

Roll No

BE-3001 (EC) (CBGS)**B.E., IV Semester**

Examination, November 2018

Choice Based Grading System (CBGS)**Mathematics - III***Time : Three Hours*<https://www.rgpvonline.com> **Maximum Marks : 70**

- Note:** i) Attempt any five questions.
ii) All questions carry equal marks.

- Find the Fourier series to represent $f(x) = x + x^2$ in interval $(-\pi, \pi)$.
 - Expand the function $f(x) = x \sin x$ as Fourier series in interval $(0, 2\pi)$.
- Find the Fourier cosine transform of the function $f(x)$ of $f(x) = \begin{cases} \cos x, & 0 < x < a \\ 0, & x > a \end{cases}$.
 - Find Fourier sine transform of $f(x) = \frac{1}{x}$.
<https://www.rgpvonline.com>
- Find the Laplace transform of the followings
 - $\frac{\sin t}{t}$
 - $\frac{e^{-t} \sin 2t}{t}$
 - Evaluate the integral $\int_0^{\infty} t e^{-3t} \sin t dt$.

4. a) Find the inverse Laplace transforms of the followings:

$$\text{i) } \frac{1}{9s^2 + 25} \quad \text{ii) } \frac{5s - 18}{9s^2 + 25}$$

$$\text{b) Evaluate } L^{-1} \left\{ \frac{1}{(s+1)(s-2)} \right\}.$$

- If there are 3 misprints in a book of 1000 pages, find the probability that a given page will contain
 - No misprint <https://www.rgpvonline.com>
 - More than 2 misprints

$$\text{b) Find } L \left\{ \frac{1 - e^t}{t} \right\}$$

- Find mean and variance of Prison distribution.
 - In a binomial distribution the mean and standard deviations are 12 and 2 respectively. Find n and p .
- Fit a straight line to the data:

x:	1	4	2	3	5
y:	3	1	2	5	4
 - If on an average one ship in every ten is wrecked. find the probability that out of 5 ships expected to arrive 4 atleast will arrive safely. <https://www.rgpvonline.com>

8. a) Use Laplace transform to solve.

$$y'' + 2y' + 5y = 3e^{-t} \sin t$$

$$\text{Given that } y(0) = 0, y'(0) = 1.$$

- If 3% of the electric bulbs manufactured by a company are defective, find the probability that in a sample of 100 bulbs exactly 5 bulbs are defective.
