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DATE: - 24-8-2022 – 21-9-2022

MENTOR'S NAME: - DR. CHANDNI PATEL

SUBMITTED TO: - DR. DEBASHIS BANERJEE

PROJECT REPORT

ON

“PATHOLOGY LABORATORY”

AT

SK PATHOLOGY LABORATORY , RAJKOT

Submitted to the Department of Biotechnology

ACKNOWLEDGMENT

We are very thankful to **DR. CHANDNI PATEL** for encouraging us and guiding us in our academic venture.

We feel immense pleasure in expressing our deep sense heart felt thanks to **DR. DEBASHIS BANERJEE** for providing us opportunity to undergo training.

Dr. Jigna Patel
MBBS, DCP (Unl. First)

Dr Chandni Patel
MBBS, DCP



pathology
LABORATORY

"TO WHOMSOEVER IT MAY CONCERN"

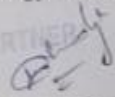
This is to certify that **Ms. DARSHANGI ASHWINKUMAR SABHAYA** worked as trainee (B.S.C.Biotech) student at our SK Pathology Laboratory from **24/08/2022** to **21/09/2022 (121- Hours)**.

She is sincere, hard working and dedicated to her goal. She bears good moral character with excellent skill. During her service her work was very satisfactory.

We wish her all the success for her bright future.

FOR SK PATHOLOGY LABORATORY

SK Pathology Laboratory

PARTNER


Dr. Chandni Patel
Pathologist

Date: 22/09/2022

Dr. Jigna Patel
MBBS, DCP (Uni. First)

Dr Chandni Patel
MBBS, DCP



"TO WHOMSOEVER IT MAY CONCERN"

This is to certify that Ms. URVASHI RAMESHKUMAR POPAT worked as trainee (B.S.C.Biotech) student at our SK Pathology Laboratory from 24/08/2022 to 21/09/2022 (123- Hours).

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FOR SK PATHOLOGY LABORATORY
SK Pathology Laboratory

Dr. Chandni Patel

Pathologist

Date: 22/09/2022



TABLE OF CONTENT:-

- CBC (Complete blood count) test
- CRP (C – Reactive protein) test
- Urine analysis
- Blood grouping
- Widal test
- ESR (Erythrocyte sedimentation rate)
- Malaria card test
- Creatinine test
- SGPT and SGOT test
- HIV card test

INTRODUCTION

- In pathology lab tests are carried out on clinical specimen to obtain information about the health of a patient to aid in diagnosis treatment and prevention of disease.
- Clinical pathology lab may include blood count, blood grouping, hormone related test, vitamin test etc..
- For example, a biochemist may assess cholesterol and triglyceride level in order to determine heart disease risk.
- Pathology is divided into 2 categories:-
 - I. **GENERAL PATHOLOGY** :- It deals with general principles of disease eg , inflammation, cancer, ageing.
 - II. **SYSTEMIC PATHOLOGY** :- It deals with the study of disease pertaining to the specific organ and body system.
- A diagnostic center provides a wide scope for the detection of ailments and affords facilities for a detailed medical check up by diagnostic procedures.

TASKS PERFORMED

CBC (COMPLETE BLOOD COUNT) TEST

- A CBC is a blood test used to look at overall health and find a wide range of condition including anemia, infection and leukemia.
- A complete blood count test measures the following:-
 - Red blood cells, which carry oxygen.
 - White blood cells, which fight infection.
 - Hemoglobin, the oxygen carrying protein in RBC.
 - Platelets , which help blood to clot.

NORMAL RANGES FOR CBC:-

Hemoglobin normal range:

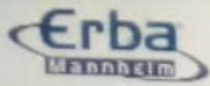
- Male (age 15+): 13.0 – 17.0 g/dL
- Female (age 15+): 11.5 – 15.5 g/dL

Platelet count normal range: 150,000 – 400,000/ml

WBC normal range: 5000 – 10,000/ml

PROCEDURE

- Clean the skin with antiseptic
- Put an elastic band above the area to get the veins to swell with blood
- Insert a needle into a vein and pull the blood sample into a vial or syringe.
- Take off the elastic band and remove the needle from vein.
- Put this blood sample into EDTA tube.
- Now touch this sample to the probe of CBC machine.
- Result will display on screen.
- Result will display on screen.



Sample Analysis

Review

QC

Reagent Management

LIS



Previous

Next

Mode & ID

Pre-entry

Validate

Print

Patient Info.

