BENGAL ENGINEERING AND SCIENCE UNIVERSITY, SHIBPUR
B.E. 7TH SEMESTER (MinE) FINAL EXAMINATIONS, 2012
Computer Application in Mining (MN 704)

Full Marks: 70 **Time: 3 hrs**

Use separate answer script for each half
Question Nos. 1 & 6 are compulsory
Answer FOUR questions from the rest, taking TWO from each half
Marks are indicated on the right margin of the questions

1st half

1. a) Write the 'difference between the two' of all of the followings:

i) Discrete system and discrete-event system
ii) System and Process
iii) Endogenous Activity and Exogenous Activity
iv) Availability and Utilization
v) Production Efficiency and Overall Equipment Effectiveness [3×5=15]

2. a) What do you mean by Simulation?

A mining company produces around 100 wagons of coal. The daily production varies from 96 to 104 wagons depending upon the manpower, availability of raw materials and other working conditions:

Production (per day):	96	97	98	99	100	101	102	103	104
Probability :	0.04	0.09	0.12	0.14	0.11	0.10	0.20	0.12	0.08

Coal is transported through rail consisting of 100 wagons. Using following random numbers:

68 69 61 57 80 81 76 75 64 43 18

26 10 12 65

Simulate the process to find out:

(i) What will be the average wagons of coal waiting in the coal handling plant?

(ii) What will be the average number of empty wagons in the rail?

[2+8=10]

3. a) What do you mean by reliability?

b) Explain 'bathtub hazard rate curve' to represent the failure rate of various types of engineering items.

c) Write the probability mass functions of 'Binomial Distribution' and 'Poisson Distribution' and also explain the corresponding reliability networks which obey these distributions.

[2+2+6=10]

4. a) What are the commonly used fault tree symbols?

b) Write the expressions for probability of occurrence for each of them.

c) Elaborate with a suitable example if all basic fault events occur independently and occurrence probability of each one is 0.25. [2+3+5=10]

5. a) Write the expression for mean corrective maintenance time.

b) Assume that an open pit system is composed of shovel, dump truck, working face and dumping place, which form a series configuration. Their constant failure rates are 0.004, 0.006, 0.008 and 0.01 failures per hour respectively and all the components fail independently.

(i) Calculate the open pit series system reliability in a 30 hours mission

(ii) Calculate also the mean time to failure.

(iii) If the corrective maintenance times associated with subsystems are 4, 3, 1.5 and 2 hours respectively, calculate the pit systems mean corrective maintenance time.

[1+3×3=10]

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CAM ~~(704)~~ 2nd Half

Answer question number 6 and any two from the rest

6) a) What are the basic uses of computer in mining industry ?

b) Write a note on how resource modeling is done in a mine planning software. Describe the modeling technique used for non strata bound and non uniform ore deposit .

(4+9)

7 a)What are the factors to be considered for optimal pit design?

b) Describe Lerchs and Grossman 2D pit optimization algorithm.

(4+7)

8 a) What is user defined block model ? What should usually be the size of a user defined block in a block model ?

b) Discuss how economic value is assigned to the blocks in a block model?

(3+8)

9 a) Give a brief account of the data requirement for pit design using a mine planning software

b) What are the steps involved in pit design in a mine planning software ?

(8+3)

10 a) Name four mine planning software commonly used in the mining industry.

b) What is a constrained block model?

c) Write a short note on database building module of any mine planning software .

(4+2+5)