CS/IS

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06CS81

Eighth Semester B.E. Degree Examination, December 2011
Advanced Computer Architecture

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions, selecting
at least TWO questions from each part.*

PART – A

1 a. Define the computer architecture. Explain the response time, throughput, elapsed time and processor clock. **(06 Marks)**
   b. Briefly explain the Amdahl's law. **(07 Marks)**
   c. Two code sequences for a particular machine are considered by a compiler designer.

Instruction class	CPI for this instruction class
A	1
B	2
C	3

The compiler designer considers 2 code sequences that require the following instruction counts for a particular high – level language statement.

Code sequence	Instruction counts for instruction class		
	A	B	C
1	20	10	20
2	40	10	10

   i) Which code sequence executes most of the instructions?
   ii) What is the CPI for each sequence?
   iii) Which will be faster? **(07 Marks)**

2 a. What are the major hurdles of pipelining? Illustrate the data hazard, briefly. **(10 Marks)**
   b. With a neat block diagram, explain how an instruction can be executed in 4 or 5 clock cycles in MIPS data path, without the pipeline register. **(10 Marks)**

3 a. List the steps to unroll the code and schedule. **(05 Marks)**
   b. Explain how Tomasulo's algorithm can be extended to support speculation. **(10 Marks)**
   c. Explain the dynamic branch prediction state diagram. **(05 Marks)**

4 a. Explain the basic VLIW approach. List its drawbacks. **(08 Marks)**
   b. With a neat diagram, explain the steps involved in handling an instruction, with a branch target buffer. Also evaluate how well it works. **(12 Marks)**

PART – B

5 a. Explain the different taxonomy of parallel architecture. **(08 Marks)**
   b. With a neat diagram, explain the basic structure of a centralized shared – memory and distributed – memory multiprocessor. **(06 Marks)**
   c. Explain the snooping, with a respect to cache – coherence protocols. **(06 Marks)**

6 a. Explain the six basic optimizations. **(12 Marks)**
   b. With a neat diagram, explain the hypothetical memory hierarchy. **(08 Marks)**

7 a. Explain the DRAM technology. How do you improve memory performance inside a DRAM chip? **(10 Marks)**
   b. Explain the compiler optimizations to reduce miss rate. **(10 Marks)**

8 a. Find all the true dependences, output dependences and antidependences and eliminate the output and antidependences by renaming, in the code given below:

```
for (i = 1;   i < = 100;  i  = i + 1) {
    y[i] = x[i] /c ;        /* s1 */
    x[i] = x[i]+c ;         /* s2 */
    z[i] = y[i]+c ;         /* s3 */
    y[i] = c – y[i] ;       /* s4 */
    }
```
(10 Marks)

   b. Write short notes on:
      i)   The Itanium 2 processor
      ii) IA – 64 register model. **(10 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011

System Modeling and Simulation

Time: 3 hrs.   Max. Marks:100

Note: 1. *Answer any FIVE full questions, selecting*
at least TWO questions from each part.
2. *Statistical tables A.6 and A.8 from the*
text book can be provided.

PART – A

1   a. List any five circumstances, when the simulation is the appropriate tool and when it is not.
                                                                 (10 Marks)
    b. Explain the steps in a simulation study, with the flow chart.   **(10 Marks)**

2   a. One company uses 6 trucks to haul manganese ore from Kolar to its industry. There are two loaders, to load each truck. After loading, a truck moves to the weighing scale to be weighed. The queue discipline is FIFO. When it is weighed, a truck travels to the industry and returns to the loader queue. The distribution of loading time, weighing time and travel time are as follows :

        Loading time :   10   5   5   10 15 10 10
        Weigh time :   12 12 12 16 12 16
        Travel time :   60 100 40 40 80

Calculate the total busy time of both the loaders, the scale average loader and scale utilization. Assume 5 trucks are at the loaders and one is at the scale, at time "0". Stopping time $T_E = 64$ min.   **(10 Marks)**
    b. Explain simulation in GPSS, with a block diagram, for the single server queue simulation.
                                                                 (06 Marks)
    c. Explain the following :
    i) System   ii) Event list   iii) Entity   iv) Event.   **(04 Marks)**

