TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Baishakh

Exam.	Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering (*CT 601*)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What are typical software characteristics? Discuss spiral model of software development in brief. [3+5]
2. Prepare a list of functional requirements, level -0 and level -1 DFD for the following project:

   An automated ticket issuing system sells bus tickets. When the user presses the button, a menu is displayed with potential destination along with a message to the user to select a destination. Once a destination is selected, users are requested to input their credit card. Its validity is checked and the user is then requested to input their personal information. When the credit transaction has been validated, the ticked is issued. [3+2+3]
3. What is the purpose of use case diagrams? Construct use case diagrams and context level diagram for a library management system. [2+4+2]
4. Differentiate between thin client and thick client model. Describe layered architecture for software. [3+5]
5. Define real-time operating system. List out some important characteristics of RTOS. [1+3]
6. What are the pros and cons of software reuse? What factors need to be taken care while software reuse planning? [5+2]
7. What are the components and component-based software engineering? What are the advantages and disadvantages of using components? [2+3]
8. Explain software inspections and formal methods. Explain the V-model for test-based software development. [4+6]
9. What is the purpose of using different COCOMO models? Explain the COCOMO model in cost estimation of the software. [2+4]
10. Differentiate between ISO and CMMI standards for software quality. What are formal technical reviews? Discuss all the levels of CMMI. [3+5+2]
11. What is software configuration management and why is it important? How could you do change management systematically in software projects? [2+4]

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2078/07/10

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Kartik

Exam.	Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT 601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
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1. What is software crisis? Briefly explain the qualities of a good software. [3+4]
2. What is a software process model? Explain how both the waterfall model and prototyping model of software process can be accommodated in spiral process model? [2+6]
3. A restaurant uses an information system that takes customer orders, sends the order to the kitchen, monitors the goods sold and inventory and generates reports for management.
   a) List functional and non-functional requirements for this system. [5]
   b) Develop DFD level 0 and level 1 for above scenario. [3+5]
4. What do you understand by control styles in architectural design? Explain call reference architecture with suitable example. [2+4]
5. Differentiate real-time software and other software. Explain data acquisition system. [2+3]
6. What are the benefits and problems of software reuse? What factors need to be taken care for software reuse planning? [3+4]
7. Compare validation and verification. Explain software inspection process. Explain unit test, integration test and system test. [4+4+3]
8. Define regression testing. Explain cyclomatic complexity as a software metric. [2+3]
9. What is software reliability and how can we measure it? Briefly explain CMM and its different levels. [4+5]
10. Write short notes on: [3×3]
    a) CBSE (Component Based software Engineering)
    b) Version and Release Management
    c) COTS reuse

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT 601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
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1. Define software. List the typical software characteristics? Justify this statement "software doesn't wear out". [1+3+4]
2. What do you mean by software requirements document? Explain requirement engineering process in detail. [2+6]
3. Draw use case diagram for a system illustrating the interactions between a doctor, who sees patients and prescribes him medicine and treatments. List some functional and non-functional requirements in this case. [5+3]
4. What is software architecture? Why architecture is important to drive software development? Explain multi-tier architecture with example. [2+2+4]
5. Distinguish between a real time and non-real time system. What is a data acquisition system? [2+2]
6. List the different levels in which software reuse may be possible. What are the advantages and disadvantages of software reuse? [3+4]
7. What are the benefits of CBSE? What are software components? Explain with symbols for components. [2+3]
8. Differentiate between verification and validation. Explain how and why the V-model emphasis software V and V. Discuss various hierarchical level of testing. [2+4+4]
9. What is COCOMO? What are the different types of COCOMO models proposed? What is the problem with using lines of code? [1+3+2]
10. Explain formal technical review process. Explain how CMMI model is used to evaluate the maturity of a software development. [5+5]
11. What is the difference between version and variant of a system? Describe change management process in software engineering. [2+4]

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT 601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
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1. What is software crisis? What are typical software characteristics? [4+3]
2. Explain the Prototyping model of software development. What are its advantages and disadvantages? [5+2]
3. Study the narration for a ride sharing system and prepare analysis and design models as specified below:

