PRACTICE EXAM

PRACTICE EXAM NO. 2

COSC572

Management Information Systems

2 hours and 15 minutes

Answer 20 Multiple Choice Questions | 1 Mark Each | Total 20 Marks. Answer these questions on the general purpose answer sheets provided

Answer 5 Short Answer | 4 Marks Each | Total 20 Marks in the answer booklet provided

Answer ANY THREE (3) Extended Response Questions (from the FOUR (4) questions provided) | 20 Marks Each | Total 60 Marks. Answer these in the answer booklet provided

The maximum available number of marks for this examination is 100

MULTIPLE CHOICE

20 Questions | 1 Mark Each | Total 20 Marks.

Question 1

Which of the following best describes how new information systems result in legal gray areas?
- A) They work with networked, electronic data, which are more difficult to control than information stored manually.
- B) They result in new situations that are not covered by old laws.
- C) They are implemented by technicians rather than managers.
- D) They are created from sets of logical and technological rules rather than social or organizational mores.
- E) They are little understood by politicians or lawyers.

Answer:
B
Page Ref: 160
Difficulty: Moderate
AACSB: Ethical understanding and reasoning
CASE: Analysis in terms of assess
LO: 4.1: What ethical, social, and political issues are raised by information systems?

Question 2

The moral dimension of _____ can be described as the obligations that individuals and organizations have concerning rights to intellectual property.
- A) property rights and obligations
- B) system quality
- C) accountability and control
- D) information rights and obligations
- E) quality of life

Answer:
A
Page Ref: 160
Difficulty: Easy
AACSB: Ethical understanding and reasoning
CASE: Comprehension
LO: 4.1: What ethical, social, and political issues are raised by information systems?

Question 3

A firm that must invest in new information systems capabilities in order to comply with federal legislation can be said to be investing to achieve which business objective?
- A) customer intimacy
- B) operational excellence
- C) survival
- D) improved reporting
- E) improved decision making

Answer:
C
Page Ref: 47
Difficulty: Moderate
AACSB: Information technology
CASE: Application
LO: 1.1: How are information systems transforming business, and why are they so essential for

running and managing a business today?

Question 4

The three activities in an information system that produce the information organizations use to control operations are
- A) information retrieval, research, and analysis.
- B) input, output, and feedback.
- C) data, information, and analysis.
- D) data analysis, processing, and feedback.
- E) input, processing, and output.

Answer:
E
Page Ref: 48-49
Difficulty: Easy
AACSB: Information technology
CASE: Concept
LO: 1.2: What is an information system? How does it work? What are its management, organization, and technology components and why are complementary assets essential for ensuring that information systems provide genuine value for organizations?

Question 5

What is the most important function of an enterprise application?
- A) increasing speed of communicating
- B) enabling business functions and departments to share information
- C) enabling a company to work collaboratively with customers and suppliers
- D) enabling cost-effective e-business processes
- E) enabling inventory and supply chain management

Answer:
B
Page Ref: 85
Difficulty: Difficult
AACSB: Analytical thinking
CASE: Evaluation
LO: 2.3: Why are systems for collaboration and social business so important and what technologies do they use?

Question 6

The four major enterprise applications are
- A) SCMs, CRMs, DSSs, and KMSs.
- B) SCMs, CRMs, ESSs, and KMSs.
- C) enterprise systems, SCMs, DSSs, and CRMs.
- D) enterprise systems, SCMs, CRMs, and KMSs.
- E) TPSs, MISs, DSSs, and ESSs.

Answer:
D
Page Ref: 85
Difficulty: Easy
AACSB: Information technology
CASE: Content
LO: 2.3: Why are systems for collaboration and social business so important and what technologies do they use?

Question 7

A firm can exercise greater control over its suppliers by having
- A) more suppliers.
- B) fewer suppliers.
- C) global suppliers.
- D) local suppliers.
- E) regional suppliers.

Answer:
A
Page Ref: 128
Difficulty: Easy
AACSB: Reflective thinking
CASE: Content
LO: 3.3: How do Porter's competitive forces model, the value chain model, synergies, core competencies, and network economics help companies develop competitive strategies using information systems?

