Quadrant-I   (e-Text)

Details of Module and its structure

Module Detail	
Subject Name	**Education**
Course Name	**ICT in Education**
Course Code	**EDU504**
Module Name/Title	**ICT – its emerging trends and its educational applications; Augmented reality, e- books, rhizomatic learning, learning analysis, ubiquitous computing and mobile learning, games based learning, cloud computing, 3D printing, maker space and software as service**
Module Code	**IIE006**
Pre-requisites	**………………………**
Learning Outcomes	**After going through this lesson, the learners will be able to:** • **Justify the augmented reality work and e-book formats.** • **Explain the concept of rhizomatic learning and can elaborate the learning analysis.** • **Distinguish between ubiquitous computing and mobile learning.** • **Analyze benefits of mobile learning, game-based learning, cloud computing and make its appropriate use** • **Apply 3D printing, makerspace and evaluate the software as a service.**
Keywords	**ICT, Emerging Trend in ICT and Educational Applications of Emerging ICTs.**

2. Development Team

Role	Name	Affiliation
Principal Investigator (PI)	**Dr S K Bawa**	**Central University of Punjab**
Subject Matter Expert (SME)	**Dr G R Angadi**	**Central University of Gujarat**

Contents

1.Introduction

Mahi is a trained post graduate English teacher working in a village in Karnataka. Recently she has organized an 'International Day of Non-Violence' on the eve of M. K. Gandhi Birthday. She organized a video show on Gandhiji life and his message to the nation. She has identified this video from YouTube. Based on the learning from the shown video, students took a quiz competition in the afternoon. Since the quiz was online, she could announce the winner immediately. She used to google form for this purpose. She has shared pictures of the event in the English subject teachers' forum (E-STF) via WhatsApp. One of her friend suggested her to open an educational blog on her experiential learning experiences. She has an experiential learning blog now, in which she is regularly posting her teaching and learning experiences and reflections. Mahi is uses web tools and technology in her class regularly. Mahi has finds that the technology integration in teaching-learning and it enriches the learning experiences. She has later excited about the potentialities and possibilities through technology use in the classroom.

It is an example to quote how the information and communication technology in education can influence the classroom practices of the teaching-learning. This is only an example to show how Information and Communication Technology (ICT) have started influencing the classroom practices.

The technological gadgets and apps are best used in the classroom to help the students to achieve more and prepare them for the world outside the school, in the recent years, technology assisted learning programs focused on focused on emergent-technological gadgets and apps like, game based learning, ubiquitous and mobile learning, augmented reality, learning analytics for improving the experiences of the learner in the learning environment.

This module would introduce us to the basic concepts and ideas related to the field of ICT and its emerging trends and its educational applications of Augmented reality, e- books, rhizomatic learning, learning analysis, ubiquitous computing and mobile learning, games based learning, cloud computing, 3D printing, marker space and software as service. How these can offer richer materials for teaching-learning and affect the way of teacher-learners time is used in schools.

2. Augmented Reality (AR)

The technologies that are being gradually introduced in educational contexts enable students to diversify the ways for knowledge building. The arrival of a new technology, as is the case of augmented reality devices, captures the teachers' attention. It creates the expectation that its uses may provide students with new ways to interact, new possibilities of collaboration between students and teachers and potentially an increase in the motivation for learning.

Augmented Reality Meaning

The word 'augment' means to magnify, to increase, to extend, or make better. AR can be understood as a form of virtual reality where the real world is expanded or enhanced through the use of virtual elements, usually overlaying through the use of a visual device to view the real world.

AR is the technology it expands our physical world, by adding layers of digital information to it. AR appears in direct view of an existing environment and adds sounds, videos and graphics to it. A view of the physical real-world environment with superimposed computer-generated images, thus changing the perception of reality, is the AR.

