

National Exams May 2014

04-For-A1, Forest Engineering Operations

3 hours duration

NOTES:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is an OPEN BOOK EXAM.
Any non-communicating calculator is permitted.
3. Answer any FIVE (5) of the following 8 questions, 5 answers of 5 questions constitute a complete exam paper.

The first five questions as they appear in the answer book will be marked.
4. Each question is of equal value of 20 marks.
5. Questions require an answer in essay format. Clarity and organization of the answer are important. Use of examples, diagrams, figures may be essential for clarity.

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2014 Examination Questions

1. Define: Harvest System. What kinds of harvest systems are common to Canadian Forest Industry? How is each system different from another? Give examples of equipment that work in each system, explaining the functionality of each machine (Use of an arc node diagram may help).
2. Productivity improvement has become a key business strategy for forest companies. Define process improvement, relate this to forest operations, justify why forest companies have focused on improving productivity and explain how costing and efficiency related to forest operations are impacted.
3. With respect to harvest systems, does improving the productivity of one machine in a system, improve the productivity of the system? Explain why or why not. Use examples where appropriate to clearly illustrate your rationale.
4. Describe the difference between a full tree system and a short wood system. Define common machines found in each system. Explain the functions of each machine including limiting factors on productivity and output quality. Explain how the function of one machine can impact the productivity of subsequent machines following it in a system.
5. Understanding equipment costing is critical to the forest industry. Companies refer to the costing of equipment as a rental rate or proforma. Define rental rate or proforma. Explain all relevant information required to calculate the cost to operate a machine (\$/pmh). Give examples where appropriate.
6. List and describe 4 techniques (technology or otherwise) forest companies have used to reduce their wood cost (process improvement, productivity improvement, multistage, etc). These improvements can relate to any aspect of forest operations (harvesting or trucking) but must be thoroughly explained.
7. Business earnings in the forest industry are critical to ensure all operating costs and expenses are covered. Given the following formula to calculate earnings:

$$\frac{\text{Volume (Production)} * \text{Rate (\$/volume)} * \text{Productivity (volume/pmh)}}{\text{Utilization}}$$

Define each part of the formula and explain how each are calculated or recorded, indicate how a positive or negative relationship impacts earnings as it relates to the forest industry (e.g. productivity goes up or down). Use a common machine in the forest industry as your example.

8. Equipment earnings are an essential component to financial health of companies and equipment. Explain the pro's and con's to having equipment reimbursed based on an hourly rate and productivity. When would a business desire payment for each approach. Provide formula's if needed to ensure clarity