Question 8

Firms use a _____ strategy to provide a specialized product or service for a narrow target market better than competitors.
- A) product differentiation
- B) market niche
- C) mass customization
- D) process efficiency
- E) low-cost leadership

Answer:
B
Page Ref: 129
Difficulty: Moderate
AACSB: Reflective thinking
CASE: Content
LO: 3.3: How do Porter's competitive forces model, the value chain model, synergies, core competencies, and network economics help companies develop competitive strategies using information systems?

Question 9

_____ states that the value or power of a network grows exponentially as a function of the number of network members.
- A) Metcalfe's Law
- B) Moore's Law
- C) Law of scalability
- D) Law of outsourcing
- E) Law of networks

Answer:
A
Page Ref: 210
Difficulty: Difficult
AACSB: Information technology
CASE: Content
LO: 5.2: What are the components of IT infrastructure?

Question 10

The device that acts as a connection point between computers and can filter and forward data to a specified destination is called a(n)

- A) hub.
- B) switch.
- C) router.
- D) NIC.
- E) modem.

Answer:

B

Page Ref: 290

Difficulty: Easy

AACSB: Information technology

CASE: Comprehension

LO: 7.1: What are the principal components of telecommunications networks and key networking technologies?

Question 11

The method of slicing digital messages into parcels, transmitting them along different communication paths, and reassembling them at their destinations is called

- A) multiplexing.
- B) packet shifting.
- C) packet routing.
- D) ATM.
- E) packet switching.

Answer:

E

Page Ref: 293

Difficulty: Easy

AACSB: Information technology

CASE: Comprehension

LO: 7.1: What are the principal components of telecommunications networks and key networking technologies?

Question 12

The organization's rules for sharing, disseminating, acquiring, standardizing, classifying, and inventorying information is called a(n)

- A) information policy.
- B) data definition file.
- C) data quality audit.
- D) data governance policy.
- E) data policy.

Answer:

A

Page Ref: 272

Difficulty: Moderate

AACSB: Information technology

CASE: Content

LO: 6.4: Why are information policy, data administration, and data quality assurance essential for managing the firm's data resources?

Question 13

All of the following are technologies used to analyze and manage big data *except*

    A) cloud computing.
    B) noSQL.
    C) in-memory computing.
    D) analytic platforms.
    E) Hadoop.

Answer:
A
Page Ref: 263-267
Difficulty: Moderate
AACSB: Information technology
CASE: Content
LO: 6.3: What are the principal tools and technologies for accessing information from databases to improve business performance and decision making?

Question 14

How do software vendors correct flaws in their software after it has been distributed?

    A) They issue bug fixes.
    B) They issue patches.
    C) They re-release the software.
    D) They release updated versions of the software.
    E) They don't; users purchase software at their own risk.

Answer:
B
Page Ref: 350
Difficulty: Moderate
AACSB: Information technology
CASE: Comprehension
LO: 8.1: Why are information systems vulnerable to destruction, error, and abuse?

Question 15

Which of the following specifications replaces WEP with a stronger security standard that features changing encryption keys?

    A) TLS
    B) AUP
    C) VPN
    D) WPA2
    E) UTM

Answer:
D
Page Ref: 362
Difficulty: Difficult
AACSB: Information technology
CASE: Comprehension
LO: 8.4: What are the most important tools and technologies for safeguarding information resources?

Question 16

Which of the following systems digitizes, indexes, and tags documents according to a coherent framework?

- A) wikis
- B) CAD
- C) document management
- D) LMS
- E) KMS

Answer:

C

Page Ref: 465

Difficulty: Easy

AACSB: Information technology

CASE: Content

LO: 11.2: What types of systems are used for enterprise-wide knowledge management and how do they provide value for businesses?

Question 17

Business processes are analyzed, simplified, and redesigned in

- A) business process redesign.
- B) rationalization of procedures.
- C) automation.
- D) paradigm shifts.
- E) systems analysis and design.

Answer:

A

Page Ref: 537

Difficulty: Moderate

AACSB: Reflective thinking

CASE: Content

LO: 13.1: How does building new systems produce organizational change?

Question 18

Which method is used to assign weights to various features of a system?

- A) information systems plan
- B) scoring model
- C) portfolio analysis
- D) TCO
- E) real options model

Answer:

B

Page Ref: 584

Difficulty: Easy

AACSB: Reflective thinking

CASE: Content

LO: 14.2: What methods can be used for selecting and evaluating information systems projects and aligning them with the firm's business goals?