3   a. Explain discrete random variables and continuous random variables, with examples.
                                                                 (10 Marks)
    b. Explain any two discrete distributions.   **(05 Marks)**
    c. Explain the following continuous distribution :
    i)   Uniform distribution
    ii)   Exponential distribution.   **(05 Marks)**

4   a. Explain the characteristics of a queuing system. List different queuing notations.   **(10 Marks)**
    b. Explain any two long-run measures of performance of queuing systems.   **(10 Marks)**

PART – B

5   a. Explain the two different techniques used for generating random numbers, with examples.
                                                                 (10 Marks)
    b. The sequence of numbers 0.44, 0.81, 0.14, 0.05, 0.93 has been generated. Use the Kolmogonov-Smirnov test with $\alpha = 0.05$ to determine if the hypothesis that the numbers are uniformly distributed on the interval [0, 1] can be rejected. Compare F(X) and $S_N(X)$ on a graph.   **(10 Marks)**

6   a. Explain inverse-transform technique of producing random variates for exponential distribution. **(05 Marks)**

     b. Generate three Poison variates with mean $\alpha = 0.2$. **(05 Marks)**

     c. Explain the types of simulation with respect to output analysis. Give at least two examples. **(10 Marks)**

7   a. Explain Chi-square goodness of fit test. Apply it to Poisson assumption with $\alpha = 3.64$. Data size = 100 and observed frequency O_i = 12, 10, 19, 17, 10, 8, 7, 5, 5, 3, 3, 1. **(10 Marks)**

     b. List the steps involved in the development of a useful model of input data. **(05 Marks)**

     c. Explain Chi-square goodness-of-fit test for exponential distribution, with an example. **(05 Marks)**

8   a. Explain, with a neat diagram, model building, verification and validation. **(10 Marks)**

     b. Explain any two output analysis for steady-state simulations. **(10 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011
Programming Languages

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
atleast TWO questions from each part.

PART – A

1 a. Describe any five tools that commonly support the work of a compiler within a larger programming environment. **(10 Marks)**
   b. List different times – binding times, at which, decisions may be bound. **(05 Marks)**
   c. Andy and Bob are shopping for groceries. Andy knows how to program prolog and Bob agrees to Andy's suggestion to use the following program to purchase the items :
   likes (andy, twinkies)
   likes (andy, cake)
   likes (andy, pie)
   likes (andy, juice)
   likes (bob, pie)
   likes (bob, apples)
   likes (bob, twinkies)
   price (twinkies, 1)
   price (cake, 5)
   price (pie, 7)
   price (juice, 2)
   buy (x) : likes (andy, x), /+
           likes (bob, x),
           price (x, p), p < 3
   For query ? – buy (x), which items x are found on backtracking. **(05 Marks)**

2 a. Explain with examples, the eight major categories of control – flow mechanisms. **(10 Marks)**
   b. Define deep binding and shallow binding. Describe the difference between them, with examples. **(10 Marks)**

3 a. What is short–circuit Boolean evaluation? Explain its importance, with examples. **(08 Marks)**
   b. How are tail – recursive functions faster than naïve implementation of recursion? **(04 Marks)**
   c. Write a recursive function in C and in scheme to implement
$$fib(n) = \begin{cases} 1 & \text{if } n = 0 \text{ or } n = 1 \\ fib(n-2) + fib(n-1) & \text{otherwise.} \end{cases}$$
(08 Marks)

4 a. Define :
      i) Strongly types language
      ii) Statically typed language
      iii) Denotational view of type
      iv) Constructive view of type. **(08 Marks)**
   b. With neat diagrams, explain the difference between row – major and column – major layouts for contiguously allocated arrays. **(06 Marks)**
   c. What is row – pointer layout? Mention its advantages. **(06 Marks)**

Third Semester B.E. Degree Examination, December 2011
Materials Science and Metallurgy