Sample ID 14



Mode VWB-CBC+DIFF

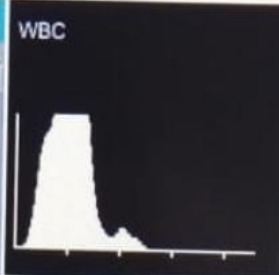
Name

Run Time 08/02/2023 13:45:34

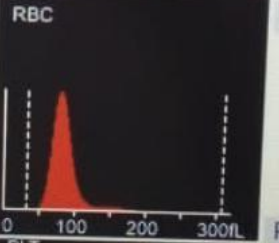
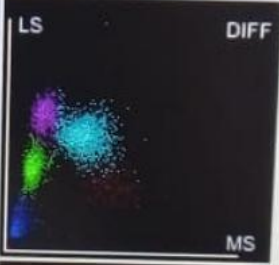
Age

Gender

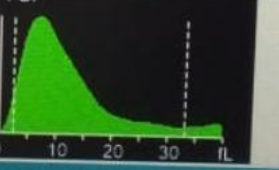
Para.	Arrow	Result	Unit
RBC		4.31	10 ⁶ /uL
HCT		39.2	%
MCV		90.9	fL
MCH		30.7	pg
MCHC		33.8	g/dL
RDW-CV		13.3	%
WBC		4.94	10 ³ /uL
Neu%		47.5	%
Lym%		36.8	%
Eos%		3.7	%
Mon%	↑	11.3	%
Bas%		0.7	%
Neu#		2.35	10 ³ /uL
Lym#		1.82	10 ³ /uL
Eos#		0.18	10 ³ /uL
Mon#		0.56	10 ³ /uL
Bas#		0.03	10 ³ /uL
PLT		191	10 ³ /uL
PCT		0.160	%
MPV		8.4	fL
PDW-SD		10.2	fL
P-LCR		24.3	%
*ALY#		0.01	10 ³ /uL



WBC Message



RBC Message



PLT Message

"*" means "Research use only, not for diagnostic use".

Next Sample: 15
Sample Count

Mode: VWB-CBC+DIFF
User: admin

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CRP (C – Reactive protein) Test

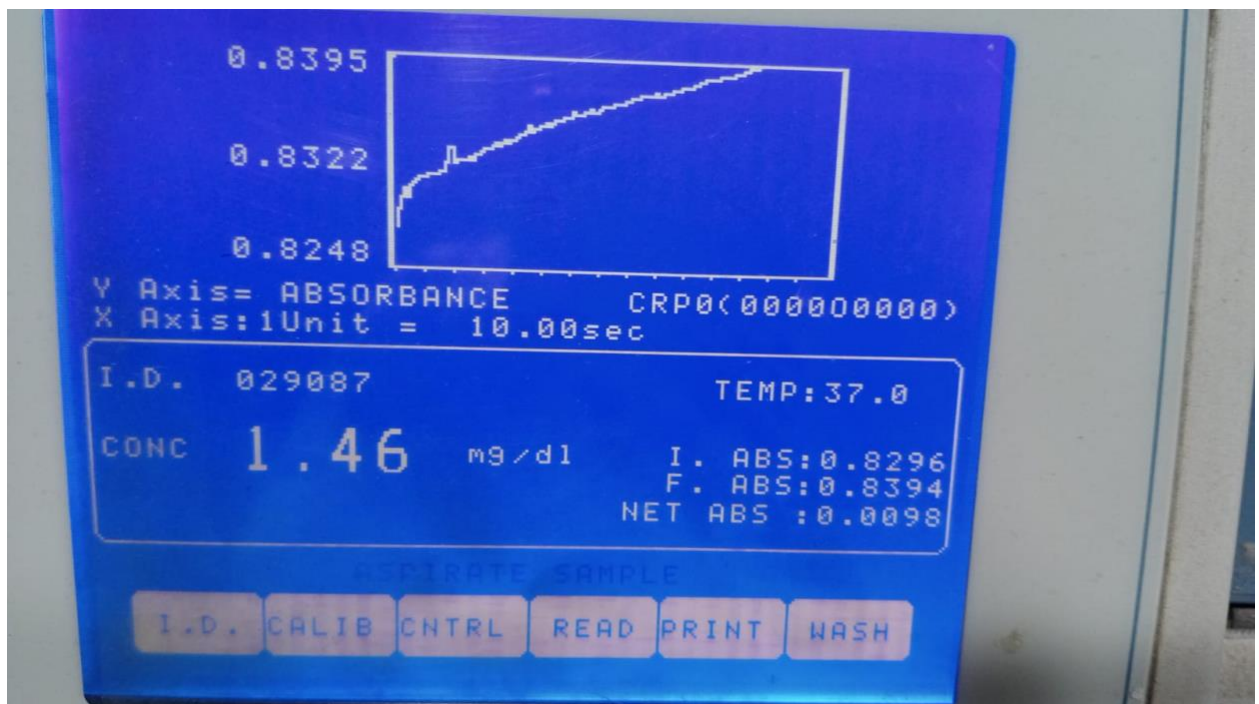
- CRP is done to check the infection.
- CRP test may be used to find or monitor the inflammation in acute or chronic conditions such as infection from bacteria or viruses.
- CRP is done to check the risk of heart disease and also used to determine the risk of second heart attack.

