Q1. A provider in health care industry lacks an *information culture*. Business function and department heads manage their technology investments and create processes in accordance with their needs.

(a) What is the likely state of information integration in this enterprise? (2)

The keyword is *siloded*. Any reasonable equivalent explanation gets full credit.

(b) According to *The Information Opportunity*, what are 5 business performance consequences? (5)

See Figure 26.

i. Financial losses
ii. Increased operational cost
iii. Reputation damage
iv. Poor innovation
v. Unacceptable delays to competition market

Equivalent answers get full credit. Other reasonable business performance consequences of poor information sharing get half credit.

(c) *Besides information systems*, what are the *top* three reasons why such a provider might fail to implement an integrated electronic patient record system? (3)

See Figure 28.

i. Lack of trust
ii. Policies and procedures
iii. Lack of staff skills and training

(d) In choosing the right integration methodology, what would be some of the technology considerations and possible approaches? Define your three favorite considerations using 1-2 sentences each and then simply list two possible approaches for each. (3+3+3)

Any three bubbles and any two branches from that bubble get full credit. See diagram on next page.

(e) What is one aspect of integration that primarily affects performance but not the function of the integrated system? (1)

Either *caching* or *indexing* gets full credit.
Q2. This question concerns Data Quality, Master Data Management and Information Lifecycle Management.

(a) Draw a line from each example in Column B to the best matching MDM technique in Column A. 

<table>
<thead>
<tr>
<th>COLUMN A</th>
<th>COLUMN B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Logic</td>
<td>Discover data sources, extract and combine the data</td>
</tr>
<tr>
<td>Data Integration</td>
<td>Use industry standard data model for 80% of data</td>
</tr>
<tr>
<td>Entity Taxonomy</td>
<td>Use rules to ensure correct interpretation of data values</td>
</tr>
<tr>
<td>Common Data Model</td>
<td>Use standard names to refer to entities, their attributes and classes</td>
</tr>
</tbody>
</table>

(b) Draw a line from each rule in Column B to the best matching ILM policy area in Column A. This is not one-to-one!

<table>
<thead>
<tr>
<th>COLUMN A</th>
<th>COLUMN B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migration</td>
<td>Keep tax records for at least 3 years beyond the date of filing.</td>
</tr>
<tr>
<td>Retention</td>
<td>Purge information about expired coupons from the marketing system.</td>
</tr>
<tr>
<td>Deletion</td>
<td>On an air travel site, when a browser converts to a buyer (by purchasing their first ticket), move the account to a system with shorter RPO and RTO.</td>
</tr>
<tr>
<td></td>
<td>On a university admission system, purge all incomplete applications 30 days after the notification deadline.</td>
</tr>
<tr>
<td></td>
<td>Keep all patient records at least until 10 years after an employee leaves the company.</td>
</tr>
<tr>
<td></td>
<td>Use two database instances for the parts catalog supporting a manufacturing system. Those parts that have not been used in 2 months are aged over to an “old parts” database, leaving the “active parts” database fast and small!</td>
</tr>
</tbody>
</table>

Q3. This question pertains to cloud computing, SOA, and the lifecycle of services.

(a) An IT Manager would like to define and manage his service portfolio by business value. In analogy with business value of information, can he measure service value in $/hr? Explain. (2)

Service outage penalty measured in $/hr of lost service. (for full credit)

Service loss penalty is INCORRECT but gets 0.5 out of 2 for attempting.

(b) An enthusiastic IT architect has just compiled a trend presentation on cloud computing for his CIO. List 3 reasons in 1-2 sentences each why launching a SOA imperative can be a step toward cloud computing. (6)

Examples of correct answers
- A SOA imperative will result in definition of a services portfolio some of which can be sourced from the cloud.
- A SOA imperative will cause business and IT to align around value of a service
• A SOA imperative will cause business and IT to align around identifying the risks to a service
• A SOA imperative will result in definition of SLAs which will be useful when sourcing from a cloud provider.

(c) How can cloud computing allow a business to derive greater return on investment from its own services? List 3 ways in which this can be accomplished, using 1-2 sentences each. (6)

Examples of correct answers.
- It can lower the cost of services by allowing the business to use cloud providers for infrastructure or platform
- It can allow the business that occasionally uses a service and lease/rent rather than own
- It can allow a business to derive greater return on investment by selling its services to others in the industry

(d) A department head argues that cloud computing is an IT bypass technology. He opposes the CIO’s decision to create a ‘Cloud Controller’ that will wrap E2C services. List three reasons why the department head is wrong in this case. (6)

The benefits of wrapping cloud services under an IT controllers
- Centralization and standardization of policy
- Auditability for compliance
- Measurement & monitoring usage and payments

(e) Connect each example in Column B to the best matching stage of service lifecycle in Column A. This is not one-to-one! (10)