Time: 3 hrs. 　　　　　　　　　　　　　　　　　　　　　Max. Marks:100

Note: *Answer any FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1. a. Sketch the unit cell of a HCP crystal structure. Calculate the number of atoms per unit cell. Derive an expression for the density of atomic packing. (Given C = 1.633a). **(06 Marks)**
   b. Copper has an atomic radius of 1.28×10^{-8} cm, a FCC crystal structure and an atomic weight of 63.5. Calculate its density (Avogadro number = 6.023×10^{23}). **(05 Marks)**
   c. Explain the different types of surface imperfections, with neat sketches. **(06 Marks)**
   d. State and explain the Fick's second law of diffusion. **(03 Marks)**

2. a. Draw the stress-strain diagram of mild steel and describe how the following properties can be obtained from the diagram:
   i) Elastic modulus 　　ii) Ductility 　　iii) Toughness. **(07 Marks)**
   b. A cylindrical specimen of steel having an original diameter of 12.8mm is tensile tested to fracture and found to have an engineering fracture strength σ_f of 460 MPa. If its cross-sectional diameter at the fracture is 10.7mm, determine
   i) The ductility in terms of percent area reduction ii) The true stress at fracture. **(06 Marks)**
   c. Differentiate between the slip and twinning, with neat sketches. **(07 Marks)**

3. a. Explain with a sketch, the ductile to brittle transition in the materials. **(04 Marks)**
   b. If the specific surface energy for Al_2O_3 is 0.9 J/m^2, calculate the critical stress required for propagation of an internal crack of length 0.4mm. (E = 393 GPa for Al_2O_3). **(05 Marks)**
   c. Draw and explain the S-N curve for steel and aluminium alloy. **(05 Marks)**
   d. Define stress relaxation. Derive the corresponding expression. **(06 Marks)**

4. a. Explain the homogeneous nucleation. Discuss the significance of critical radius of the nuclei. **(08 Marks)**
   b. Describe the different types of solid solution. **(06 Marks)**
   c. State the Gibb's phase rule and explain with a simple example. **(06 Marks)**

PART – B

5. a. Construct a phase diagram for two metals completely soluble in the liquid state but partially soluble in solid state. **(04 Marks)**
   b. Draw the iron-carbon equilibrium diagram and label all the parts. **(08 Marks)**
   c. With the help of the diagram in 5(b), explain the cooling of steel with 0.6% carbon, showing the microstructure at different stages. **(08 Marks)**

6. a. Draw the TTT diagram for plain carbon eutectoid steel and explain the critical cooling rate. **(07 Marks)**
   b. Explain any one type of surface hardening, with sketches. **(06 Marks)**
   c. Differentiate between the normalizing and annealing, with sketches. **(07 Marks)**

7. a. Explain the different types of cast iron, with microstructures. **(08 Marks)**
   b. Write a short note on the copper alloys. **(08 Marks)**
   c. Explain the modification of Al - Si alloy. **(04 Marks)**

8. a. What is a composite material? How is it classified? **(08 Marks)**
   b. With a neat sketch, explain any one method for production of fiber reinforced plastic. **(06 Marks)**
   c. Briefly discuss the advantages & applications of metal matrix composites(MMCs). **(06 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011

Software Testing

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1   a.   Why is it impossible for a tester to find all the bugs in a system? Why might it not be necessary for a program to be completely free of defects before it is delivered to its customers?   **(10 Marks)**

   b.   Define software quality. Distinguish between static quality attributes and dynamic quality attributes. Briefly explain any one dynamic quality attribute.   **(10 Marks)**

2   a.   Explain variety of ways in which software testing can be integrated into the software development life cycle.   **(10 Marks)**

   b.   Consider the following program :

   1)   begin   10)   while (power 1 = 0) {
   2)   int x, y, power ;   11)   z = z * x ;
   3)   float z ;   12)   power = power – 1 ;
   4)   input (x, y) ;   13)   }
   5)   if (y < 0)   14)   if (y < 0)
   6)   power = –y ;   15)   z = 1/z ;
   7)   else   16)   output (z) ;
   8)   power = y ;   17)   end
   9)   z = 1 ;

