

Marks Scored:

KATHMANDU UNIVERSITY
End Semester Examination
July/August, 2017

Level : B.E./B. Sc.

Year : IV

Course : COMP 486

Semester : II

Exam Roll No. :

Time : 30 mins.

F. M. : 10

Registration No. :

Date AUG 20 2017

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Select the best answer.

1. What is dependability?
 - a. It is the user's degree of trust in the particular system.
 - b. It is one of the functional properties of the system
 - c. It is a binding between two components in the system
 - d. It is the relationship between the two different systems
2. Which of the following statement is wrong?
 - a. System failures may have widespread effects with large numbers of people affected by the failure.
 - b. Systems that are not dependable and are unreliable, unsafe or insecure may be rejected by their users.
 - c. The costs of system failure may be very high if the failure leads to economic losses or physical damage.
 - d. Dependable systems may cause information loss with a high consequent recovery cost.
3. A judgment of how likely it is that the system will cause damage to people or its environment is _____
 - a. Reliability
 - b. Availability
 - c. Safety
 - d. Security
4. What are the failures of the system?
 - a. Failures are a usually a result of system errors that are derived from faults in the system
 - b. Failures are not usually a result of system errors that are derived from faults in the system
 - c. Failures are a usually a result of multiple clusters of systems errors that are derived from faults in the system
 - d. Failures are a usually a result of system errors that are derived from faults in the system by human being
5. The process that does the " Verification and validation techniques that increase the probability of detecting and correcting errors before the system goes into service are used" _____
 - a. Fault avoidance
 - b. Fault detection and removal
 - c. Fault tolerance
 - d. Fault management
6. A system consists of 7 components in series each having a reliability of 0.97. What is the reliability of the system?
 - a. 0.86
 - b. 0.84
 - c. 0.80
 - d. 0.87

7. An electronic product contains 100 integrated circuits. The probability that any integrated circuit is defective is .001 and the integrated circuits are independent. The product operates only if all the integrated circuits are operational. What is the probability that the product is operational?
- a. 0.90 b. 0.98 c. 0.97 d. 0.99

8. What is the main problem of series system for reliability?
- a. Reliability increases as component increases
b. Reliability decreases as component increases
c. The cost reduces but reliability increases as component increases
d. Reliability is same even we increase the component

9. Where do you use following equation?

$MTBF / (MTBF + MTTR)$

- a. For maintainability b. For survivability
c. For availability d. For security

10. What is Triple Modular Redundancy (TMR)?

- a. The TMR system has three entities that work in parallel on the same input data and a voter that compare the three entities outputs: the output is equal to the majority of the three entities.
b. The TMR system has three entities that work in series on the same input data and a voter that compare the three entities outputs: the output is equal to the majority of the three entities.
c. The TMR system has three entities that work in parallel and series on the same input data and a voter that compare the three entities outputs: the output is equal to the majority of the three entities.
d. The TMR system has three or more than three entities that work in parallel on the same input data and a voter that compare the three entities outputs: the output is equal to the majority of the three entities.

11. _____ cases are structured documents that set out detailed arguments and evidence that a required level of safety or dependability has been achieved.

- a. Safety and dependability
b. Safety and security
c. Safety and portability
d. Safety and reliability

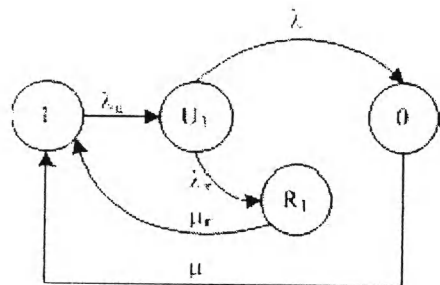
12. What is a safety case?

