5. The estimated cost has the estimated income and benefits; the best way of the project evaluation includes the developmental costs in terms of accruing from the system. How the overall estimation of the required activities, the installation cost and the operational cost have been performed? Interpret how cost- benefits evaluation techniques is done & its methods with examples.

Techniques
1. Net profit
2. Payback reriod
3. Return on investment
4. Net present value
5. Internal rate of return

Net profit
✓ The net profit of a project is the difference between the total costs and the total income over the life of the project.
✓ Net profits do not involve the timing of the cash flows.
✓ Project incomes are returned only towards the end of the project.
✓ Net profit = Total income – Total costs

Payback period
✓ Time taken to break even or payback the initial investment.
✓ The project with the shortest payback period will be chosen on the basis that an organization will wish to minimize the time that a project is 'in debt'
✓ Minimize the time limit.
✓ The payback period is simple to calculate but sensitive to forecasting errors.
✓ The limitation of the payback period is that it ignores the overall profitability of the project.
✓ Payback period = Time taken to break even

Return On Investment (ROI)
✓ ROI = (Average annual profit/total investment) * 100.
✓ Also known as Accounting Rate of Return (ARR).
✓ Provides a way of comparing the net profitability to the investment required.
✓ Return on Investment (ROI) = (Average annual profit / Total investment) * 100 %.

Net Present Value (NPV)
✓ A Project evaluation technique that takes into account the profitability of a project and the timing of the cash flow rates are produced.
✓ Sum of all incoming and outgoing payments, discounted using an interest rate, to a fixed point in time (the present).
✓ Present value = (value in year t) / $(1 + r)^t$'
  - r is the discount rate.
  - t is the number of years into the future that the cash flow occurs.
✓ Net present value can also be calculated by multiplying the cash flow by the appropriate discount factor.
✓ NPV for project is obtained by summing the discounted values and discounting each cash flows.
✓ The NPV for project is obtained by discounting each cash flow and summing the discounted values.
✓ $(1 + r)^t$ is known as discount factor
✓ In the case of 10% rate and one year
  - Discount factor = $1/(1 + 0.10) = 0.9091$

- o Discount factor = 1 = (1.10 □ 1.10) 0.8294
- ✓ Discount rate is the annual rate by which we discount future earnings.
  - o e.g. If discount rate is 10% and the return of an investment in a year is $110, the present value of the investment is $100.

Internal Rate of Return (IRR)
- ✓ Attempts to provide a profitability measure as a percentage return that is directly comparable with interest rates.
- ✓ The IRR is calculated as that percentage discount rate that would produce an NPV of zero.
- ✓ A spreadsheet or a small computer program can be used to calculate the IRR is a convenient and useful measure of value of a project.
- ✓ The limitation of IRR is that it does not indicate the absolute size of the return value.
- ✓ Can be used to compare different investment opportunities.
- ✓ May be estimated by plotting a series of guessing.
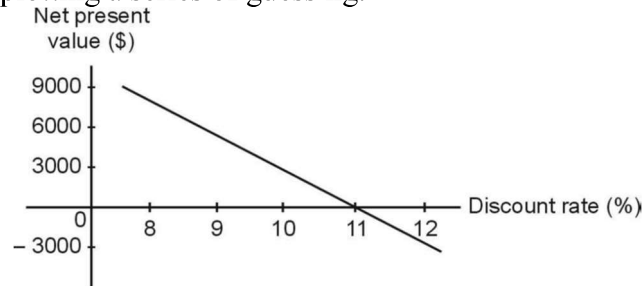
UNIT – II
2- Marks

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1.   How to identify the project as either Object – Driven or Product – Driven.

Project whose requirement is to meet certain objectives which could be met in a number of ways, is objective-based project. Project whose requirement is to create a product, the details of which have been specified by the client, is product-based project.

2.   Whether RAD is the incremental model? Give the Justification of the incremental model.

RAD model is Rapid Application Development model. It is a type of incremental model. In RAD model the components or functions are developed in parallel as if they were mini projects. The developments are time boxed, delivered and then assembled into a working prototype.

3.   How to be aware of the major shortcomings of the SLOC measure.

Source Lines of Code (SLOC): is software metric used to measure the size of software program by counting the number of lines in the text of the program's source code. This metric does not count blank lines, comment lines, and library. SLOC measures are programming language dependent. They cannot easily accommodate nonprocedural languages. SLOC also can be used to measure others, such as errors/KLOC, defects/KLOC, pages of documentation/KLOC, cost/KLOC. ii) Deliverable Source Instruction (DSI): i similar to SLOC. The difference between DSI and SLOC is that s "if then-else" statement, it would be counted as one SLOC but might be counted as several DSI .

4.   Draw the Waterfall model with neat diagram.