How Augmented Reality Works

Augmented reality is live; right now user can be seeing it in the real world as it is. It manipulates the real world space by altering the users' perception of the reality. The user can watch a live cricket match via recording of the real world with virtual elements imposed on top of it. The interested persons can watch the live game in the house from their own Television but can also see the scores of the game field, augmented reality allows the user to look around and surrounding their environment in real time, but through the display that overlays information to create the augmented real experience.

For example, in Google glass, this is the device that appears much like a regular pair of glasses, it has a small screen on which the user can see GPS directions, users can send the photos, conduct the experiment and check the weather and many more functions. When we put the virtual object between the user and the real world, object recognition and computer vision can be

used to allow the object to be manipulated by actual physical objects, and allow the user to interact with the virtual elements.

The Google translator is an example for augmented reality app. With it, we can scan text in a language we do not understand, and it will translate it for us in real time.

3. E-books

It is an electronic book (e-book), made the publication in digital form and it is the combination of text, images, graphs or together these, it can readable on computer and other electronic devices. It is sometimes defined as 'an electronic version of a printed book'. E-books can be read on dedicated e-reader devices, but also on any computer device that features a controllable viewing screen, including desktop computers, laptops, tablets and smartphones. The e-books, users can browse through titles online, and then when they select and order titles, the e-book can be sent to them online or the user can download the e-book. The main reasons for people buying e-books online are possibly lower prices, increased comfort and a larger selection of titles. The Project Gutenberg was launched in 1971, creating e-books as we know them today, and digitalising books ever since.

E-book Formats

There is n-number of e-book formats, but most of us earthly mortals will only meet a couple during our lifetime. E-book readers typically like a particular format however most of them can still settle for multiple formats. The difference between the formats is mainly in how well they handle fixed-layout and reflow-able books, if they support DRM (Digital Right Management), whether they support pictures and multimedia content and what are their preferred devices.

- **.txt (Plain Text):** We do not know how far a plain text format will take us. Being the most widely accepted e-book format, txt cannot do anything but give simple, reflowable text.

- **.azw and .azw3 (Kindle):** Kindle is very own format can pretty much do everything we expect from it to do. It supports reflowable and fixed layout books, handles DRM and interactivity. The solely backside being that it is only accepted by Kindle devices and Kindle apps.

- **.epub (epub):** ePub, being currently after its third major update, can do everything the Kindle format can, but is much more likely accepted: literally every device can handle ePub-except Kindles, of course.

- **.mobi (Mobi-pocket):** When Amazon launched Kindle, mobi was the first format they used. While it had since been replaced by .azw, it is still hugely popular.

- **.pdf (Portable Document Format)** While technically not an e-book format, this is the one most people are familiar with. Designed for printing and straightforward, platform neutral sharing of fixed-layout documents, it is no surprise that reflowing the text is problematic.

4. Rhizomatic Learning

Rhizomatic learning is a perspective on learning that has been promoted in the past few years by Dave Cormier, a teacher at the University of Prince Edward Island. Rhizomatic learning may be method of pondering learning supported ideas delineated by Gilles Deleuze and Felix Guattari in a very thousand plateaus. A rhizome, typically referred to as a crawl stem, is a stem of a plant that sends out roots and shoots as it spreads. It is an image used by D & G to describe the way that ideas are multiple, interconnected and self-replicating.

In botany, a rhizome is the term used for the stem of a plant, usually found underground, whose roots spread out in many directions. With this image in mind, supporters of rhizomatic learning believe that learning is a multi-dimensional process that has no defined beginning or end. Learning is a complex, chaotic process, in which each student independently chooses his or her own path. The rhizomatic learning perspective is based on the premise that teachers cannot possibly know or cater to students' individual needs, interests, and contexts.

A rhizome has no beginning or end… like the learning process. 'The whole idea of rhizomatic learning is to acknowledge that learners come from different contexts, that they need different things, and that presuming you know what those things are is like believing in magic.' Rather than providing a defined set of course materials in a predetermined order, teachers who support rhizomatic learning strive to create a context 'within which a conversation can

grow,' much as a garden provides the space for a plant to take root and flourish.