Question 19

Which metric is based on the relationship between the revenue produced by a specific customer, the expenses incurred in acquiring and servicing that customer, and the expected life of the relationship between the customer and the company?

A) churn rate
B) customer lifetime value
C) cost per lead
D) cost per sale
E) customer average value

Answer:
B
Page Ref: 398
Difficulty: Moderate
AACSB: Reflective thinking
CASE: Comprehension
LO: 9.3: How do customer relationship management systems help firms achieve customer intimacy?

Question 20

Netflix's public announcement of a reward for a technology solution to its movie recommendation system is an example of
A) prediction markets.
B) behavioral targeting.
C) long-tail marketing.
D) social shopping.
E) crowdsourcing.

Answer: E
Page Ref: 440
Difficulty: Moderate
AACSB: Application of knowledge
CASE: Comprehension
LO: 10.3: How has e-commerce transformed marketing?

Short ANSWER

5 Questions | 4 Marks Each | Total 20 Marks.

Question 21

Identify the five moral dimensions that are involved in political, social, and ethical issues and briefly describe each. (2 Marks)

Of these, which do you think is the most difficult for society to deal with? Support your opinion with an example. (2 Marks)

Answer:

The five moral dimensions are:

(1) Information rights and obligations. What rights do individuals and organizations have with respect to information pertaining to them?

(2) Property rights and obligations. How can intellectual property rights be protected when it is so easy to copy digital materials?

(3) Accountability and control. Who will be held accountable and liable for the harm done to individual and collective information and property rights?

(4) System quality. What standards of data and system quality should we demand to protect individual rights and the safety of society?

(5) Quality of life. What values should be preserved? What institutions must we protect? What cultural values can be harmed?

Individual answers for determining the most difficult for society to deal with will vary. One answer might be:

Quality of life issues will be most difficult for society to deal with in societies that are comprised of many different cultural and ethnic groups, such as Australia or the United Kingdom. It is difficult to regulate concerns that are based on subjective values.

Freedom of Speech on the Internet campaigns are one example of the difficulty of society to reconcile the Quality of Life moral dimension.

Page Ref: 160
Difficulty: Moderate
AACSB: Written and oral communication
CASE: Evaluation in terms of assess
LO: 4.1: What ethical, social, and political issues are raised by information systems?

Question 22

The retail home improvement chain you work for, Northern DIY, has noticed that one of its brands of sink is not selling nearly as well as anticipated.

What information systems would you use to determine the reason for the poor sales? Discuss what information you will retrieve from each system. (3 Marks)

Which of the information systems will be most important for your analysis? (1 Mark)

Answer:

Information systems: TPS, ESS, DSS, MIS

You might query operational level TPS to make sure that the product is actually getting to the stores and being restocked. You could query MIS to see average sales levels according to geography, location, and other factors to see if there are any specific factors affecting the sales.

You might query ESS to see if the same sinks are being sold by competitors and what these

prices are.
You might use DSS to see what factors could increase sales.
Assuming that the sinks are being properly stocked at the stores, the most important systems to query are the managerial-level systems: MIS for summaries of sales records to help pinpoint any other factors; ESS to check competition, and DSS for higher-level analysis to forecast possible solutions.
   Page Ref: 78-84
   Difficulty: Difficult
   AACSB: Analytical thinking
   CASE: Evaluation
   LO: 2.2: How do systems serve the different management groups in a business and how do systems that link the enterprise improve organizational performance?

Question 23

You have been hired by a national furniture leasing company to implement its first business intelligence systems and infrastructure. To prepare for your initial report, describe the types of data in their firm they can use to support business intelligence and the systems that you will implement to support both their power users and casual users, and explain how these systems or tools work together.   (4 Marks)

Answer:
All types of data can be used for their business intelligence systems, including operational, historical, machine-generated, Web/social data, audio and video data, and external data.

The large datasets can be collected in a Hadoop cluster and used by an analytic platform to support power user queries, data mining, OLAP, etc. A data warehouse can be used to house all data, including smaller data sets and operational data, and be used to support casual use, for queries, reports, and digital dashboards, as well as support the analytic platforms. Smaller data marts can be created from the data warehouse to enable faster querying and typical queries from casual users.
   Page Ref: 263-270
   Difficulty: Difficult
   AACSB: Information technology
   CASE: Synthesis
   LO: 6.3: What are the principal tools and technologies for accessing information from databases to improve business performance and decision making?