   Identify the basic blocks, their entry points and exit points. Draw the control flow graph.
   (06 Marks)

   c.   Write a short note on the saturation effect.   **(04 Marks)**

3   a.   What is equivalence partitioning? Explain the systematic procedure for equivalence partitioning by considering boiler control example.   **(10 Marks)**

   b.   What is boundary value analysis? Explain the procedure for BVA by considering your own example.   **(10 Marks)**

4   a.   Explain cause effect graphing, with suitable examples. Show the basic elements of cause effect graphing.   **(10 Marks)**

   b.   What is the goal of predicate testing? Explain missing or extra Boolean variable faults by giving examples.   **(10 Marks)**

PART – B

5   a.   What is structural testing? Explain statement testing and branch testing with examples.
   (10 Marks)

   b.   Distinguish between white box and black box testing categories.   **(04 Marks)**

   c.   What is path testing? Draw a flow graph for the biggest of three numbers program and calculate the cyclomatic complexity.   **(06 Marks)**

6 a. Explain data flow analysis with arrays and pointers. (10 Marks)

  b. What is a data flow testing? Explain data flow testing criteria. (10 Marks)

7 a. Define the following testing terms:
  i)   Test case
  ii) Test case specification
  iii) Test obligation
  iv) Test suite
  v)   Smoke testing. (10 Marks)

  b. What is scaffolding? Distinguish between generic and specific scaffolding. Briefly explain the differences. (10 Marks)

8 Write short notes on :
  a. Alpha and beta testing
  b. Risk management
  c. Integration testing
  d. Adequacy criteria (20 Marks)

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Eighth Semester B.E. Degree Examination, December 2011

Decision Support Systems

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. Explain the factors affecting managerial decision making and explain ten major roles performed by managers.   **(10 Marks)**
   b. Explain various reasons for computerized decision support and also explain a system and structure of system, with examples.   **(10 Marks)**

2 a. Explain a framework for decision support proposed by Gorry and Scott Morton.   **(10 Marks)**
   b. Explain classification of models and explain intelligence phase of decision making process.
                                                                       (10 Marks)

3 a. Explain choice phase of decision making process and with example explain what _ if analysis and goal seeking analysis.   **(10 Marks)**
   b. Explain ideal characteristics and capabilities of DSS.   **(10 Marks)**

4 a. Explain various components of DSS.   **(10 Marks)**
   b. Explain : i) DSS technology levels and tools
                ii) DSS development platforms.   **(10 Marks)**

PART – B

5 a. Write some characteristics of group work and explain time/place communication framework and some collaborative computing support technologies.   **(10 Marks)**
   b. Explain group systems and GSS meeting process.   **(10 Marks)**

6 a. Explain distance learning and its advantages and disadvantages.   **(10 Marks)**
   b. Explain in detail the characteristics and capabilities of EIS.   **(10 Marks)**

7 a. Define supply chain and SCM. With an example, explain the components of supply chain. Explain supply chain problems and solutions.   **(10 Marks)**
   b. Explain two fundamental approaches to knowledge management.   **(10 Marks)**

8 a. Explain KMS cycle and explain the role of chief knowledge officer in knowledge management.   **(10 Marks)**
   b. Describe management support systems impacts on organizations and impacts on individuals.
                                                                       (10 Marks)

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Eighth Semester B.E. Degree Examination, December 2011

Storage Area Networks

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1   a. Discuss the server-centric IT architecture and its limitations, with a neat diagram. **(10 Marks)**
    b. Explain the six steps needed to replace a server in a storage network, with a neat diagram. **(10 Marks)**

2   a. Explain four types of connections between hard disks and internal I/O channels. **(08 Marks)**
    b. Explain RAID-O, with a neat diagram and its advantages and disadvantages. **(12 Marks)**

3   a. Explain with neat diagrams, two methods of remote mirroring. **(10 Marks)**
    b. Explain with a neat diagram, the physical I/O path from CPU to the storage system. **(10 Marks)**

4   a. Explain the different types of fibre channel ports and their uses. **(10 Marks)**
    b. Explain at least ten differences between FC-SAN and NAS. **(10 Marks)**

PART – B

5   a. Explain network attached storage (NAS), with a neat diagram. **(10 Marks)**
    b. Explain direct access file system (DAFS) with a neat diagram and its advantages. **(10 Marks)**