   Real-time ridesharing is a service that arranges one-time shared rides on very short notice. Vehicle owners register to the system as Service Provider and customers register as Service Seeker. The vehicle registration can be done for motorbike and car only. This type of service makes use following technological advances:

   -GPS navigation devices to determine a driver's route and arrange the shared ride

   -Smartphones for a traveler to request a ride from wherever they happen to be

   These elements ar coordinated through a mobile application, which can instantaneously handle the driver payments and match using an optimization algorithm. When a seeker needs ride, he/she opens the mobile app which automatically tracks his/her location and marks as pick-up point. Seeker sets the drop-off point using map. Seeker can also search the location and set hi/her drop-off point. The system calculates the estimated fare and seeker needs to confirm the ride. System searches the near by service provides and displays the information about the provider including the vehicle number and mobile number. Once the service provider picks the seeker, system tracks the route followed and calculates the fare once they reach to the drop-off point. Seeker may pay in cash or other electronic platform like e-sewa. Seeker can provide the feed back about his/her ride and can also view the ride history.

   a) List functional and non-functional requirements for the system. [5]
   b) Draw Level 0 DFD. [3]
   c) Draw Level 1 DFD. [5]
4. Describe software architecture. Explain Client-Server architecture and its importance. [3+4]
5. What is the role of data acquisition system? Explain the difference between hard and soft real time system. [2+3]
6. What are the main problems with software reuse? List key factors that should be considered for reusing software components. [3+3]
7. Differentiate between verification and validation. What are the types of the faults that can be uncovered by software inspection? Differentiate between black-box testing and white-box testing. [3+2+5]
8. What is component composition? Briefly explain the use of COCOMO model. [2+3]
9. Explain different levels of CMMI. [5]
10. What is FTR? How is Formal Technical Review (FTR) performed? [2+5]
11. Write short notes on: [4×2]

    a) Modular decomposition styles
    b) Need of software configuration management

TRIBHUVAN UNIVERSITY
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Examination Control Division
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT 601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions. .*
- ✓ *The figures in the margin indicate **Full Marks**.*
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1. a) Define software crisis. How can you say that there was software crisis in late 60s? [5]
   b) Explain incremental model. Writes its advantages and disadvantages. [4+3]
2. DFD level-0 and DFD level-1 for the case study given below. [3+5]
   A travel agency wants an Airline Ticketing System to be developed for the office so that user can easily book flight tickets from anywhere. First of all, the customer enters the destination and data for the flight. After that, the system displays the available airlines for the same along with route or available time which is provided by the airlines company. Now the customer selects the airline which he/she finds appropriate where he/she can either book the ticket or confirm the ticket. The customer pays the ticket charge either via e-sewa or transferring the amount to the agency's bank account directly. The customer has to provide the valid email address to get the notification of booking or ticket confirmation.
3. a) What is software design architecture and what is its significance in software engineering? [2+3]
   b) What are the common modular decomposition styles used in architectural design? Explain. [5]
4. How is a real-time software different from other software? What is a data acquisition system? [2+3]
5. Briefly describe advantages and disadvantages of software reuse. What is COTS reuse? [4+2]
6. What are the different factors to be considered before reusing software components. Explain. [5]
7. What is verification and validation? Explain their difference. Why is verification and validation planning necessary in software engineering? [3+2]
8. Write about stub and driver testing. Differentiate between white box and black box testing. [3+3]
9. Describe Cyclomatic Complexity as a software testing metrics. Use the concept of Halstead's metrics to compute the program length, program vocabulary, program volume, potential volume, program level, programming effort and time for the following code. [2+4]

```
Int x, y, z;
z = 0;
while ( x > 0 )
{
    z = z + y;
    x = x - 1;
}
printf("%d",z);
```

10. a) What do you mean by Formal Technical Review (FTR)? How is a formal technical review conducted? [2+4]
    b) Describe software reliability an SQA. [3+3]
11. Describe configuration management planning. [5]

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TRIBHUVAN UNIVERSITY
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2076 Ashwin

