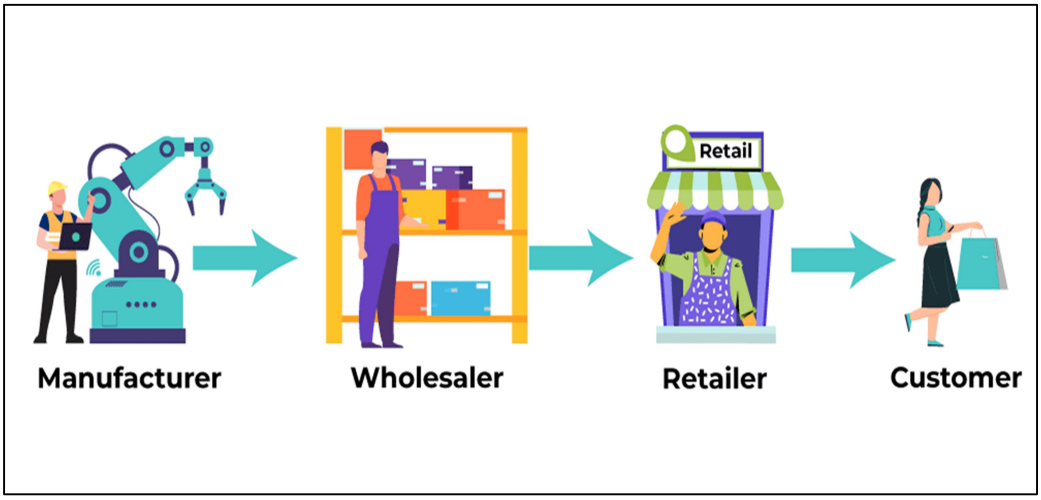
REVISION WORKSHEET
CLASS: XI
APPLIED MATHEMATICS (241)

CASE STUDY 1

A manufacturer listed the price of his goods at Rs. 2000 per article. He allowed a discount of 15% to a wholesaler, who in turn allowed a discount of 10% on the listed price to a retailer. The retailer sells one article to a consumer at a discount of 5% on the listed price. All sales are intra state and rate of GST is 12%.



1. How much amount does the wholesaler pay for each item (inclusive of GST)?
2. How much amount does the retailer pay for each item (inclusive of GST)?
3. Find the amount paid by customer (inclusive of GST) per article.
4. How much amount per item is paid by the wholesaler to the state government as GST?
5. How much amount does the central government receive from the retailer as GST?

CASE STUDY 2

A company manufactures smart thermal sensors used in industrial machines.
The temperature-response of the sensor, at time t seconds after activation, is modelled by:

$$R(t) = \begin{cases} \frac{t^2-4}{t-2}, 0 \le t < 2 \\ \frac{\sqrt{9t+18}-6}{t-2}, 2 < t \le 4 \\ a(3t^2+2t+1), t \ge 4 \end{cases}$$

To check the precision of the machine company wants to need some calculations based on calculus:

1. *In the interval* $[0,2)$ *, which type of discontinuity has been observed for* $R(t)$?
2. Find the value of $\lim_{x \to 2} \frac{\sqrt{9t+18}-6}{t-2}$
3. *If the function* f *is continuous at* $t = 4$ *, then what is the value of* a?
4. *Find the value of* $R'(4)$ *, i.e. differentiate the function at* $t = 4$ *and find its value.*
5. *For a function* $f(x)$*, if the right hand limit and left hand limit at a point* $x = a$ *exists but have different values, then which type of discontinuity does it have at* $x = a$?