Rhizomatic learning is a variety of pedagogical practices informed by the work of Gilles Deleuze and Felix Guattari. Explored initially as an application of post-structural thought to education, it has more recently been identified as methodology for net-enabled education. In contrast to goal-directed and hierarchical theories of learning, it posits that learning is most effective when it allows participants to react to evolving circumstances, preserving lines of flight that allow a fluid and continually evolving redefinition of the task at hand. In such a structure, 'the community is the curriculum,' subverting traditional notions of instructional design where objectives pre-exist student involvement.

5. Learning Analysis

Learning analysis may be defined as 'it is the measurement, collection, analysis and reporting of the data about learners and their learning contexts, for the purposes of understanding learning and environments in which it occurs'. It is related with teaching-analysis, which provides the means to analyse the learning context, namely the teaching design.

Learning analysis can provide the methods and tools to:

- **Collect student data** during the delivery of a lesson in order to update individual student profiles. The types of student data typically used belong to the 'Student Dynamic Data' it may include:

    a. Engagement in learning activities
    b. Performance in assessment activities
    c. Interaction with digital educational resources and tools and
    d. Behavioral data.

- **Analyse and report** on student data to facilitate the teacher to decide on personalised interventions (e.g., feedback and scaffolding). To do this, learning analysis utilise both 'student dynamic data' which refer to students' activities during the learning process and are generated in a more frequent rate, as well as 'student static data' which refer to personal and academic attributes of students that may remain unchanged for large periods of time.

Learning analysis depicts in the table 1 as different types of learning outcomes

6. Ubiquitous Computing and Mobile Learning

Mobile learning (M-learning) and ubiquitous computing are two different ways of utilising various technologies to expand the delivery of learning materials. In many current educational applications, both m-learning and u-learning environments make use of mobile devices for many purposes, such as a medium to present knowledge to learners. Both of them use similar technologies but may use them in different ways.

a. Ubiquitous Computing

The concept of ubiquitous computing was originated by Weiser (1991), who said that: 'The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it'. Weiser's visionary reflections of such technologies and those of others were later believed to have transformed the way we interact and go about our daily lives. Practically, today we live surrounded by "ubiquitous" technology which are 'invisible' to us.

The word ubiquitous literally means 'existing or being everywhere at the same time', implying something that is constantly encountered, and widespread. Ubiquitous computing is technology that is pervasive and due to the pervasiveness, it is sometimes referred to as "pervasive computing". The pervasiveness of these technologies in our everyday environment tends to make us use it without thinking about it. Instead, we focus on the task at hand, making the technology invisible while still using it. Ubiquitous technology is often mobile, wireless, and networked, making its users more connected to the world around them and the people in it.

Computer-mediated social interaction is all kinds of social interaction communication using either a tool or technology e.g. Facebook, skype, mobile phones, ad-hoc networks, etc. Both ubiquitous computing and computer-mediated social interaction are playing a role in the education sector today by modernising the learning environments.

b. Mobile Learning

Mobile learning, it is also calling as m-learning, in an educational context. It supports learning with the help of mobile devices, by continuous access in the process of learning. The learners can learn anywhere, anybody, anytime

and by their own self-pacing. With the advent of m-learning, educational system has changed.

To unpack the 'Mobile' in mobile learning:

- *Mobility in Physical Space:* learners on the move trying to cram learning into the gaps of daily life space.

- *Mobility of Technology:* portable tools and resources are available to be carried around, conveniently packed into a single lightweight device.

- *Mobility in Conceptual Space:* A typical young learner undertakes more learning, as well as numerous learning episodes every day, so attention moves from one conceptual topic to another driven by personal interest, curiosity or commitment.

- *Mobility in Social Space:* learners perform within various social groups, including encounters in the family or classroom context.

- *Learning Dispersed Over Time:* learning is a cumulative process involving connections and reinforcement among a variety of learning experiences, across formal and informal learning environments.

