2020

GSA Solved Past Paper

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Q What do you know about Hepatitis? Dexribe its types and write down preventive measures.

1 **Hepatitis:**

Too much lengthy answers
Add maximum headings
Lack of diagrams
Start new questions from new pages

Hepatitis is caused by the inflammation of the liver which is [illegible] for processing nutrients, filtering blood [illegible]. Hepatitis is most commonly caused by a viral infection. However, hepatitis can also be caused by an autoimmune reaction which happens when the body makes antibodies against the liver tissue and mistakenly starts attacking it.

Hepatitis can also be caused due to overuse of certain medications, drugs, toxins and alcohol or other underlying medical conditions. The treatment options are determined by the type of hepatitis present, and whether the diagnosed infection is acute or chronic.

2 **Types of Hepatitis and treatment:**

Five types of Hepatitis are discussed below:

2.1) Hepatitis A:

This type derives from an infection with the Hepatitis A virus (HAV). It is mostly transmitted by the consumption of contaminated food or water or through direct contact with an infected person.

Hepatitis A symptoms cause a lot of discomfort but no specific treatment exist for it. The body clears the virus

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Itself and the liver heals within 6 months causing no lasting damage. vaccines have also been developed to prevent HAV infections by helping the body produce antibodies to fight the infection.

2.2) Hepatitis B:

This type derives from an infection with the Hepatitis B virus (HBV). It is mostly transmitted when a person comes in contact with the infectious bodily fluids like blood, Saliva or Semen of an infected person. This mostly happens through sexual contact, sharing of medical equipment /needles or from mother to child at the time of birth.

Chronic Hepatitis B is treated by antiviral medications but acute cases normally do not require treatment.

2.3) Hepatitis C:

This type comes from the Hepatitis C virus (HCV). This type mostly Spreads through contact with the blood of an infected person by sharing injection equipment, needles or sexual contact.

Both acute and chronic cases of Hepatitis C are treated with a combination of antiviral therapies. However, chronic patients that develop Cirrhosis or scarring the liver may require liver transplantation.

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2.4) Hepatitis D:

Hepatitis D, also known as "delta hepatitis", is caused by the virus (HDV). Which is contracted when the blood or bodily fluids of an infected person come in contact with a person who is not infected. The severity of Hepatitis D can vary from an acute short term infection to a long term chronic infection.

Hepatitis D is treated with a medication called alpha interferon.

2.5) Hepatitis E:

Hepatitis E is a waterborne disease caused by the Hepatitis E virus (HEV). Hepatitis E is mainly found in area with poor sanitation and is typically caused by the consumption of virus-carrying water that is contaminated by human or animal fecal matter.

No specific medications or therapies exist to treat Hepatitis E because it is often acute and normally resolves on its own. However, people with this type of infection are recommended to get enough rest, stay hydrated, and avoid the consumption of alcohol.

3 Methods of Hepatitis diagnosis:

There are different methods that may be used by doctors to diagnose hepatitis. These includes;

3.1) Physical Exam:

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One method to diagnose hepatitis is to examine the liver through a physical exam. The doctor will press gently against the abdomen to assess if the liver is swollen or inflamed and would also notice the color of the eyes and skin to see if there is yellowness due to jaundice.

3.2) Liver Biopsy:

Another method to evaluate the health of the liver is through a minimally invasive procedure called the liver biopsy. To carry out this procedures the doctor inserts a needle through your skin into your liver and takes a small sample of the liver tissue and examines it under a microscope to check for sign of inflammation or diease.

3.3) Liver Function Tests:

Liver function tests also known as liver panels are blood samples that measure how efficiently the liver functions. These tests check how the liver clears blood waste, and how different enzymes, protein or other substances are made by the liver. High liver enzyme levels may indicate that the liver is stressed or damaged.

3.4) Ultrasound:

An abdominal ultrasound is also used to check the functionality of

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the liver. Ultrasound waves are created to make an image of the organ and check blood flow inside the veins. Doctors check for cirrhosis, hepatitis and other liver conditions with this test as it reveals whether the liver is enlarged or damaged.

3.5) Blood Tests:

Blood tests used to detect the presence of hepatitis virus antibodies and antigen in the blood will indicate or confirm which virus is the cause of the hepatitis.

