

Instructions to candidates

- Answer any **FIVE FULL** questions.
- Missing data, if any, may be suitably assumed.

1A. Draw swim-lane diagram for the Motor parts shop software the summary of the requirements is as follows.

The motor parts shop deals with a large number of motor parts of various manufactures and different vehicle types. Some of the motor parts are very small and some are of reasonably large size. The shop owner stocks different parts in wall-mounted, numbered racks. The shop owner maintains as small an inventory for each item as is reasonable, with a view to reducing inventory overheads. The one important problem that the shop owner faces is to be able to order an item as soon as quantity in the inventory falls below a threshold value. The shop owner wants to stock parts to be able to sustain selling for about one week. To calculate the threshold value for each item, the software must be able to calculate the average daily sale of each part for one week. At the end of each day, the shop owner would request the computer to generate the items to be ordered. The computer should print out the part number, the quantity required and the address of the vendor supplying the part. The computer should also give a printout of the revenue generated each day and at the end of the month, provide a graph showing the sales for each day of the month.

1B. With suitable example specify the difference between top-down and bottom-up Integration Testing.

1C. How key project characteristics can be defined with the use of W⁵HH Principles? **(5+3+2)**

2A. Draw the control flow graph (CFG) for the code snippet in Fig. Q.2A, calculate cyclomatic complexity and find its independent path.

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1. if (a)
2.   if (b)
3.     goto d:
4.   else
5.     goto e:
6.   else if (c)
7.     goto d:
8.   else goto e:
9: print "welcome to Software Engineering"
10: print "How are you?"

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Fig. Q.2A

2B. Describe the phases of unified process model with necessary diagrams.

2C. What are drivers and stubs? Mention their use in testing with neat diagrams **(5+3+2)**

- 3A.** Identify the classes with the noun phrase approach and draw the class diagram with all relationships and appropriate multiplicities for following problem statement. The Best School of Business keeps track of each graduate's student number, name, country of birth, current country of citizenship, current name, current address, and the name of each major the student completed (each student has one or two majors). To maintain strong ties to its alumni, the school holds various events around the world. Events have title, date, location, and type (e.g., reception, dinner or seminar). The school needs to keep track of which graduates have attended which events. When a graduate attends an event, a comment is recorded about the information school officials learned from that graduate at that event. The school also keeps in contact with graduates by mail, e-mail, telephone and fax interactions. As with events, the school records information learned from the graduate from each of these contacts. When a school official knows that they will be meeting or talking to a graduate, a report is produced showing the latest information about that graduate and the information learned during the past two years from that graduate from all contacts and events the graduate attended.
- 3B.** Identify at least three activities carried out during each phase of a spiral model and also write down any two advantages of the above model.
- 3C.** Mention the difference between CRC and Use-Case driven approach. (5+3+2)

- 4A.** Draw the use-case diagram for the newspaper agency automation software. The summary of the requirements is as follows.

This software is to be used by the manager of the news agency and his delivery persons. For each delivery person, the system must print each day the publications to be delivered to each address. The addresses should be generated in consecutive order as far as possible so that the commutation of the delivery person is minimal. Customers usually subscribe one or more newspapers and magazines. They are allowed to change their subscription list by giving one week's advance notice. The system should also print for the news agent the information regarding who received what publications and summary information of the current month. At the beginning of every month bills are printed by the system to be delivered to the customers. These bills should be computed by the system automatically and should include the publication type, the number of copies delivered during the month, and the cost for these. The customers may ask for stopping the deliveries to them for certain periods when they go out of station. Customers may request to subscribe new newspapers/magazines, modify their subscription list, or stop their subscription altogether. Customers usually pay their monthly dues either by cheques or cash. Once the cheque number or cash received is entered in the system, receipt for the customer should be printed. If any customer has any outstanding due for more than one month, a polite reminder message is printed for him and his subscription is discontinued if his dues remain outstanding for period of more than two months.

- 4B.** Explain any three back box testing methods along with suitable example

- 4C.** Draw State machine diagram for following scenario:

At the start of a call, the telephone line is idle. When the phone is removed from the hook, it emits a dial tone and can accept the dialing of digits. Upon entry of a valid number, the phone system tries to connect the call and route it to the proper destination. The connection can fail if the number or trunk is busy. If the connection is successful, the called phone begins ringing. If the called party answers the phone, a conversation can occur. When the called party hangs up, the phone disconnects and reverts to idle when put on hook again. (5+3+2)

5A. The optimistic, most probable, and pessimistic times (in days) for completion of activities for a certain project are as follows (Fig Q.5A): [Assume that $P(z \leq 0.83) = 0.7967$]

Activity	Immediate Predecessor	Optimistic Time (O)	Most Probable Time (M)	Pessimistic Time (P)
A	-	4	5	6
B	-	6	8	10
C	A	6	6	6
D	B	3	4	5
E	B	2	3	4
F	C,D	8	10	12
G	E	6	7	8
H	C,D	12	13	20
I	F,G	10	12	14

Fig. Q.5A

i) Find the critical path.

ii) Find the probability that all critical activities will be completed in 35 days or less.

5B. What is difference between cohesion and coupling. Discuss any two types of Cohesion and two types of Coupling with necessary examples

5C. List out the strength and weakness of a RAD process model. **(5+3+2)**
