**COMPUTING FOR MEDICINE**
**QUIZ-1**

INSTRUCTIONS:

- Fill your credentials carefully.
- Total marks:30.
- Time: 45mins
- No of questions: 20

( 1*17 = 17 marks)

1. In the context of reproducible research and data, FAIR stands for:

a) Flexible, Authenticated, Interoperable, & Responsive
b) Fair, Accessible Interoperable, & Reusable
**c) Findable, Accessible, Interoperable, & Reusable**
d) Findable, Authenticated, Interactive, & Resource

2. _____is the ability of two or more systems or components to exchange information and to use the information that has been exchanged.

a) RESTful APIs
b) **Interoperability**
c) HL7 messages
d) Reusability

3. Which of the following depicts the correct order of **increasing** complexity in data interoperability?

**a) Syntactic, Semantic, Process, Human**
b) Semantic, Syntactic. Human, Process
c) Human, Semantic, Syntactic, Process
d) Human, Process, Semantic, Syntactic

4. You are working with data from ECG machines. Which standard is used to communicate such data?

**a) HL7**
b) FAIR
c) FHIR
d) SNOMED

5. You are building a FHIR app aimed at primary health care services in villages in India and are working on the Patient FHIR resource. A_____ will help you constrain the Patient resource for the use case contexts of use and specify a variety of restrictions.

a) Conformance resource
b) Value Sets
c) Ontology
**d) Profile**

6. If there are 12 hospitals each implementing their own standards, what will be the number of inter-hospital mappings required to achieve interoperability?

a) 144
**b) 66**
c) 11
d) 10

7. The feature of administrative discharge and billing in an EHR comes under which component of the meta-models?

a) Organizational
b) Information System
**c) Functional**
d) Data model

8. Which of the following is not true about HL7 Messages. These

a) Are delimited by a pipe separator
b) Are used primarily to exchange data between medical equipment
**c) Can only have one segment per message transmitted**
d) Can have numbers, text or symbols within the delimiting separators

9. Which of the following is not mandatory in a FHIR resource:-

a) Identifier
b) Human Readable Summary
**c) Profile**
d) A URL link

10. What is the purpose of the Patient resource in FHIR?

a) To exchange information regarding procedures and surgeries for an individual receiving care or healthcare services
b) To exchange information regarding orders and prescriptions of an individual receiving care or healthcare services
**c) To exchange information regarding demographic and administrative information of an individual receiving care or healthcare services**
d) All of the above

11. Which of the following is the first line of a HL7 syntax?

a) Patient ID (PID)
b) Admission Discharge Transfer (ADT)
**c) Message Header (MSH)**
d) Observation Segment (OBX)

12. Which of the following components of the FHIR structure identifies a FHIR system service. i.e. a server that makes information available in conformance with the FHIR specification.

a) Type
b) Id
c) **Base-address**
d) URL

13. What is the first component of the ABDM FHIR stack that comes into role when a patient signs up on the app?

a) Health Information Users (HIUs)
b) Health Information Providers( HIPs)
**c) Consent Manager (CMs)**
d) Gateway

14. An ontology is represented as a

a) Undirected Graph
**b) Directed Graph without Cycles**
c) Undirected Graph with Edge Weights
d) Directed Graph with Cycles

15. Which term is used to describe a list of relevant terms pulled directly from a body of unstructured or semistructured text?

a) Ontology
b) Thesaurus
**c) Index**
d) Terminology

16. Biomedical Ontologies are useful for designing clinical decision support system by providing

a) **Computational graphs for querying parents and child terms of biomedical entities**

b) Drugs information for treatment for diseases

c) Synonyms, related terms and preferred terms biomedical entities

d) Syntactic interoperability for structuring data

17. Which of the following is not true?

a) Concepts are computational meanings that do not change.
b) Each concept has at least one "is a" relationship.
c) Relationship types in SNOMED CT are stored as concepts and have a SNOMED CT ID
**d) Post-coordinated SNOMED CT expressions use a single concept identifier is used to represent a clinical idea**

**18. What is the difference between an Ontology and a Knowledge Graph? Provide a one line answer. (3 marks)**

**Ans:**

An ontology refers to a generalized model that explains the relationship between two entities on a broader level based on common properties and not individuals whereas the knowledge graphs are data specific and help in establishing a link between the data points.

Knowledge Graph = Data + Ontology

**19. Write briefly about ABDM frameworks for the emerging healthcare paradigm in India. (2 marks)**

**Ans:**

Mission: To create a digital platform for evolving the health ecosystem through wide-range of data, information and infrastructure services while ensuring security, confidentiality and privacy. It has 3 milestones: M1,M2,M3. The stakeholders in the ABDM framework are as follows:

1. Patients
2. Health Professionals
3. Health Facilities
4. Digital Solution Companies

ABHA address: In order to manage the personal health records, users (patients) must first create an account on a HIE-CM (Health information exchange- Consent Manager), called their Ayushman Bharath Health Account (ABHA) address. This looks like computingformedicine@abdm. The @abdm tells us which HIE-CM is responsible for this address.

ABHA number: ABHA number is a *14-digit number* that is unique (only one per person) issued only after a strong KYC. Every ABHA number is automatically available as an ABHA address on the NHA HIE-CM like <14digitabhano>@abdm.

**20. Explain the FHIR resources in one line with at least two examples each. ( 2*4= 8 marks)**

**Ans:**

a) Conformance: Resources describe how a system does or should work. Example: ValueSet, Conformance, StructureDefinition. (1+1)
b) Administration: Resources to manage the administrative side of healthcare. Example: Patient, Order, OrderResponse. (1+1)
c) Clinical: Clinical summaries, record keeping and planning. Example: Observation, Condition, CarePlan, AllergyIntolerance. (1+1)
d) Financial: Resources that support financial services associated with the provision of healthcare. Example: Claim, Coverage, ExplanationOfBenefit. (1+1)