Exam.	Back		
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Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT 601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
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1. What do you mean by requirement elicitation and analysis? List the characteristics, advantages and disadvantages of Incremental Development Model. [4+6]
2. In a particular college, a sports week needs to be organized you have been assigned a role of business analyst to design a DFD diagram for the whole system. Assuming the activities such as online registration, student council, form fill up, sport event venue and time, score card, rules and regulations, card system and prize distribution. [3+5+2]
   a) Prepare the list of process and agents.
   b) Draw the DFD up to level 1.
   c) Distinguish between functional and non-functional requirements.
3. Why is architectural design really important? What are the different types of control styles used by software engineers in designing the architectures? Explain in detail. [2+6]
4. Differentiate between hard real time system and soft real time system. Outline real time system design process. [2+3]
5. Justify the statement "Advantages of reuse are lower costs, faster software development and lower risks." What is a design pattern? [3+2]
6. What is a component? Explain the component-based software engineering (CBSE) process in brief. [2+4]
7. Differentiate verification and validation. Write different types of fault that can be determined from inspection. [5]
8. Explain the V-model for software development process. Distinguish between alpha and beta testing. [5+2]
9. Explain the cocomo model for software cost estimation. [5]
10. a) Define SQA. What are the main objectives of Formal Technical Reviews? [2+3]
    b) Define term software reliability. Explain how CMM encourages continuous improvement of software process. [2+4]
11. Write short notes on: [4×2]
    a) SEI Capability Maturity Model
    b) Software version, variant and release

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31 TRIBHUVAN UNIVERSITY
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Examination Control Division
2075 Ashwin

Exam.	Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All questions**.*
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1. What factors have contributed to the making of the present software crisis? Suggest the possible solutions to the present software crisis? [3+3]
2. Why it is so difficult to gain a clear understanding of what the customer wants? Describe the guidelines for the requirement elicitation process with suitable examples. [3+4]
3. Suppose a travel and tour agency needs a software for automating its book keeping activities. The set of activities to be automated are rather simple and are at present being carried out manually. The travel agency had indicated that it is unsure about the type of user interface which would be suitable for its employees and its customers. Would it be proper for a development team to use the spiral model for developing this software? Justify. [6]
4. A company needs to develop a time Management system (TMS) for its executives. The software should let the executives register their daily appointment schedules. The information to be stored includes person (s) with whom meeting is arranged, venue, the time and duration of the meeting, and the purpose. When a meeting involving many executives needs to be organised, the system should automatically find a common slot in the diaries of the concerned executives, and arrange a meeting at that time. It should also inform the concerned executives about the scheduled meeting through e-mail. If no common slot is available, TMS should help the secretary to rearrange the appointments of the executives in consultation with the concerned executives for making room for a common slot. To help the executives check their schedules for a particular day the system should have a very easy-to-use graphical interface. Since the executives and the secretaries have their own desktop computers, the time management software should be able to serve several remote requests simultaneously. Many of the executives are relative novices in computer usage. Everyday morning the time management software should e-mail every executive his appointments for the day. Besides registering their appointments and meetings, the executives might mark periods for which they plan to be on leave. Also, executives might plan out the important jobs they need to do on any day at different hours and post it in their daily list of engagements. Other features to be supported by the TMS are the following–TMS should be able to provide several types of statistics such as which executive spent how much time on meetings. For which project how many meetings were organised for what duration and how many man-hours were devoted to it. Also, it should be able to display for any given period of time the fraction of time that on the average each executive spent on meetings.

   a) List out all functional and non-functional requirements of the Time Management System. [6]
   b) Draw a labelled DFD for the following Time Management Software (TMS). Clearly show the context diagram and its hierarchical decompositions up to level 2. [6]

5. Why is it necessary to design the system architecture before specifications are written? Explain the different methods of modular decompositions with suitable examples. [3+4]

6. What are the major technical and non-technical factors that hinder software reuse? Do you suggest to reuse much software and, if not, why not? [4+3]