Benefit of M-Learning

M-Learning enables educator, learner and teacher to extend beyond the traditional schoolrooms (classroom, tutorial and laboratories); the portable computing and communication devices provide teachers and learners more flexibility and offer new interaction opportunities.

The benefits of M-Learning are as follows:

- Anytime and anywhere access to content.

- Support distance learning.

- Can enhance student-centered learning.

- Great for just-in-time training or review of content.

- It can be used more effectively for the differently-abled.

- Support differentiation of student learning needs and personalized learning.

- Can enhance interaction between and among students, learners and teachers.

- Reduce cultural and communication barriers between faculty and students by using communication channels that students like.

7. Game Based Learning (GBL)

Games based learning offers a typical design to complement the traditional teaching strategies and infuse teaching with energetic, ignite innovative thinking and provide variety in teaching methods. Games make learning concepts more acceptable for learners. Games encourage creative behaviour and divergent thought (Fuszard, 2001) and are excellent ice breakers. Games will often act as learning triggers inducing lively discussion on learning concepts amongst students.

It describes an approach to teaching, where students explore relevant aspect of games in a learning context designed by teachers. Teachers and students collaborate in order to add depth and perspective to the experience of playing the game. Worth game-based learning applications can draw learners into virtual environments. Within an effective game-based learning environment, we work toward a goal, choosing actions and experiencing the consequences of those actions along the way.

8. Cloud Computing

Cloud computing is an of internet based computing that provides shared computer processing resources and data to computers and other devices on demand. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources (e.g., computer networks, servers, storage, applications and services), which can be rapidly provisioned and released with minimal management effort. Cloud computing and storage solutions provide users and enterprises with various capabilities to store and process their data in either privately owned, or third-party data centers that may be located far from the user–ranging in distance from across a city to across the world.

Services of Cloud

With an aim of reducing the expenditure of the universities and institutions for IT infrastructure and the complexity faced by universities and institutions, the traditional installed software on the campus computers are now replaced by cloud computing. With the power of cloud, today higher education can gain significant flexibility and agility and can migrate the sensitive data into remote and world wide data center 'the cloud' itself.

To use the cloud services, the universities and the institutions has to first define their requirements and has to take a special attention for the privacy and critical issues.

There are several cloud services as follows:

1. **Infrastructure as a Service (IaaS):** can be used to satisfy the infrastructure needs of the students, faculties or researcher globally or locally with some specific hardware configuration for a specific task.

2. **Platform as a Service (PaaS):** certain providers are opening up application platforms to permit customers to build their own application without the cost and complexity of buying and managing the underlying hardware and software layers.

3. **Software as a Service (SaaS):** Software applications as services are presented on the Internet rather than as software packages to be buy by any client. Examples are Google web-based office

4. **Computing as a Service (CaaS):** providers offer access to raw computing power on virtual server such as Amazons service.

5. **Data as a Service (DaaS):** A particular type of service in the cloud that offers features for storing, managing and accessing data.

9. 3D printing

3D printing is also known as additive manufacturing, or desktop fabrication. It is a process in which a real, physical object is created based on a 3D design blueprint. 3D printing is an emerging technology that first introduced in the year 1986; however, it was not until the 1990s that it began to draw serious attention from all corners of the world of technology.

Applications of 3D Printing

The rapid growth and improvements in 3D printing technology have enabled us to benefit from it.

1. 3D printing provides an excellent method for geometry visualizations and design initiatives at art schools. It is also used in numerous disciplines of study for research purposes.

2. In architecture this technology for structure verification, design review, reverse-structure engineering, and expedited scaled modelling.

3. All kinds of prototypes of toys, action figures, games, musical equipment and other things are being manufactured using 3D printers.

The medical field has gained an edge as a result of the advancements in 3D printing. A number of working organs have been created and a lot of research is being carried out. It may not be too long when organs for transplant could be easily 'printed'.