<table>
<thead>
<tr>
<th>COLUMN A</th>
<th>COLUMN B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy</td>
<td>Deciding whether to flex a service using a cloud provider</td>
</tr>
<tr>
<td>Design</td>
<td>Reporting SLA violations</td>
</tr>
<tr>
<td>Transition</td>
<td>Determining how many concurrent users a service will have</td>
</tr>
<tr>
<td>Operation</td>
<td>Defining what service offerings are needed in support of business imperatives</td>
</tr>
<tr>
<td>Refinement</td>
<td>Testing to see whether a new version of the service can replace an older one</td>
</tr>
<tr>
<td></td>
<td>Recovering from server failure</td>
</tr>
<tr>
<td></td>
<td>Determining whether any existing services can be reused</td>
</tr>
</tbody>
</table>
Q4. In the HP product portfolio management case study,

(a) Compare the “revenue generated” and “revenue impacted” metrics: Define each in one sentence. Which metric needs more data to be gathered, and what kind of data? (2+2)

The revenue generated metric looks only at the revenue of each product. The revenue impacted metric considers the entire order that a product is a part of. The latter needs more data (order/transaction data from point of sale systems).

(b) Identify two strategic decisions made by the company on the basis of its revenue coverage optimization study and list one key business outcome of each of those decisions (2+2)

Low ranking products were discontinued. These did not generate much revenue on their own nor did they lead to sales of other revenue generating products. Inventory simplification resulted.

The company introduced a recommended offering program lowering order cycle time and improving competitiveness.

(c) How does the Integer Programming formulation strike a balance between marketing objectives and supply chain objectives? (1-2 sentences) (2)

By calculating the maximum revenue achievable for a fixed number of top-ranked products, the integer programming formulation allowed identification of the top-ranking products for any portfolio size. The supply chain objective of choosing fewer products could thus be traded off versus marketing’s objective of maximizing revenue.

Q5. This question is about metrics, or how we can measure quantities of interest.

(a) The availability of a system can be characterized by MTBF/(MTBF+MTTR). How can an IT manager improve the availability of her service by conducting failover practice drills? (3)

By conducting failover practice drills, the manager seeks to lower the average recovery time thus increasing availability for any given rate of failure of services.

(b) An international currency trading system manages low volume of high-value transactions. Customers place greater premium on data loss than on trading system availability. Which one of RPO or RTO should be emphasized more, and why? (2)

The correct answer is that Recovery Point Objectives should be emphasized because they really care about any lost data but are willing to allow the service to take time to recover.

(c) List a scenario in which a backup-only (no mirroring) strategy fails to meet business requirements. Which metric is the most adversely affected? (2)
Refer to slide 51 in Keeton lecture. Anything other than the student account case (company documents, consumer bank, central bank, web server) is the correct answer. RTO is most severely affected because restoring from backups takes time.

(d) List a scenario in which the backup-only strategy is adequate. (1)

Student accounts scenario was the correct example.

(e) What would be a reason for choosing a short backup window? (1)

Minimizing the amount of data lost since last backup

(f) What would be a reason for choosing a long backup window? (1)

Avoiding disruption and lowering the cost and complexity of backup media. Any one of these would be correct.

Q6. The following test your understanding of mechanisms used by IT in support of marketing function.

(a) Why does the distinction between 1st-party and 3rd-party cookies matter for SE marketing? (3)

Browser security settings often prevent third party cookies from being stored. This can prevent mediators (such as ad networks and ad brokers) from tracking and measuring the performance of advertisements served.

(b) Draw a line from each concept in Column A to the best example/definition in Column B. (7)

<table>
<thead>
<tr>
<th>COLUMN A</th>
<th>COLUMN B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-time bidding</td>
<td>Competing for keywords indicating shopping intent with high-conversion ads</td>
</tr>
<tr>
<td>Campaign</td>
<td>Identifying the right keywords for tagging a website</td>
</tr>
<tr>
<td>Clicks</td>
<td>Contextually deciding how much to pay for a user selecting a search result</td>
</tr>
<tr>
<td>Impressions</td>
<td>Counting how often consumers completed a transaction</td>
</tr>
<tr>
<td>Conversions</td>
<td>Counting how often consumers went to the target URL</td>
</tr>
<tr>
<td>SEO</td>
<td>A tactical plan for achieving the desired lift in product sales through marketing</td>
</tr>
<tr>
<td>SEM</td>
<td>Counting how many times an ad has been shown</td>
</tr>
</tbody>
</table>
Q7. Based on the contrasting SOA styles used by Blue Cross and Cigna in our SOA case studies:

(a) Identify the company whose approach plays well with existing applications. Explain (in 3-4 sentences) according to their driving use case. (1+4)

(b) Identify the company whose approach drives a wedge between existing applications and their data. Explain (in 3-4 sentences) according to their driving use case. (1+4)

GRADE LENIENTLY

Blue Cross used SOA to achieve MDM, breaking the data silos and taking a data integration/MDM approach.
Contrast that with the message oriented “play well” approach used in the Cigna use case.

Cigna: Continue to focus on claims while emphasize on providing products, services and data assets that help keep individuals healthy.

Blue Cross: Privacy legislation, providing time sensitive data for patient care: lab tests, pathology reports, X-rays, Digital imaging etc. by linking business service and data across departments and by improving the level of cooperation between providers and payers.