

## Engineering Mathematics

### Continuous Probability Distributions – Gaussian Distribution

#### Exercise 2

The examination marks for an engineering module follow a normal distribution with mean  $\mu = 50$  and standard deviation  $\sigma = 10$ . If 300 students took the examination and the pass mark is 40%, how many students passed the exam?

(Ans. 252 students passed)

#### Exercise 2 solution:

Mean value is  $\mu = 50$  and standard deviation is  $\sigma = 10$ .

Following a normal distribution, standard variate is

$$u = \frac{x - \mu}{\sigma} \quad (1)$$

Pass mark is  $x = 40$ , therefore, using Eq. (1) we obtain

$$u = \frac{x - \mu}{\sigma} = \frac{40 - 50}{10} = -1$$

Hence

$$P(x \geq 40) = P(u \geq -1) = P(0 \leq u \leq 1) + 0.5 = 0.3413 + 0.5 + 0.8413$$

Where the value 0.3414 is the area under the Standard Normal Curve for the given conditions, which can be found in section 2.5 of the Engineering Databook (Eight Edition).

The number of students taking the exam is 300, therefore the number of students passing the exam is  $0.8413 \times 300 = 252.39$ .

Therefore, 252 students passed the exam.