Question 24

You have been hired by Croydon Visiting Nurse Services, whose business processes are all manual, paper-based processes. How might a CRM system benefit them?   (4 Marks)
Answer:
A CRM system that includes patients' health records would allow any nurse to take over if another needed replacement. Assuming the nurses had access via laptops or tablets to the system, a new nurse would have instant access to the patients' needs. The CRM might also be able to record which types of treatments or products customers were most interested in or gave the greatest benefit to customers, and help anticipate needs.
Additionally, with PRM capabilities, products needed by the nursing service would be more easily anticipated, ordered, and delivered. Since the employees work in the field, or away

from a central office, Internet-based communications might provide tools for reviewing employee performance and connecting that performance with individual clients.

Finally, a CRM would also allow the tracking of prospective clients – either referred from central agencies (like community hospitals) or those who were considering self-referral. Surveys from the latter group could be captured in the CRM to facilitate analysis for trends (both direct: purchasing priorities, and indirect: socio-economic groups, location) that could drive future marketing strategies.

Page Ref: 393-399

Difficulty: Difficult

AACSB: Analytical thinking

CASE: Evaluation in terms of assess

LO: 9.3: How do customer relationship management systems help firms achieve customer intimacy?

Question 25

    a) What are Knowledge Workers and why are knowledge workers so important to the digital firm?   (1 Mark)

    b) What are their functions and which of these do you feel is most critical to the success of the firm?   (2 Marks)

    c) What are two (2) examples of Knowledge Work Systems?   (1 Mark)

Answer:

a)

Knowledge Workers create new products or find ways to improve existing ones. Without them, the firm would stagnate and become less competitive in an environment that is always changing and is increasingly more competitive. In the modern economy, knowledge is required to differentiate and remain effective in a marketplace.

b)

Student answers will vary, but should include an understanding of the three main functions of knowledge workers.

The three major functions of knowledge workers are: keeping the organization up-to-date in knowledge as it develops in the external world; serving as internal consultants regarding their areas of knowledge and its opportunities; and acting as change agents as they evaluate, initiate, and promote new projects.

The most important of these is to develop new knowledge as it applies to the making of products or services, as offering products and services is the mainstay of the corporation.

c)

Two examples of Knowledge Work Systems are:

- Computer Aided Design (CAD) systems like Dassault Systems' CATIA, and
- Virtual (or Augmented) Reality systems like Microsoft Hololens

Page Ref: 470
Difficulty: Moderate
AACSB: Analytical thinking
CASE: Evaluation
LO: 11.3: What are the major types of knowledge work systems and how do they provide value for firms?

EXTENDED RESPONSE

Answer THREE (3) Questions of the FOUR (4) Questions provided

20 Marks Each | Total 60 Marks.

Question 26. Business Strategy

a) Define and describe a business ecosystem. (4 Marks)
   Describe an example of a business ecosystem. (4 Marks)
b) How is Internet technology useful from a network economics perspective? (2 Marks)
   Give two (2) detailed examples. (10 Marks)

Answer:

a) Business Ecosystem

A business ecosystem is a collection of loosely coupled but interdependent industries (suppliers, distributors, technology manufacturers, etc.) that provides related services and products. It is similar to a value web, except that cooperation takes place across many industries rather than many firms.

Business ecosystems can be characterized as having one or a few keystone firms that dominate the ecosystem and create the platforms used by other niche firms. Keystone firms in the Microsoft ecosystem include Microsoft and technology producers such as Intel and IBM. Niche firms include thousands of software application firms, software developers, service firms, networking firms, and consulting firms that both support and rely on the Microsoft products.

Another example of a business ecosystem is the mobile Internet platform. In this ecosystem there are four industries: device makers (Apple iPhone, RIM BlackBerry, Motorola, LG, and others), wireless telecommunication firms (AT&T, Verizon, T-Mobile, Sprint, and others), independent software applications providers (generally small firms selling games, applications, and ring tones), and Internet service providers (who participate as providers of Internet service to the mobile platform).