3.6) Viral Antibody Testing:

Further viral antibody testing may be used to determine the specific type of hepatitis virus present.

To avoid contracting any types of Hepatitis, people should be careful about the cleanliness of the water they drink and should use new and clean injections needles and equipment at hospitals. They must also avoid physical contact with patients of acute or chronic Hepatitis.

QUESTION 02

Differentiate between Middle latitude Cyclones and Tornadoes.

1 Tornado:

A tornado is defined as violently rotating funnel-shaped column of air

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that is attached to the base of a thunderstorm. Tornadoes are nature's most powerful thunderstorms and may reach 300 miles per hour. They can damage human life and property within seconds.

1.1) Causes of Tornado:

A tornado forms from a thunderstorm when the warm, humid air rises and the cool air falls along with rain or hail. The heat from the sun causes the warm air to rish and push its way through colder air.

These conditions cause spinning air currents and the warm air spins faster and faster causing a horizontal funnel cloud to form. This cloud turns vertical and touches the ground forming a tornado.

2 Mid latitude Cyclone:

Midlatitude cyclones are also known as extratropical cyclones and they form when warm air lifts up vertically and joins cold air in the upper atmosphere. The warm tropical and cold polar air masses interact at the polar front resulting in mid latitude cyclones which produce strong wind and heavy rain.

Air in this type of cyclone moves counterclockwise around a low pressure center and each cyclone lasts from several days up to a week. Cyclones are fueled by the temperature differences

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and pressure gradients that exist along frontal boundaries. They are normally the strongest during cold months when temperature differences between air masses are the most extreme

2.1) Cause of Mid latitude Cyclone:

Most cyclones occur due to a disturbance in the upper atmosphere. They happen when the air moving through ridges of high pressure and troughs of low pressure converges and diverges and the surface air begins to rotate as the cold air moves southward and warm air moves northward.

The cyclone is characterized by a center of low pressure. Warm air rises to form clouds and when the temperature difference between the warm and cold air is extreme, it results in severe storms. The cyclone encompasses a cold front, a warm front and eventually it can even form an occluded front.

	Cyclone	Tornado
(1)	A cyclone is an atmospheric system characterized by rapidly swirling air masses around a low-pressure core, which is typically accompanied by stormy	A tornado is a spinning column of air with a diameter varying from a few yards to over a mile that is whirling at high speeds and is normally followed

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	and often destructive weather. Cyclones are storms that originate in the southern Pacific. Winds may approach 300kph and cause widespread damage	by a funnel-shaped downward extension of a cumulonimbus cloud. Winds ranging from 40 to 300 miles per hour.
(ii)	A cyclone is a massive and destructive storm	A tornado is a twisted vortex of high-speed wind that is violent
(iii)	A cyclone is defined by a low-pressure zone surrounded by high pressure	A tornado forms when a funnel-like column of cold air descends from a cloud.
(iv)	High-speed winds whip through the middle, followed by a heavy rain.	Warm air rises, allowing high-speed circulating winds to form
(v)	They have a wide circumference	They are relatively smaller
(vi)	Commonly quite strong. The scale for measuring cyclones is called the Beaufort scale and Saffir-Simpson scale and may vary in different countries.	The scale used for rating the strength of tornadoes is called the Fujita (F), Enhanced Fujita (EF), and TORRO (T) scale
(vii)	They are found in the Southern Pacific Ocean and Indian Ocean. Cyclones in the northwest Pacific that reach or exceed 74 mph are "typhoons".	Tornadoes have been spotted in all continents except Antarctica.
(viii)	Most affected area	Most affected area is

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	is the Pacific ocean	where a convergence of cold and warm fronts is common i.e. US Midwest
(ix)	10-14 cyclones occur per year	The United States records about 1200 tornadoes per year, whereas the Netherlands records the highest number of tornado per area. compared to other countries. Tornadoes occur commonly in spring and fall season are less common in winters
(x)	Mostly occur in warm areas	Mostly occur in places where cold and warm fronts converge and can occur just about anywhere
(xi)	Cause rain only	Cause rain, steel and hail

QUESTION 03

What is open system interconnections (OSI) and describe its layers?

