ICML Body of Knowledge Breakdown

I. Maintenance Strategy (5%)
- A. Why machines fail
- B. The impact of poor maintenance on company profits
- C. The role of effective lubrication in failure avoidance

II. Lubrication Theory (10%)
- A. Fundamentals of tribology
- B. Functions of a lubricant
- C. Hydrodynamic lubrication (sliding friction)
- D. Elastohydrodynamic lubrication (rolling friction)
- E. Mixed-film lubrication

III. Lubricants (15%)
- A. Base-oils
- B. Additives and their functions
- C. Oil lubricant physical, chemical, and performance properties and classifications
- D. Grease lubrication
  1. How grease is made
  2. Thickener types
  3. Thickener compatibility
  4. Grease lubricant physical, chemical, and performance properties and classifications

IV. Lubricant Selection (15%)
- A. Viscosity selection
- B. Base-oil type selection
- C. Additive system selection
- D. Machine-specific lubricant requirements
  1. Hydraulic systems
  2. Rolling element bearings
  3. Journal bearings
  4. Reciprocating engines
  5. Gearing and gearboxes
- E. Application and environment-related adjustments

V. Lubricant Application (25%)
- A. Basic calculations for determining the required lubricant volume
- B. Basic calculations to determine re-lube and change frequencies
- C. When to select oil, when to select grease
- D. Effective use of manual delivery techniques
- E. Automatic delivery systems
  1. Automated delivery options

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a) Automated grease systems
b) Oil mist systems
c) Drip and wick lubricators
2. Deciding when to employ automated lubricators
3. Maintenance of automated lubrication systems

VI. Preventive and Predictive Maintenance (10%)

A. Lube routes and scheduling
B. Oil analysis and technologies to assure lubrication effectiveness
C. Equipment tagging and identification

VII. Lube Condition Control (10%)

A. Filtration and separation technologies
B. Filter rating
C. Filtration system design and filter selection

VIII. Lube Storage and Management (10%)

A. Lubricant receiving procedures
B. Proper storage and inventory management
C. Lube storage containers
D. Proper storage of grease-guns and other lube application devices

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