> Page Ref: 140-141
> Difficulty: Moderate
> AACSB: Analytical thinking
> CASE: Analysis
> LO: 3.3: How do Porter's competitive forces model, the value chain model, synergies, core competencies, and network economics help companies develop competitive strategies using information systems?

b) Network Economics

In network economics, the cost of adding a participant in the network is negligible, while the gain in value is relatively much larger. The Internet itself is an example of a successful implementation of network economics—the more people participate, the more valuable and essential a commodity it is.

When Microsoft provides a service through the Internet such as a project management application (Microsoft Project), the costs to the company of adding another user are small (as the software infrastructure or application is already built), and the more users are signed up, the more profit is made. In this case Microsoft aims to develop and deploy a core product offering Microsoft Project Standard and package this with other software, driving adoption and lowering distribution costs. As usage increases and the package matures, Microsoft continues to receive income for a software package that has already been developed and – largely – paid for. Microsoft can then allocate this revenue to other software projects or into

developing MS Project into new MS Project Professional, etc…

Another example is eBay, the giant online auction website. The value of eBay lies in the number of active members; the more people who offer products on eBay, the more valuable eBay.com – and its subsidiaries – become to all existing users, the more compelling it is as a platform for potential users, and the lower the unit-cost of providing the service becomes. Moreover, as usage increases, the increase in value to existing users becomes a form of 'lock in' where business strategies built around the supply of goods through eBay – at cost bases made possible by the large volume of sales – would not work at other sites.

> Page Ref: 139
> Difficulty: Moderate
> AACSB: Analytical thinking
> CASE: Analysis
> LO: 3.3: How do Porter's competitive forces model, the value chain model, synergies, core competencies, and network economics help companies develop competitive strategies using information systems?

Question 27. Information Security

a) How can a firm's security policies contribute and relate to the following six main business objectives?
- Operational Excellent
- New Products, Services, Business Models
- Customer and Supplier Intimacy
- Improved Decision Marking
- Competitive Advantage
- Survival   (12 Marks)

b) Give an example of each.   (6 Marks)

c) Select one of your examples and explain way it is the most important business objective for the firm to focus on.   (2 Marks)

Answer:

(1) Operational excellence:

Security policies are essential to operational excellence. A firm's daily transactions can be severely disrupted by cybercrime such as hackers. A firm's efficiency relies on accurate data. In addition, information assets have tremendous value, and the repercussions can be devastating if they are lost, destroyed, or placed in the wrong hands.

Sony was forced to suspend its PlayStation Network (PSN) for approximately a month following a data breach in 2011.

(2) New products, services, business models.

Security policies protect a company's ideas for new products and services, which could be stolen by competitors. Additionally, enhanced security could be seen by a customer as a way to differentiate your product.

Website **macrumors.com** is one of several website publishing leaked and speculative data regarding Apple's products. Often, the value is in the assembled information – as was seen in

Mac Rumor's predictions about iPhone 8 cases leading up to the phone's official release in September 2017.

(3) Customer and supplier intimacy:

Customers rely on your security if they enter personal data into your information system, for example, credit card information into your e-commerce site. The information you receive from customers and suppliers directly affects how able you are to customize your product, service, or communication with them.

In 2013, **Adobe.com** was breached leaking millions of Adobe.com (and Creative Catalyst) accounts, including username, email, encrypted password and password hint.

(4) Improved decision making:

Secure systems make data accuracy a priority, and good decision making relies on accurate and timely data. Lost and inaccurate data would lead to compromised decision making.

Evian Water built a Water Testing System that relied on automated quality monitoring by checking for 'error flags' produced by a number of sub-systems. When an inline water purity testing sub-system failed, it was not able to generate and pass up an error message, causing a False-Positive in the Water Testing System. Unchecked bottles were sold assuming they had been checked. Evian had to recall the affected product.

(5) Competitive advantage:

The knowledge that your firm has superior security than another would, on an otherwise level playing field, make your firm more attractive to do business with. Also, improved decision-making, new products and services, which are also affected by security (see above), will contribute to a firm's competitive advantage. Strong security and control also increase employee productivity and lower operational costs.

Google mail servers (collectively Gmail) are marketed as a safe and secure alternative for a core business service. Google relies on market perception their services are more secure than competitors when selling G Suite (formally Google Apps) as a white-labelled service to businesses.