1 OSI Model:

The open systems interconnection (OSI) model is a conceptual framework that describes the functions of the networking or telecommunication systems as seven layers, each with its own function. These layers help understand the workings of the system and helps to identify the nature of each issue.

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Computer programmers also use these layers while creating applications and when tech vendors are selling new products, they refer to the OSI model to help customers understand which layers their product works with or if it works 'across the stack'.

The OSI model was published in 1984, but it is used to this day to describe the network architecture. In the OSI reference model, the communication between a computing system are split into seven different abstraction layers, Physical, Data Link, Network, Transport, Session, Presentation, and Application.

2 The Seven (7) layers of the OSI model:

The layers are:

Layer 1 - Physical; Layer 2 - Data Link; Layer 3 - Network; Layer 4 - Transport; Layer 5 - Session; Layer 6 - Presentation; Layer 7 - Application.

2.1) Layer 7 - Application

The Application layer in the OSI model is the layer that the user interacts with. It receives information directly from users and displays incoming data to the user. However, applications themselves do not reside at the application layer but this layer facilitates communication through lower layers in order to establish connections with

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applications at the other end. Some examples of communications that rely on layer 7 are web browsers like Google Chrome, Firefox, Safari, etc.

2.2) Layer 6- Presentation

The presentation layer represents the area that is independent of data representation at the application layer. The main function of this layer is to translate application format to network formats, or vice versa.

In simpler words, this layer "present" data for the application or the network. An example of the function of layer 6 is the encryption and decryption of data for secure transmission.

2.3) Layer 5- Session

The main function of this layer is to create a session to enable the communication of two networked devices. Function at this layer involve setup, coordination (for instances, how long should a system wait for a response) and termination between the applications at the each end of the session.

2.4) Layer 4- Transport

This layer deals with the coordination of the data transfer between end systems and hosts. It decides how much data needs to be sent, at what rate and where it goes, etc.

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2.5) Layer 3 - Network

Another important part of these 7 layers is the network layer and most of the router functionality happens here including packet forwarding and routing through different routers. If a computer in one area wants to connect with a server in another area, there will be many different paths to take and routers will help choose it efficiently.

2.6) Layer 2 - Data Link

The Data Link layer provides node-to-node data transfer between two directly connected nodes, and also handles error correction from the Physical layer. TWO sub-layers called the Media Access control (MAC) and the Logical Link Control (LLC) are also part of this. Most switches operate at the data link layer.

2.7) Layer 1 - Physical

The Physical layer is the bottom of the OSI model and represents the electrical and physical representation of the system. This can include everything from the cable type, radio frequency link (as in a Wi-Fi network), as well as the layout of pins, voltages, and other physical requirements.

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When a networking issue occurs, the physical layer is checked to see that all the cables are properly connected and that the power plug hasn't been pulled from the router, switch or computer.

7 Application Layer	Human-computer interaction layer, where applications can access the network services
6 Presentation Layer	Ensures that data is in a usable format and is where data encryption occurs.
5 Session Layer	Maintains connections and is responsible for controlling ports and sessions.
4 Transport Layer	Transmits data using transmission protocols including TCP and UDP
3 Network Layer	Decides which physical path the data will take
2 Data Link Layer	Defines the format of data on the network
1 Physical Layer	Transmits raw bit stream over the physical medium

QUESTION 04

What is GPS? How does it work?

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1 The Global Positioning System (GPS):

The Global Positioning System (GPS) is a group of 30+ navigation satellites that orbit the Earth. The main function of these satellites is to receive and send information to the receivers on the earth to pinpoint the geographic location.

2 Three parts of GPS:

A GPS system is made up of three parts: satellites, ground stations and receivers. The satellites serve like stars in the constellation.

Ground stations monitor and control the satellites and identify their location.

Receivers listen to signals from the satellites. The highly advanced receivers are so accurate that they can even identify the exact location within a fraction of an inch.

3 Working of GPS:

A GPS tracking unit is used to track exact location by constantly sending out and receiving signals. Some modern uses of the GPS system include tracking lost cars and mobile phones if they are stolen. GPS tracking is also used to find missing people and many criminal cases have been solved using GPS tracking as most

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Smart phones have GPS capability.