How do you arrive at diameters of drafting-rollers considering the design and technological aspects
- 17) A cylinder of length 1000 mm and diameter 500 mm carries two pulleys each of 400 mm diameter. Pulleys are spaced equidistance from the extreme ends of cylinder. Span length between the mid-planes of the pulleys is 1400 mm. Cylinder has an excess mass 100 g at 150 mm radial distance and at vertical plane lying at 300 mm from the left end of the cylinder. How do you dynamically balance the cylinder by doing corrections on the pulleys?
- 18) Derive an expression for the power loss in sliding contact bearings

1. A waste land reclamation project produces the distribution of costs and benefits as shown in the table below. Discuss the effect of discount rate selection on the project viability. [15]

Year	Cost incurred at the end of year (x 1000 Rs)	Benefits produced at the end of year (x 1000 Rs)
0	1000	0
1	200	0
2	200	0
3	200	100
4	200	300
5	200	800
6	200	800
7	200	800
8	200	800
9	200	800
10	200	800

2. Let us assume site k as the potential site for a technology t . There are three types of wastes (W_1 , W_2 , and W_3) arising in the region. All three waste types are compatible with technology t . Waste types W_1 and W_3 are considered compatible with each other (i.e., waste types W_1 and W_3 can be treated by the same treatment technology t). However, combination of waste types W_1 - W_2 and W_2 - W_3 are considered noncompatible (i.e., these combinations should not be allowed at the same treatment technology). Using a 0-1 variable y_{tk} to represent the presence or absence of the technology t at the site k , and a 0-1 variable z_{wtk} to represent the state of waste type w being treated at technology t at site k , formulate the waste-waste and waste-technology compatibility constraints. [10]
3. Write a short note on the utility of systems approach in addressing the environmental problems. Discuss the limitations associated with the systems approach and caution in terms of result's interpretation. [5]
4. Compare the linear programming and dynamic programming methods for environmental decision making in terms of their advantages and limitations. [5]