6   a. Explain the server virtualization through volume manager and also discuss benefits and advantages. **(10 Marks)**
    b. Explain the storage virtualization in network and discuss advantages and disadvantages. **(10 Marks)**

7   a. Explain class 1, class 2 and class 3 connections and their typical uses. **(10 Marks)**
    b. Discuss the five types of fabric OS services. **(10 Marks)**

8   a. Explain the ISL functions with a simple cascading switch configuration. **(10 Marks)**
    b. Discuss the five systems management disciplines, with a neat diagram. **(10 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011
Network Management Systems

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1   a. Briefly discuss some common network problems.   **(06 Marks)**
    b. How would you use network management system and why?   **(04 Marks)**
    c. Define network management? Explain network management goal and functions of network operations as defined by ISO?   **(10 Marks)**

2   a. What are the different types of network management models? Explain information model and communication model of OSI network management model.   **(12 Marks)**
    b. With an example explain characteristics of internet perspective and OSI perspective of managed objects.   **(08 Marks)**

3   a. Explain clearly the functions of two-tier and three-tier SNMP organization model. **(10 Marks)**
    b. How manager and agent communicate with each other in a SNMP network management architecture?   **(10 Marks)**

4   a. Define and explain SNMP access policy in SNMP management.   **(10 Marks)**
    b. Discuss the various SNMP generic traps.   **(04 Marks)**
    c. Give the SNMP protocol specification for the communication between manager and the agent.   **(06 Marks)**

PART – B

5   a. With a neat diagram, explain the RMON MIB frame work and ATM probe locations.
                                                                   (10 Marks)
    b. Explain clearly the RMON Token ring MIB groups and its functions.   **(10 Marks)**

6   a. Explain the five important concepts of ATM technology.   **(10 Marks)**
    b. Explain the functions of ATM switch and ATM virtual LAN.   **(10 Marks)**

7   a. What is broadband access networks? Explain.   **(06 Marks)**
    b. Explain HFC network with neat diagram.   **(08 Marks)**
    c. Discuss ADSL encoding schemes.   **(06 Marks)**

8   a. What is rule-based reasoning? Explain.   **(06 Marks)**
    b. Explain classification of reports in report management.   **(06 Marks)**
    c. Explain policy management architecture.   **(08 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011
Ad-hoc Networks

Time: 3 hrs.   Max. Marks:100

**Note: *Answer any FIVE full questions, selecting
at least TWO questions from each part.***

PART – A

1   a. Briefly explain the following networks with proper diagrams :
    i)   Cellular wireless networks.
    ii)   Ad-hoc wireless networks.
    iii) Hybrid wireless networks.
    iv)   Wireless sensor networks.   **(08 Marks)**
    b. Discuss the following major issues and challenges that need to be considered when an ad-hoc wireless system is to be designed :
    i)   Medium access scheme.
    ii)   Routing.
    iii) Transport layer protocol.
    iv)   Self organization.
    v)   Address and service discovery.
    vi)   Scalability.   **(12 Marks)**

2   a. Briefly discuss the following main issues that need to be addressed while designing a MAC protocol for ad-hoc wireless networks :
    i)   Quality of service support.
    ii)   Hidden and exposed terminal problem.
    iii) Mobility of nodes.
    iv)   Error – prone shared broad cast channel.   **(08 Marks)**
    b. Briefly discuss the following basic types of MAC protocols :
    i)   Contention – based protocols.
    ii)   Contention – based protocols with reservation mechanisms.
    iii) Contention – based protocols with scheduling mechanisms. **(09 Marks)**
    c. What are the advantages of reservation based MAC protocols over contention based MAC protocols?   **(03 Marks)**

3   a. Give application scenarios where contention – based, reservation based and packet scheduling – based protocols can be used.   **(06 Marks)**
    b. Explain distributed priority scheduling scheme with proper diagrams. **(10 Marks)**
    c. What are the pros and cons of using multichannel MAC – protocols over single channel MAC protocols?   **(04 Marks)**

