IIHMR DELHI | INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH

Post Graduate Diploma in Management (Hospital & Health Management)
PGDM – 2023-25 Batch
Term – II : Term End Examination

Course & Code	:	**CC 617 Introduction to Digital Health II**	**Reg. No.**	:	
Term & Batch	:	**II, 2023-2025**	**Date**	:	**12th April 24**
Duration	:	**3 Hrs**	**Max. Marks**	:	**70**

Instructions:

- Budget your time as per the marks given for each question and write your answer accordingly.
- Don't write anything on the Question Paper except writing your Registration No.
- Mobile Phones are not allowed even for computations.

Part A: Q. 1 to Q.10 (10 questions*1 marks = 10 marks). All are compulsory

1. What term is used to describe the current era of rapid technological advancement and smart automation?
   a) First Industrial Revolution
   b) Second Industrial Revolution
   c) Third Industrial Revolution
   d) Fourth Industrial Revolution
2. Which type of AI focuses on recommending actions based on insights extracted from data?
   a) Analytical AI
   b) Functional AI
   c) Interactive AI
   d) Textual AI
3. What is the relationship between Machine Learning (ML) and Deep Learning (DL)?
   a) ML is a subset of DL
   b) DL is a subset of ML
   c) They are independent of each other
   d) They have no relationship with Artificial Intelligence
4. Which technique involves uncovering patterns from unlabelled data?
   a) Reinforcement Learning
   b) Supervised Learning
   c) Unsupervised Learning
   d) Semi-supervised Learning
5. Which company offers an artificial intelligence-powered personalized dosing platform to manage chronic drug regimens?
   a) Roche
   b) Pfizer
   c) Dosis
   d) Merck

6. Which segment of healthcare experiences the highest number of cyber attacks according to the text?
   a) Pharmaceutical companies
   b) Hospital management systems
   c) Health monitoring and wearables
   d) Medical systems and patients' health data

7. 1.Which of the following is NOT a potential benefit of using telemedicine to achieve universal health coverage?
   a) Increased access to healthcare for people in remote areas.
   b) Reduced costs for both patients and healthcare providers.
   c) Improved quality of care through access to specialists.
   d) Increased risk of misdiagnosis due to lack of physical examination.
8. What is the main challenge in using telemedicine to reach underserved populations?
   a) Lack of reliable internet access and technology infrastructure.
   b) Resistance from healthcare providers to adopt new technology.
   c) Concerns about data privacy and security.
   d) All of the above.
9. Which of the following is NOT a necessary component of a successful telemedicine program?
   a) Clear and consistent regulations for telemedicine practice.
   b) Training for healthcare providers in using telemedicine technologies.
   c) Access to affordable and reliable telemedicine equipment for both patients and providers.
   d) A strong public awareness campaign about the benefits of telemedicine.
10. How can telemedicine be used to improve the management of chronic diseases?
   a) By providing remote consultations with specialists for medication management.
   b) By using wearable devices to monitor vital signs and collect data.
   c) By offering online educational resources and support groups for patients.
   d) All of the above.

Part B: Q.11 to Q.15 (4 questions *5 Marks =20 Marks) Attempt any four.

11. Explain how AI-based devices equipped with smart sensors contribute to healthcare, highlighting their role in early diagnostics and remote patient monitoring.

12. Describe the role of digital twins in surgical planning and patient-specific simulation. Provide examples from various surgical specialties.

13. Assess the potential advantages of blockchain technology in home healthcare data management. Discuss how blockchain ensures data immutability, tamper resistance, and auditability, thereby enhancing trust and transparency in healthcare transactions. Analyse the impact of blockchain on empowering patients with greater control over their health information and fostering collaborative care partnerships between providers and patients.

14. What are the social, ethical, and legal challenges in implementing Tele mental program in rural areas

15. Describe the infrastructure required for implementing tele-mentoring for neurology interns.

Part C: Q.16 to Q.18 (2 questions *20 Marks =40 Marks) Attempt any two.

16. Case Study: A study published in the Journal of Thoracic Disease described the case of a 65-year-old patient diagnosed with a complex congenital heart defect requiring surgical correction. Traditional imaging modalities provided limited insights into the intricate cardiac anatomy, making surgical planning challenging. To address this, cardiothoracic surgeons utilized 3D printing technology to create a patient-specific model of the heart based on cardiac CT scans. The 3D-printed model allowed the surgical team to visualize the defect in detail, simulate different surgical approaches, and optimize the placement of prosthetic devices. During the procedure, the 3D-printed model served as a valuable reference, guiding the precise placement of sutures, and ensuring optimal device positioning. The patient underwent successful corrective surgery with improved cardiac function and reduced risk of postoperative complications.

    a. Critically evaluate the utility of 3D printing technology in preoperative planning for complex congenital heart defects, drawing insights from the case study provided. Discuss how patient-specific cardiac models enhance surgical precision, minimize intraoperative risks, and improve postoperative outcomes in cardiothoracic surgery.

    b. Explore the challenges and barriers to implementing 3D printing technology in the field of cardiothoracic surgery, considering factors such as cost-effectiveness, accessibility to advanced imaging resources, and regulatory considerations. Propose strategies to overcome these challenges and promote the widespread adoption of 3D printing in routine cardiothoracic practice.

17. Case Study: A randomized controlled trial published in the Journal of NeuroEngineering and Rehabilitation investigated the use of virtual reality (VR) technology in upper limb rehabilitation for stroke patients. The study enrolled a cohort of 50 stroke survivors with hemiparesis and divided them into two groups: a VR intervention group and a conventional therapy group. Participants in the VR group underwent immersive VR-based rehabilitation exercises targeting upper limb motor function, while those in the control group received standard physiotherapy. The VR intervention utilized interactive virtual environments and motion-tracking sensors to engage patients in repetitive and task-specific exercises. Results demonstrated that stroke survivors in the VR group exhibited greater improvements in upper limb motor function, functional independence, and quality of life compared to those in the control group.

    a. Assess the effectiveness of virtual reality technology in upper limb rehabilitation for stroke survivors, based on the findings of the randomized controlled trial presented. Discuss how VR-based interventions promote neuroplasticity, enhance motor learning, and facilitate functional recovery in individuals with hemiparesis following stroke.

    b. Investigate the potential applications of virtual reality in other domains of rehabilitation therapy, such as gait training, balance exercises, and cognitive rehabilitation. Explore the role of immersive VR environments, gamification elements, and real-time feedback mechanisms in optimizing rehabilitation outcomes across diverse patient populations and clinical settings.

18. Considering the rise in Zoonotic diseases as evidenced by Covid 19 there is an increase in focus on One health that related animal- human and environment interface.

    a. How can Telehealth be used for surveillance of One health issues considering both animal and human health in sync.

    b. What should be the infrastructure set up for this

    c. How will you implement the same. Give a basic plan for the same.