

B.A. (Honours) Examination, 2018
Semester-III (CBCS)
Economics
Skill Enhancing Compulsory Course - SECC-1
(Mathematical Methods III)

Time: Two Hours

Full Marks: 25

Questions are of value as indicated in the margin
Answer *any two* questions

1. Consider an economy that produces output “y” using only capital “K” according to the production function $y = (4 + 0.3K)t^{1/2}$

where t denotes time. A constant proportion “s” of output is saved where $0 < s < 1$. Capital accumulation is equal to savings ($s = 0.2$) 12.5

$$\dot{K} = 0.2y$$

Given that the initial level of capital is $K_0=1000$ find the explicit solution for capital in this model.

2. Find the complete solution to the second order linear differential equation. 12.5

$$\ddot{y} + 5\dot{y} + 4y = 24$$

Given that $y(0) = 20$ and $\dot{y}(0) = 2$

3. A professor has two research assistants, one female and one male. On any given day the probability that the female assistant will be absent is 0.05 and the probability that the male assistant will be absent is 0.08 and that they will both be absent is 0.02. Find the probability that on any given day

(a) At least one research assistant will be absent.

(b) Only one of the research assistants will be absent.

(c) No research assistant will be absent. 4+4+4.5

4. (a) When are two events called independent. Explain using an example.

(b) State and prove the Bayes’ theorem

(c) Suppose 25% of all cars in West Bengal emit excessive pollutants. Suppose the probability that a car emitting excessive pollutants will fail a pollution check is 0.99; and the probability that a car not emitting excessive pollutants fails the check is 0.17.

What is the probability that a car that fails the check actually emits excessive pollutants? 4+4+4.5