7. Develop a complete test strategy for the Time Management System (Q.N.4). Document it in a Test Specification. [4+4]

8. What are the importance of quality management in Software Development? Explain about staged CMMI Model. [3+4]

9. What is COCOMO? Calculate COCOMO effort, development time in calendar month, average staffing and productivity for the software construction process of Q.N.4. State your assumptions if necessary. [2+6]

10. Write short notes on: [4×3]

    a) Real Time Operating System Vs. Non-real Time Operating System
    b) Verification Vs. Validation
    c) CBSE Process
    d) Formal Technical Review

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31 TRIBHUVAN UNIVERSITY
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Examination Control Division
2074 Chaitra

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Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT601)*

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1. a) "Walking on water and developing software from specification are easy if both are frozen". Justify this statement. [5]

   b) Assume that you are the technical manager of software development organization. A client approached for a software solution. The problem stated by client have uncertainties which lead to loss if not planned and solved. Which model do you suggest for his project? Justify. Explain that model with its pros and cons. [5]

2. a) What is requirement engineering? Explain its steps. [4]

   b) For better healthcare facilities in remote areas, Ministry of Health (MOH) launches Telemedicine project. Through this project expert doctor from central hospital can examine patient in remote places through video conferencing. MOH propose to maintain central server to hold all patient records and medical history. Also system should able to manage routine of doctors, appointments and follow ups. Assume that you are technical lead of this project, answer the following questions.

   (i) list out all functional and non-functional requirement of the systems [6]

   (ii) Make project Feasibility Report [6]

3. A customer presents a cheque to a clerk. The clerk checks a database containing all account numbers and make sure whether the account number in the cheque is valid, whether adequate balance is there in the account to pay the cheque and whether the signature is authentic. Having done these the clerk gives the customer a token. The clerk also debits the customer account by an amount specified on the cheque. If the cash cannot be paid due to an error on the cheque, the cheque is returned. The token number is returned on the top of the cheque and it is passed on to the cashier. The cashier calls out the token number and the customer go to cash counter with the token. The cashier checks the token number, takes customer signature, pays cash, enter cash paid in a database called daybook and files the cheque.

   Prepare physical and logical DFD. [8]

4. What are software quality measures? Explain in details about staged CMMI model. [2+6]

5. a) Discuss the differences between verification and validation. [4]

   b) Compare and Contrast [4]

   (i) Unit testing and Integration testing
   (ii) Alpha testing and beta testing

6. a) An application has following: 10 low external inputs, 8 high external outputs, 13 logical files, 17 interface files, 11 average external inquires and complexity adjustment factor of 1.10. What are the unadjusted and adjusted function point counts? [5]

   b) Explain component-based software engineering (CBSE) process. [5]

7. What is COCOMO? Using standard method, estimate cost of software construction process of Q.N.3. State your assumption clearly before calculating the cost estimate. [8]

8. Write short notes on followings: [3×4]

   a) Distributed Object architecture
   b) Modular decomposition
   c) Hard and soft real time system
   d) Formal Technical Review and Inspection for QC

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41 TRIBHUVAN UNIVERSITY
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Examination Control Division
2074 Ashwin

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Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT601)*

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1. Mahanpur Nagarpalika is planning to develop new system for Tourists with all the details of their monumental structures, tourist attraction places and also cultural programs offering restaurants within the municipality. They have also plan to integrate entry tickets booking and purchasing through web as well as through app similar as the online movie ticket purchasing. Imagine you are one of the software engineer working on the project. With clear statement of your assumptions on the system environment and specifications about the system, prepare the followings:
   i) The list of system quality attributes including both functional and non-functional requirement of the systems. [6]
   ii) Complete data models with illustrative model diagram. [6]
2. a) Explain how software cost estimation is done using function point oriented and object point oriented methods. [5]
   b) What is software crisis? Explain with the help of example? [5]
3. Why architecture is important to drive software development? Explain 2 tier and 3 tier architecture with example. [3+3]
4. Explain CMMI model to evaluate the maturity of a software development. [8]
5. a) What are the benefits and problem of software reuse? What factors need to be taken care of while software reuse planning? [5]
   b) What are software quality measures? Why SQA is important? Explain. [5]
6. a) What is software verification? Clarify its role in ensuring the correctness of software implementation. [5]
   b) Compare and contrast the Black Box and White box testing in V and V process. [5]
7. Write short notes on: [3×4]
   i) Requirement elicitation and analysis
   ii) COCOMO and the variants
   iii) Modular decomposition styles
   iv) Pattern generator
8. Compare the following: [4×3]
   i) Client-server versus distributed object architecture
   ii) User requirements versus system requirements
   iii) Change management versus version management
   iv) Process model versus data model