10. Makerspace

Makerspace is a constructivist and constructionist movement that is taking the world by storm! A makerspace presents readily-available materials that can act as a provocation for inquiry, as well as modern technology and items to invent with.

A makerspace is a community center that provides technology, manufacturing equipment and educational opportunities to the public. Makerspaces allow community members to design, prototype and manufacture items using tools that would otherwise be inaccessible or unaffordable such as 3-D printers, digital fabrication machines and Computer-Aided-Design (CAD) software. Makerspaces are typically funded by membership fees or through affiliations with external organizations, such as universities, for-profit companies, non-profit organizations and libraries.

A makerspace offers something that traditional classes are lacking. Shop classes and home economics always included an element very similar to a makerspace, and while students may not have performed correctly, it was much easier to understand concepts and how to apply them. Makerspace takes this tool and moves it into traditional classes to give students a tactile and kinesthetic experience that shows them how and why a concept works. As the students work through a particular problem, they are encouraged to come up new and innovative ideas. Ultimately, this helps them to understand better and apply what they have learned.

11. Software as a service (SaaS)

SaaS is the commonly used acronym for software as a service. Which begs the question, what is software as a service? And how is it different than just plain software?

SaaS is the practice of accessing software solutions over the internet, as opposed to by downloading solutions onto our computer. Before SaaS, businesses and consumers would buy a physical version of the software that required installation. Remember the plastic-wrapped boxes that held the software's CD-ROM? Us too – we were a pain. SaaS eliminates the need for that thanks to the internet. Businesses and consumers simply subscribe to access externally hosted software. As long as we have a connection to Wi-Fi, we can access the software from anywhere, on any computer.

Typically, SaaS tools do not require any installation. However, some applications, like Slack, offer both a web browser version and a desktop application – both of which still require internet access. Desktop applications are convenient because the user will typically stay logged in as opposed to having to type in their username and password every time.

The software-as-a-service model in itself has proved to be popular in software today, with the large majority of software companies selling a SaaS offering. SaaS alleviates a lot of the pain of deploying software, pushing updates, and scaling users, making it appealing to software companies and software users alike.

The pay-as-we-go or pay-per-use structure also remains an invaluable aspect of the SaaS model. For users and companies buying the software, this can mean a lower initial investment, and the ability to avoid paying for a software package for our entire institution when only one particular team will use it. For software companies, this grants them the opportunity to upsell throughout the customer lifecycle.

SaaS, like anything else, has its pros and cons. When looking for a software solution, it is important first to identify our needs, absolute necessities, nice-to-haves, and the features we do not need and evaluate SaaS vs. on premise to determine which will better fit the bill and allow us to be successful.

12. Summary

During the past few years, the world has witnessed a phenomenal growth in communication technology, computer network and information technology. Development of new broadband communication services and convergence of telecommunication with computers have created numerous possibilities to

use a variety of new technology tools for teaching and learning system. The integration of computers and communications offers unprecedented opportunities to the education systems with its capacity to integrate, enhance and interact with each other over a wide geographic distance in a meaningful way to achieve the learning objectives. The growth of these communication and computer systems, their ease of use, the power and diversity of information transfer allow teachers and students to have access to a world beyond the classroom. It has the potential to transform the nature and process of the learning environment and envision a new learning culture. Interactivity, flexibility and convenience have become the order of the day in the ICT supported environment. ICT opens up opportunities for learning because it enables learners to access, extend, transform and share ideas and information in multi-modal communication styles and format. It helps the learner to share learning resources and spaces, promote learner centered and collaborative learning principles and enhance critical thinking, creative thinking and problem solving skills. Not only mastering ICT skills, but also utilizing ICT to improve teaching and learning is of utmost importance for teachers in performing their role of creators of pedagogical environments. The effectiveness of using ICT in technical considerations, little is known about which learning strategies and pedagogical framework should be used for education and training. How to construct these electronic teaching and learning environments so that they are based on specific epistemologies or knowledge bases? As we become increasingly supported by ICT, teaching and learning will not be the same as before. We will have to make use of the rich and exciting opportunities offered by the new technologies in education to reach our new goal and vision. To appreciate the ICT applications in teaching and learning, we need to understand the major paradigm shifts in education system.