- a. A documented body of evidence that provides valid argument that a system is adequately safe for a given application in a given environment
b. A documented body of evidence that provides a convincing and valid argument that a system is adequately safe for a given application in a given environment
c. A documented body of evidence that does not provide a convincing and valid argument that a system is adequately safe for a given application in a given environment
d. A documented body that provides a convincing and valid argument that a system is adequately safe for a given application in a given environment

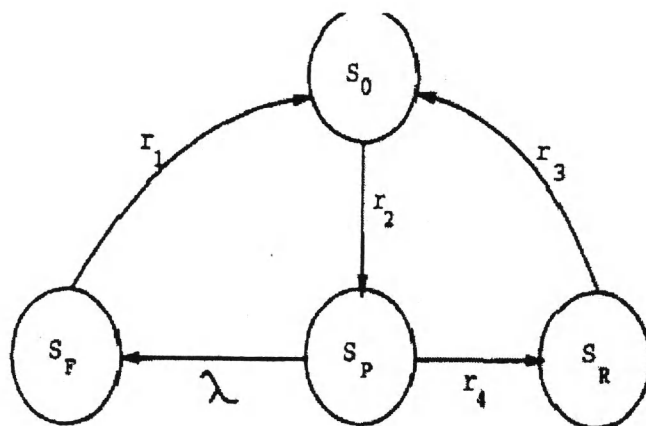
13. What is clustering?
- A clustering is a collection of independent, self-contained computer systems working together to provide a more reliable and powerful system than a single node by itself
 - A clustering is a collection of dependent, self-contained computer systems working together to provide a more reliable and powerful system than a single node by itself
 - A clustering is a collection of independent computer systems working together to provide a more reliable and powerful system than a single node by itself
 - A clustering is a collection of independent, self-contained computer systems working individually to provide a more reliable and powerful system than a single node by itself

14. _____ is a proactive fault management technique aimed at cleaning up the system's internal state to prevent occurrence of more severe crash failure in the future
- Virtualization
 - Stochastic Model
 - Software Rejuvenation
 - Markov Model

15. Identify the following diagram.



- Virtualized state transition diagram
 - Non-virtualized state transition diagram
 - Complex state transition diagram
 - Simplex state transition diagram
16. What is the equation of downtime of the following state diagram?



- $P_f + P_r$
 - $(P_f + P_r) * L$
 - $(P_f + P_r) * 100$
 - $P_f * L$
17. What is MLDD?
- Multi layered design diversity
 - Multiple low dynamic design
 - Many Low design diversity
 - Multi- level design dynamic

18. _____ provides mechanisms to the software system to prevent system failure from occurring
- a. Hardware fault tolerance
 - b. Software fault tolerance
 - c. Design diversity
 - d. Triple modular redundancy
19. _____ is a way of reusing abstract knowledge about a problem and its solution.
- a. Dependability
 - b. Reliability
 - c. Design pattern
 - d. Availability
20. Which one of the following statement is correct?
- a. DfR is the types of software reuse
 - b. The more the system is reliable the less cost
 - c. Availability cannot be enhanced by redundancy approach
 - d. Security does not belong to the part of the system dependability

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F. M. : 40

SECTION "B"

[6 Q × 4 = 24 marks]

Answer *ANY SIX* questions.

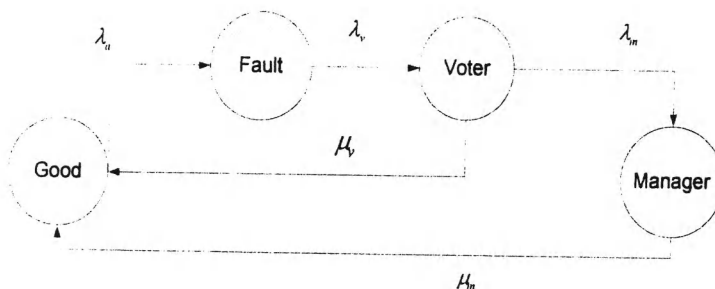
1. What is software rejuvenation? How does it make the system dependable?
2. What is fault tolerance? Explain the importance of it in system dependable.
3. Explain the types of software reuse with examples.
4. What is reliability? How do you find out the reliability of a system? Explain with examples.
5. What is MTBF? How does it play the role in system dependability?
6. What is Markov Model? Explain the types of it with examples.
7. Differentiate between safety and security in a system with examples.

SECTION "C"

[2 Q × 8 = 16 marks]

Attempt *ANY TWO* questions.

8. What is dependability? Explain the pillars of software dependability with examples.
9. Find the good (stable) equation of the following diagram. [Assume the parameters if required]



10. Explain the design diversity with examples.