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42 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Shrawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
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1. What is software crisis and what is its reason? Describe evolutionary model, in brief, explaining how it reduces crisis problem. [8]
2. In a particular school, there are various departments. There are various instructors and are having direct employment from corresponding departments. Students are admitted to school and later they choose their subject study program offered through various departments. The instructors are assigned for particular subject teaching task. Each department has a HOD to coordinate to overall activities, including class and lab scheduling processes. Students have to seat in for semester end exams as a final evaluation process. Assessment with 'NQ' status students are NOT allowed for final exam. At least after 8 semesters of such final evaluations, students with clearance form department, including HOD approval, students become ready for graduation".

   Now, answer the followings. [5+5+5]

   i) Prepare the list of processes and agents
   ii) Draw the DFD for graduation and associated processes
   iii) Depict the relationship between instructor, HOD and Department
3. Differentiate between thin client model and thick client model. Describe multiprocessor architecture for software. [3+5]
4. a) Explain the role of real-time operating system.

   b) Justify the statement "Advantages of reuse are lower costs, faster software development and lower risks." [4]
5. Compare and contrast: (a) alpha and beta testing (b) black box and white box testing (c) unit and integration testing. [8]
6. Give a suitable definition of software quality and briefly describe the rationale for your definition. Explain with quality attributes for software. [2+3+3]
7. What is the difference between version and release? Explain why we need Software Configuration Management (SCM). [2+4]
8. "Validation examines the dynamic behavior of software system". Explain this with an example. [5]
9. Write short notes on: [4×3]

   i) COCOMO
   ii) Component based software engineering
   iii) Non-functional requirements

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41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT601)*

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1. What do you mean by prototype? What are the risks if the prototyping becomes uncontrolled? Explain RAD in brief. [1+3+3]
2. Briefly discuss all the activities to be carried out in problem definition and feasibility analysis. [6]
3. Draw TWO DFD diagrams for simple e-commerce site based order processing system. Assume all necessary and required specifications on your own and state them clearly first. [2+4+4]
4. Explain how is real time OS and software different from non-real time OS and software? [6]
5. In theory, formal verification could be automated if the original specification is stated completely and precisely. Why is this hard to achieve in practice? Explain. [8]
6. The CMM rates software companies according to how well they identify and manage their software processes onto the 5 different levels. Explain any three out of these five levels. What advantages are there for a company to move up to the top level? [8]
7. Lines of code (LOC) and function point counts (FPC) are two measures of the size of a system. Explain advantages and disadvantages of using these two metrics for measuring systems. [3+3]
8. Mention the situations in which the software reuse is recommended. What do you mean by design pattern? [4+2]
9. What are the reasons behind the modern tendency toward the use of Component based Software Engineering? [5]
10. What are the main objectives of configuration management and version control? What is code line and baseline inversion management? [3+3]
11. Compare the followings: [3×4]
    i) Black-hole vs. miracle in DFD
    ii) Consistency vs. completeness in requirements engineering
    iii) Traceability vs. Adaptability in reviewing steps
    iv) Alpha vs. Beta testing

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41 TRIBHUVAN UNIVERSITY
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2072 Kartik

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Subject: - Software Engineering *(CT601)*