4   a. Discuss the differences in topology reorganization in DSDV and CGSR routing protocols. (DSDV → Destination sequenced distance – vector routing protocol ; CGSR → cluster head gateway switch routing protocol).   **(06 Marks)**
    b. Explain briefly the salient features and topology maintenance/routing information maintenance in cluster – head gateway switch routing protocol. **(10 Marks)**
    c. What are the key differences between the LAR1 and LAR2 algorithms?
       LAR1 → Location – Aided Routing 1
       LAR2 → Location – Aided Routing 2   **(04 Marks)**

PART – B

5 a. Explain "optimized link state routing" with proper diagrams. **(10 Marks)**

    b. Briefly explain the following power aware routing metrics :
  - i) Minimal energy consumption per packet.
  - ii) Maximize network connectivity.
  - iii) Minimum variance in node power level.
  - iv) Minimum cost per packet.
  - v) Minimize maximum node cost. **(10 Marks)**

6 a. Briefly explain at least four major reasons behind though put degradation that TCP faces when used in ad-hoc wireless networks. **(08 Marks)**

    b. What are the pros and cons of assigning the responsibility of end – to – end reliability to the application layer? **(06 Marks)**

    c. Assume that when the current size of the congestion window is 48 kB; the TCP sender experiences a time out. What will be the congestion window size if the next three transmission bursts are successful? Assume that MSS is 1 kB. Consider : i) TCP Tahoe and ii) TCP Reno. **(06 Marks)**

7 a. Explain with suitable diagram "security –aware ad-hoc routing protocol". **(08 Marks)**

    b. Explain how security provisioning in ad-hoc wireless networks differ from that in infrastructure – based networks. **(06 Marks)**

    c. List and explain how some of the inherent properties of the wireless ad-hoc networks introduce difficulties while implementing security in routing protocols. **(06 Marks)**

8 a. Briefly explain at least five issues and challenges faced in providing QoS in Ad-hoc wireless networks. **(10 Marks)**

    b. Explain QoS enabled Ad-hoc on – demand distance vector routing protocol. **(10 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011
Service Oriented Architecture

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART - A

1 a. What are the common characteristics of contemporary SOA?   (04 Marks)
   b. Give any eight common tangible benefits of SOA.   (04 Marks)
   c. Write a note on brief history of SOA.   (05 Marks)
   d. Compare SOA focusing on application logic, technology and security with two tire client server architecture.   (07 Marks)

2 a. With a case study, explain service requestor and service provider roles.   (06 Marks)
   b. Explain SOAP message structure and information carried with SOAP header block.
                                                                                  (08 Marks)
   c. Discuss the basic structure of UDDI business entity record.   (06 Marks)

3 a. With proper case studies and examples, explain different message exchange patterns (MEP).
                                                                                  (10 Marks)
   b. With a case study of complex activity, explain service activities of SOA.   (05 Marks)
   c. Illustrate what aspect of SOA promoted by automic transaction.   (05 Marks)

4 a. Explain the following with reference to addressing :
      i) Endpoint references   ii) Message information headers.   (10 Marks)
   b. Differentiate between transport level security and message level security. (05 Marks)
   c. Write a note on any one of the following : i) Correlation ii) Metadata exchange.
                                                                                  (05 Marks)

PART - B

5 a. How do the components of service – oriented architecture relate with each other? (07 Marks)
   b. Explain the relationship between service reusability and service – orientation principles.
                                                                                  (06 Marks)
   c. Discuss the native web service support for service orientation principles. (07 Marks)

6 a. Give a review on primary influences of contemporary SOA for any five contemporary SOA characteristics.   (10 Marks)
   b. What are the sublayers of the service interface layer? Describe any three functions of each layer.   (10 Marks)

7 a. Explain the following WS – BPEL elements : i) Sequence element   ii) Invoke element
      iii) Reply element   iv) Fault Handlers element.   (12 Marks)
   b. Explain service oriented business process design.   (08 Marks)

8 a. Outline the relationship between SOA layers and technologies.   (05 Marks)
   b. Explain the following : i) Service processing tasks   ii) Service processing logic
      iii) Vendor platforms for SOA.   (15 Marks)

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