(6) Survival:

New laws and regulations make keeping your security system up to date a matter of survival. Inadequate security and control may result in serious legal liability. Firms have been destroyed by errors in security policies.

DigiNotar was a Dutch (InfoSec) certificate authority until a data breach in 2011 cause the fraudulent issuing of certificates. Shortly afterwards the Dutch Government took control of the company and filed for its bankruptcy within a month.

Page Ref: 337-368
Difficulty: Difficult

AACSB: Written and oral communication

CASE: Synthesis in terms of applying

LO: 8.3: What are the components of an organizational framework for security and control?

Question 28. Business Intelligence

a) Explain why even well-designed information systems do not always help improve a firm's decision making. (9 Marks)

b) You are evaluating Business Intelligence (BI) software from a number of vendors. Using the following six elements in the BI environment, and your understanding of the importance of these elements to formulate six questions to ask the vendors in order to determine how their software will interplay with your needs.

- Data from the business environment
- Business Intelligence Infrastructure
- Business Analytics Toolset
- Managerial and User Methods
- Delivery Platform(s)
- User Interface (6 Marks)

c) You are an analyst for a firm that imports and distributes specialty oils and vinegars and your company wants you to evaluate their options for taking advantage of cutting edge business analytics.
Which two strategies could you adopt? Which would you recommend? (5 Marks)

Answer:

a)

The three main reasons for information systems not always producing positive results:

1. information quality,
2. management filters, and
3. organizational inertia/politics.

A sample answer is:

There are three main reasons that implementing a well-designed information system might not result in better decisions. First, the information produced by a system may be incomplete and inaccurate. The quality of information will depend on the quality of data gathered, and may require a minimum amount of data to be gathered. Inaccurate data and incomplete data can degrade the quality of decision making. Second, management filters can also stymie good decision making—a manager who has a bias against some types of activities or solutions, or is overly optimistic or pessimistic will make decisions that are skewed towards their own perspective rather than actual facts. Finally, organizational inertia and politics can hamper decision making. Information systems can require organizational change in roles and business processes that employees want to resist; or a system can produce information that suggests that a change is necessary but employees ignore in order to maintain the status quo in roles and responsibilities.

Page Ref: 504-505
Difficulty: Moderate
AACSB: Analytical thinking
CASE: Analysis
LO: 12.1: What are the different types of decisions and how does the decision-making process work? How do information systems support the activities of managers and management decision making?

b)

Six questions aligning to each of the elements are:

1. Data from the business environment. A question for a salesperson is: "How does your software integrate with our data?"
2. Business intelligence infrastructure. "What type of database system does your software use?"
3. Business analytics toolset. "What tools are included?"
4. Managerial users and methods. "Our management team uses these metrics. Does your software provide that?"
5. Delivery platform: "How does your software integrate with our platforms?"
6. User interface: "What are the elements of your user interface and what delivery methods are used—mobile, social media, web portal, etc."

    Page Ref: 507
    Difficulty: Moderate
    AACSB: Analytical thinking
    CASE: Synthesis
    LO: 12.2: How do business intelligence and business analytics support decision making?

c)

There are two strategies for adopting BI and BA capabilities:

1.   an integrated solution or
2.   using multiple best-of-breed vendor software solutions.

The hardware firms want to sell you integrated hardware/software solutions that run on their hardware (the totally integrated solution). Software firms will want to sell you "best of breed" software that runs on any machine they want. In this strategy, you adopt the best database and data warehouse solution, and select the best business intelligence and analytics package from whatever vendor you believe is best. Student recommendations will vary: The first solution carries the risk that a single vendor provides your firm's total hardware and software solution, making your firm dependent on its pricing power, but it offers the advantage of dealing with a single vendor who can deliver on a global scale. The second solution offers greater flexibility and independence, but with the risk of potential difficulties integrating the software to the hardware platform, as well as to other software.

    Page Ref: 517
    Difficulty: Moderate
    AACSB: Analytical thinking
    CASE: Evaluation
    LO: 12.2: How do business intelligence and business analytics support decision making?