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1. What are typical software characteristics? What do you mean by software crisis? Elaborate. [4+4]
2. What are the reasons for software runways? Explain how both the waterfall model of the software process and prototyping model can be accommodated in the spiral process model. [2+6]
3. What is a behavior model? How does it differentiate from data model of the same system? Explain with examples and model. [3+3+2]
4. How many levels are there in CMM? Explain in detail about all the levels. [2+5]
5. Why software quality standards are needed? What are the metrics for software project size estimation? Discuss cyclomatic complexity with suitable example. [2+3+3]
6. Compare and contrast Verification with Validation. What do you mean by critical systems? How does partitioning augments in V and V process? Explain with example. [4+2+2+2]
7. "Survival of the fittest" is valid to software industry in today's competitive market. Explain the statement in the context of issues modern software configuration management must address nowadays. [8]
8. Differentiate between functional testing and structural testing. A web enabled system with a robust back-end database estimated to be of about 200 KLOC when complete. Assuming the system will work in semidetached mode, calculate the effort required per month, the development time, average number of staff required and he productivity rate. Consider COCOMO-2 for reference. [5+3]
9. Compare the following: [3×5]
   i) Client server vs Distributed object architecture
   ii) Real time vs Non-real time operating system
   iii) Walk through vs Inspection in testing process

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41 TRIBHUVAN UNIVERSITY
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Examination Control Division
2071 Chaitra

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Subject: - Software Engineering *(CT601)*

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1. Why it is so difficult to gain a clear understanding of what the customer wants? What are the guidelines for the requirement elicitation process? [4+4]
2. Explain details about current model of software process. Explain why the waterfall model of the software process is not an accurate reflection of software development activities. [4+4]
3. Read the case mentioned hereunder carefully and: [5+3]
   a) Make DFD level 1 for the system
   b) What do you mean by DFD balancing in the given case?

   A customer visits an online movie portal. He chooses DVD movies from three different categories: Sci-Fi, Classical and Romantic and places the order for the same. He is supposed to be able to make online payment using his bank details. Upon successful transaction he is expected to receive confirmation through his e-mail.
4. Explain why it may be necessary to design the system architecture before specifications are written. Explain client-server architecture with appropriate example. [4+5]
5. How do real-time software and operating system differ from non-real time software and operating system? Describe Data Acquisition System. [4+4]
6. What are the benefits of CBSE? How closely code generation feature of case tools are associated with CBSE? Explain. [3+5]
7. How does the SEI CMM ensure quality aspects of any complex software under development? What are the differences between ISO and CMM? [4+3]
8. What is COCOMO? Calculate COCOMO effort, development time in calendar month, average staffing and productivity for project of application program that is estimated to be 49,200 lines of code. [3+5]
9. Establish the chronology among component, release unit and integration testing. Also write distinctive notes on their testing. [3+4]
10. Write short notes on: [3×3]
    a) Software Requirement Specifications (SRS)
    b) Generator based reuse
    c) Change management

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42 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Shawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Explain why the waterfall model of software development is not an accurate reflection of software development activities. Explain better alternative model. [10]
2. Give your view on requirement engineering and requirement specification. [10]
3. What is behavior modeling in systems analysis process? Illustrate with a sample model diagram of any web-based transaction portal system. [5]
4. Explain the versioning process in the context of configuration management with all the associated components. [5]
5. How the modular decomposition concept is practiced in system design processes? Illustrate with your own example of a second level DFD. [4+6]
6. What specific considerations are to be made while designing typical software to be operated in real-time environment? Explain. [5]
7. Prepare a brief notes on design pattern with statement of their benefits. [5]
8. What is verification planning? Why such planning is required? What are the different steps involved in it? Explain. [8]
9. What is exception and error testing in the context of system implementation? [5]
10. What is COCOMO? Illustrate the calculation with an appropriate example. [5]
11. Write Short notes on: (any three) [4×3]
    a) Software testing metrics
    b) CMM level
    c) Statistical quality assurance
    d) CBSE

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41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.	Regular		
Level	BE	**Full Marks**	80
Programme	BCT	**Pass Marks**	32
Year / Part	III / I	**Time**	3 hrs.

Subject: - Software Engineering *(CT601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Why it is so difficult to gain a clear understanding of what the customer wants? What are the guidelines for the requirement elicitation process? [4+4]
2. Explain details about current model of software process. Explain why the waterfall model of the software process is not an accurate reflection of software development activities. [4+4]
3. Read the case mentioned hereunder carefully and: [5+3]
   a) Make DFD level 1 for the system
   b) What do you mean by DFD balancing in the given case?