Quadrant-III - (Learn More / Web Resources / Supplementary Materials):

Books, articles, research papers, journals, case studies etc.:

Angadi, G. R. (2015). Cloud Computing Technology in Education. *Online International Interdisciplinary Research Journal,* 4(Special issue), pp. 122-130.

Bacca, J., Baldiris, S., Fabregat, R., Graf, S., & Kinshuk. (2014). Augmented Reality Trends in Education: A Systematic Review of Research and Applications. *Educational Technology & Society, 17* (4), 133–149.

Fuszard, B. (2001) Gaming. In Lowenstein, A. J., Bradshaw, M. J. & Fuszard, B. (Eds.) *Fuszard's innovative teaching strategies in nursing.* 3rd ed. Gaithersburg, MD, Aspen Publishers.

Majumdar, S. (1997). Network based flexible learning: Prospects and challenges in the 21st Century: Invited keynote address at the International Conference of Vocational Education and Training (IVETA '97), Helsinki, Finland. August 24-28.

Weiser, M. (1991). The Computer for the 21st-Century *Scientific American* 265 (3), pp. 66-75.

Links to web sites giving additional readings, Wikipedia, blogs, open source content etc.:

Adaptive Quiz tool. Available at https://moodle.org/plugins/mod_adaptivequiz Minecraft: Education Edition. Available at http://eu-acerforeducation.acer.com/resources/minecraft-education-edition-the-new-learn-to-code-platform-by-microsoft/

BrightBytes. Available at https://www.brightbytes.net/student-success/

Dave's Educational Blog. Rhizomatic Learning – Why we teach? Available at http://davecormier.com/edblog/2011/11/05/rhizomatic-learning-why-learn/

edX MOOC on Analytics for the Classroom Teacher. Available at https://www.edx.org/course/analytics-for-the-classroom-teacher

Fisher, T. (2018). What is Augmented Reality? Available at
https://www.lifewire.com/augmented-reality-ar-definition-4155104

How to 3D Print: Beginner's Guide to 3D Printing: Available at
https://3dinsider.com/3d-printing-guide/

Learning Analytics Enriched Rubric. Available at
https://docs.moodle.org/35/en/Learning_Analytics_Enriched_Rubric

Learn Smart tool. Available at https://www.mheducation.com/prek-
12/platforms/learnsmart.html?utm_campaign=elearningindustry.com&utm
_source=%2Flearning-analytics-analyze-lesson&utm_medium=link

Makerspace for education blog (Trish). Available at
http://www.makerspaceforeducation.com/makerspace-for-education-blog

Scott, M., Lucy, K., Jamie, M. & Jennifer, S. Mobile Learning: A handbook for
Developers, Educators and Learners. Available at
http://1.droppdf.com/files/RRqn7/mobile-learning-a-handbook-for-
developers-educators-and-learners-scott-mcquiggan.pdf

SmartKlass Learning Analytics Moodle. Available at
https://moodle.org/plugins/local_smart_klass

Sure., S. Information and Communication Technology. Available at
http://www.riemysore.ac.in/ict/unit__1__information_and_communication_
technology.html

Teacher Contributed Makerspace Lessons! Available at
http://www.makerspaceforeducation.com/teacher-contributed-lessons.html

What is a MakerSpace? Available at https://youtu.be/NLEJLOB6fDw

Glossary:

· 3D printing- the action or process of making a physical object from a
three-dimensional digital model, typically by laying down many thin
layers of a material in succession.

· **Augmented reality**- is an interactive experience of a real-world
environment whereby the objects that reside in the real-world.

· **Cloud computing**- is the use of various services, such as software
development platforms, servers, storage and software, over the internet.