Question 29. Cloud Computing

a) A small design agency you are consulting for will be creating client Web sites and wants to purchase a Web server so they can host the sites themselves. How will you advise them on this purchase? (4 Marks)
b) Explain what IaaS, PaaS, or SaaS cloud computing models are and why each may be more beneficial for the design agency.
Include a definition and two (2) advantages and one (1) disadvantage for each model. (12 Marks)
c) Give an example of each of the four (4) computing models (on-premise, IaaS, PaaS, SaaS). (4 Marks)

Answer:

a)

They need to understand total cost of ownership: the costs will go beyond the cost of the server, but they will also need to purchase the server software and any application software they will be using. They will also need someone in their IT department to manage and maintain the computers. They will also incur facilities costs for running the computer. They need to have a backup plan should the server fail. The design agency will need to add up all the potential costs and risks. Additionally, they need to prepare for their plan if they need more servers. Will they eventually have to run and maintain their own server farm? What if one of their clients' sites is more popular than anticipated and the server has difficulty handling the load? How quickly can they add servers or processing power? The company should look at colocation, Web hosting services, and ASPs to see if their needs will be better met this way.

> Page Ref: 233-234
> Difficulty: Difficult
> AACSB: Analytical thinking
> CASE: Synthesis
> LO: 5.5: What are the challenges of managing IT infrastructure and management solutions?

b)

IaaS – Infrastructure as a Service is a cloud computing model where providers offer computing infrastructure – virtual machines and other resources – as a service to subscribers. Typically, hypervisors – such as VMWare or Hyper-V – manage the low-level system resources of each virtual machine or generic resource, enabling customers to scale their usage up or down and allocating costs accordingly.

Amazon Web Services (AWS) and Microsoft Azure are two examples of IaaS providers. Either provider allows users to 'rent' individual computing resources (eg. Storage, computing, networking, administrative utilities) – typically on a 'per hour' basis. The design agency would 'spin up' a computing instance (after configuring the specifications just like when purchasing a physical server) and attach different types of storage, networking and administration utilities to it. They would connect to their new 'instance' – just like connecting to their new physical server – and run operating systems and applications on it (just like a physical server).

Advantages include:
- Ability to flexible space – and match scaling costs with scaling revenue.
- Expand to include additional resources as capacity is exhausted.
- Easily differential hosting packages to clients (ie. charge more for faster servers, and less for slower servers)
- Virtualise their hardware provisioning, reducing disaster recovery and simplifying business continuity.
- Operating expense instead of Capital expense.

Disadvantages include:
- Outsourcing provision of a key resource to a third party.
- Pushing technology past where local tech resources may be comfortable maintaining.

PaaS – Platform as a Service is typically – but not always - used as a development environment for application developers. In the PaaS models, providers deliver a computing platform, typically including operating system, programming-language execution environment, database, and web server. The provider typically develops toolkits and standards for development and channels for distribution and payment.

cPanel is an example of a web host utility that web-hosters can deploy for clients. CPanel automatically segments each 'instance' for and provisions for direct access to each individual client to their website and associated assets (emails, files, etc...). It supports installation of third party apps including WordPress, Joomla, etc..

Advantages include:
- Proven and low-cost model that clients can access individually.
- Familiar environment for clients
- Scalable cost as demand (and revenue) grow.
- Operating expense instead of Capital expense.
- Don't need to worry about upgrading cPanel (or equivalent)

Disadvantages include:
- Reliance on 3rd party for provision for a core service.
- Lower margin available to Design Agency compared to a potential deployment of IaaS (as paying an extra supplier)

SaaS – Software as a Service is cloud computing model where providers give users access to application layers (typically software) and databases. Providers then manage the underlying infrastructure and platforms that run those applications. SaaS is sometimes referred to as "on-demand software" and like IaaS and PaaS – is usually priced on a pay-per-use basis or via a subscription fee.

Wordpress.com, Spotify and Squarespace are all examples of SaaS website design packages. Each have portals where web design agencies can attract new clients and manage existing clients' portfolios. Providers charge either the agency or the client directly for ongoing provision of services – which includes patching and ongoing infrastructural maintenance.

Advantage include:
- Highly abstracted product/service so the Design agency can focus on content creation and website design rather than infrastructural provision
- One-stop-shop for all problems – so all patches, infrastructural provisioning etc... is outsourced.
- Typically, a highly developed ecosystem of third party providers agencies can easily outsource portions of work to (either white-labelled or branded).

Disadvantages include:
- Increased vendor lock-in

- Reduced control over cost base

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