   A customer visits an online movie portal. He chooses DVD movies from three different categories: Sci-Fi, Classical and Romantic and places the order for the same. He is supposed to be able to make online payment using his bank details. Upon successful transaction he is expected to receive confirmation through his e-mail.
4. Explain why it may be necessary to design the system architecture before specifications are written. Explain client-server architecture with appropriate example. [4+5]
5. How do real-time software and operating system differ from non-real time software and operating system? Describe Data Acquisition System. [4+4]
6. What are the benefits of CBSE? How closely code generation feature of case tools are associated with CBSE? Explain. [3+5]
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9. Establish the chronology among component, release unit and integration testing. Also write distinctive notes on their testing. [3+4]
10. Write short notes on: [3×3]
    a) Software Requirement Specifications (SRS)
    b) Generator based reuse
    c) Change management

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–41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Software Engineering *(CT 601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is software crisis? Explain with the help of an example. [5]
2. Describe Spiral model for software development. What are its advantages and disadvantages? [5]
3. A restaurant uses an information system that takes customer orders, sends the order to the kitchen, monitors the goods sold and inventory and generates reports for management. List functional and non-functional requirements for this Restaurant Information System. [5]
4. Explain requirement management process with necessary illustration. [5]
5. Why system modeling is important? Mention the weakness of structured analysis method? [2+3]
6. What is an architectural design? Why it is important in software engineering? Explain multiprocessor architecture with example. [2+3+5]
7. Define a real-time system. Explain the real-time operating system and its components? [1+4]
8. What are the benefits and problems of software reuse? What factors need to be taken care of for software reuse planning? [5]
9. Explain why program inspection are an effective technique for discovering errors in a program? What types of error are unlikely to be discovered through inspections? [5+5]
10. Consider a program for the determination of the nature of roots of a quadratic equation. Its input is a triple of positive integers (say a, b, c) and values may be from interval [0, 100]. The program output may have one of the following words. [Not a quadratic equation; Real roots, Imaginary roots, Equal roots]. Design test cases to test this program. [5]
11. How do you conduct formal technical review? Explain Garvin's quality dimensions. [6+4]
12. Write short notes on: (any four): [2.5×4]
    a) Change Management
    b) Version and Release Management
    c) COCOMO
    d) Component based Software Engineering
    e) Feasibility Study

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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Baishakh

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Software Engineering

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What are the advantages and limitations of water fall process model? List out various models of software development. Explain the limitations of water fall model in detail. [10]
2. Explain software requirement specification (SRS). What are the characteristics of a good software requirement specification document? [10]
3. What is Software Quality Assurance (SQA)? What steps are required to perform Statistical SQA? [10]
4. What problems may be encountered when top down integration is chosen? What is regression testing? [10]
5. What are the main objectives of Formal Technical Reviews (FTR)? What is clean room software engineering? [10]
6. What are the types of software maintenance? Give some design principles for maintainability. [10]
7. Write notes on: [5×4]
   a) Software Safety
   b) Cohesion and Coupling
   c) Capability Maturity Module
   d) Software Reengineering

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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2067 Ashadh

Exam.	Regular/Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Software Engineering

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Compare between waterfall model and spiral model of software development process. What is the role of user participation in selection of life cycle model? [11]
2. Explain the importance of requirement engineering. List out requirement elicitation techniques. What are the problems in formation of requirements? [12]
3. What are the characteristics of Object Oriented Programming? What are the main advantage of OOP? [10]
4. Explain how CMM encourages continuous improvement of software process. Describe various key process areas of CMM at various maturity levels. [12]
5. Explain Computer Aided Software Engineering (CASE), CASE environment and CASE tools? [11]
6. Why does software project fail after it has passed through acceptance testing? Explain integration testing. [8]
7. Define the following in the context of software engineering. [4×4]
   a) Symbolic execution
   b) Software errors and their import on cost
   c) Software reliability models
   d) Regression testing

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