- **e- books**- is a book publication made available in digital form, consisting of text, images, or both, readable on the flat-panel display of computers or other electronic devices.

- **Educational application**- is changing the way students learn around the world. Designed to anything from provide advanced teaching-learning methods.

- **Emerging trends-** is a topic area that is growing in interest and utility over time.

- **Games based learning**- is a type of *game* play that has *defined learning* outcomes.

- **ICT-**Information and Communication technology

- **Learning analysis**- is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs.

- **Makerspace**- is a collaborative digital space for educators to explore how to create and use makerspaces in their own environments and will help to transform pedagogies of individual educators through immersion in the context and the support of a community of practice.

- **Mobile learning or M-learning-** learning across multiple contexts, through social and content interactions, using personal electronic devices. A form of distance education, m-learners use mobile device educational technology at their time convenience.

- **Rhizomatic learning**- is a variety of pedagogical practices informed by the work of Gilles Deleuze and Felix Guattari.

- **Software as a service**- is a software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted.

- **Ubiquitous computing**- is a concept in software engineering and computer science where computing is made to appear anytime and everywhere.

Quadrant-IV: (Self-Assessment)

For Self-Assessment

i. **Multiple Choice Questions with answers**

1. The statement "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer Hardware" refers to-

A. Information Technology (IT)

B. Information and Collaborative Technology (ICT)

C. Information and Data Technology (IDT)

D. Artificial Intelligence (AI)

Correct Answer: A.

2. Which of the following statements, regarding the term ICT is/are TRUE?

P: ICT is an acronym that stands for Indian Classical Technology.

Q: Converging technologies that exemplify ICT include the merging of audio-visual, telephone and computer networks through a common cabling system.

A. P only

B. Q only

C. P & Q

D. Neither P nor Q

Correct Answer: B.

3. Why will mobile computing revolutionize the way we use computers?

A. It allows networked communication even while the user is mobile.

B. We can't communicate and access information regardless of current time and position.

C. We can type our report while we are traveling.

D. We can access information faster than with personal computers.

Correct Answer: A.

4. It describes the distribution model in which applications are hosted by a service provider and made available to users.

A. Infrastructure-as-a-Service (IaaS)

B. Platform-as-a-Service (PaaS)

C. Software-as-a-Service (SaaS)

D. Cloud service

Correct Answer: C.

5. M-learning means;

A. Mass learning

B. Movie learning

C. Movement learning

D. Mobile learning

Correct Answer: D.

6. Which industry was the first to use augmented reality for commercial purposes?

A. Auto

B. Fashion

C. Film

D. Food

Correct Answer: A.

7. It serves as a PaaS vendor within Google App Engine system.

A. Amazon

B. Microsoft

C. Google

D. Above all

Correct Answer: C.

8. A field of technology that deals with a combination of real world and the data generated from computer.

A. ML

B. AI

C. AR

D. IoT

Correct Answer: C.

9. Which definition best fits "augmented reality"?

A. Technology that turns physical objects into digital objects.

B. Technology that overlays digital information on top of real world items.

C. Technology that completely immerses users in a new digital environment.

D. Technology that can achieve a human-level understanding of images.

Correct Answer: B.

ii) True & False Statements with answers

10. 3D printing is a process of making three dimensional solid objects from a digital file.

   A. True

   B. False

   Correct Answer: A.

11. Rhizomatic learning is a no variety of pedagogical practices

   A. True

   B. False

   Correct Answer: B.

12. E-book is an electronic version of a book.

   A. True

   B. False

   Correct Answer: A.

13. Makerspace is a non-collaborative digital space for educators and learners to explore and create in their own environments.

   A. True

   B. False

   Correct Answer: B.

14.   Learning analysis is also teaching analysis, which provides the means to analyse the learning context.

   A. True

   B. False

   Correct Answer: A.

15. A Cloud environment can be accessed from anywhere, anytime and anybody in the world as long as the user has access to the Internet.

   A. True

   B. False

   Correct Answer: A.