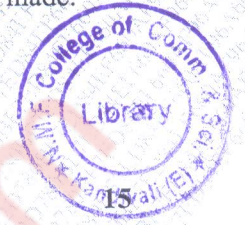(2½ hours)

Total Marks: 75

N. B.: (1) **All** questions are **compulsory**.
    (2) Make**suitable assumptions** wherever necessary and **state the assumptions** made.
    (3) Answers to the **same question** must be **written together**.
    (4) Numbers to the **right** indicate **marks**.
    (5) Draw **neat labeled diagrams** wherever **necessary**.
    (6) Use of **Non-programmable** calculators is **allowed**.

1. **Attempt _any three_ of the following:**   15
a. What is software? Explain the characteristics of software.
b. Explain software development life cycle (SDLC) with the help of diagram.
c. Define software engineering and its layer with the help of diagram.
d. Write a short note on
    1. RAD Model
    2. TimeBox Model
e. What are functional and non-functional requirements of software?
f. Explain the three phases in SCRUM for agile project management.

2. **Attempt _any three_ of the following:**   15
a. Describe the different stages of system engineering process.
b. Explain the importance of system dependability and the causes of failure in system dependability.
c. Explain the legacy system in socio technical system that continues to provide essential services.
d. Explain the process of requirement engineering briefly.
e. Explain USE Case diagram with **online shopping**: Web customer **actor** uses some web site to make purchases online. Top levels USE CASES are **view items, make purchase** and **client register**. View items use case could be used by customer as top level use case if customer only wants to find and see some products. This use case could also be used as a part of make purchase use case. Client register use case allows customer to register on the web site, for example to get some coupons or be invited to private sales.
f. Explain briefly legacy system categories and its assessment with the help of example.

3. **Attempt _any three_ of the following:**   15
a. Define architectural design and explain the functions of architectural design.
b. Explain the three rules for user interface design process (UID).
c. Explain software project management briefly.
d. Briefly explain the risk identification and the types of risk in the process of risk management.
e. Explain the functions of quality assurance and its standards.
f. Describe why it is important to measure the software metrics.

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4. **Attempt _any three_ of the following:**   15
a. Explain system testing process.
b. Explain briefly verification and validation (V & V) process.
c. List and describe the static analysis check points involved in automated static analysis.
d. Write a short note on size oriented metrics of software measurement and find the effort for the project, assume that 310 FP (function point) are estimated in total, and average productivity based on past projects is 5.5 FP/person-month.
e. Explain any one type of metrics to estimate the software productivity.
    1 Function points
    2 Object point
f. Calculate cyclomatic complexity using the control flow diagram for the given example:
    IF A = 10 THEN
    IF B > C THEN
    A = B
    ELSE
    A = C
    ENDIF
    ENDIF
    Print A
    Print B
    Print C

5. **Attempt _any three_ of the following:**   15
a. Explain process and product quality.
b. Explain the different levels of **CMMI** (capability maturity model introduced) framework.
c. Explain briefly **WSDL** (web service description language).
d. What are the benefit and problem of reusing software?
e. Briefly describe the concept of **SOA** (service oriented architecture) and the benefits of SOA.
f. Write a short note on SaaS(Software as a service).

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