CRP LEVELS:

- 0.3MG/dL = normal healthy adults
- 0.3 – 1.0mg/dL (normal elevation) = pregnancy, diabetes, common cold, cigarette smoking
- 1.0 – 10.0mg/dL (moderate elevation) = myocardial infection. Pancreatitis, bronchitis.
- More than 10.0mg/dL (marked elevation) = acute bacterial infection, viral infection, major trauma.
- More than 50.0mg/dL (severe elevation) = acute bacterial infection.

PROCEDURE:

- Bring all the reagents R1 (diluyente) and R2 (latex) at room temperature from the refrigerator.
- Take a blood sample from the patient in the plain tube (red).
- Put this tube inverted for 3-5 minute (for clotting) and then centrifuge at 5000 rpm for 4-5 minute.
- Take out the tube from centrifuge.
- Add R1 and R2 in the test tube and add blood serum into it
- Mix properly and touch this mixture to the probe of CRP machine (CHEM – 7).
- Result will display on screen in graph and digit form.



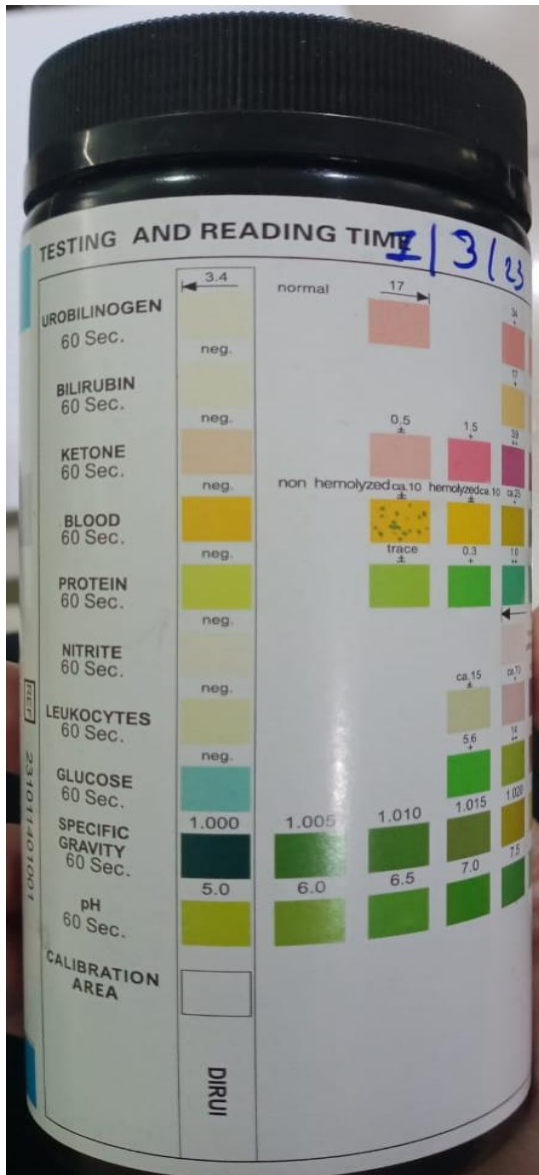
URINE ANALYSIS:

- It is used to detect and manage a wide range of disorders such as urinary tract infection, kidney disease and diabetes.

PROCEDURE:

- First of all we check the color of urine (yellow, pale yellow or white).
- Then we check the turbidity of urine whether it is clear or turbid.
- Take the sample into the test tube and immerse the pH strip into it.
- Remove the strip immediately and compare the test areas closely with the color chart on the bottle for 60 sec.
- Record the results and report any abnormal findings.
- Then centrifuge it at 4000 rpm for 5-6 minute.
- Discard the sample and tap on the bottom part of the test tube and take the drop of remaining urine on the slide.
- Measure under 10X and 40X in microscope.

URINE TESTING



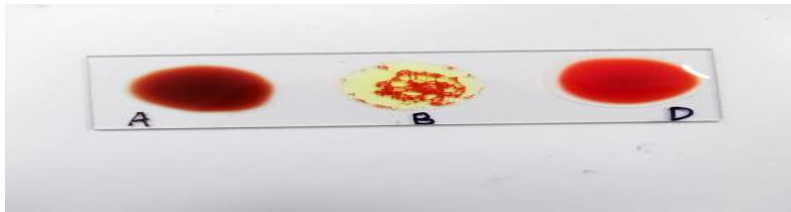
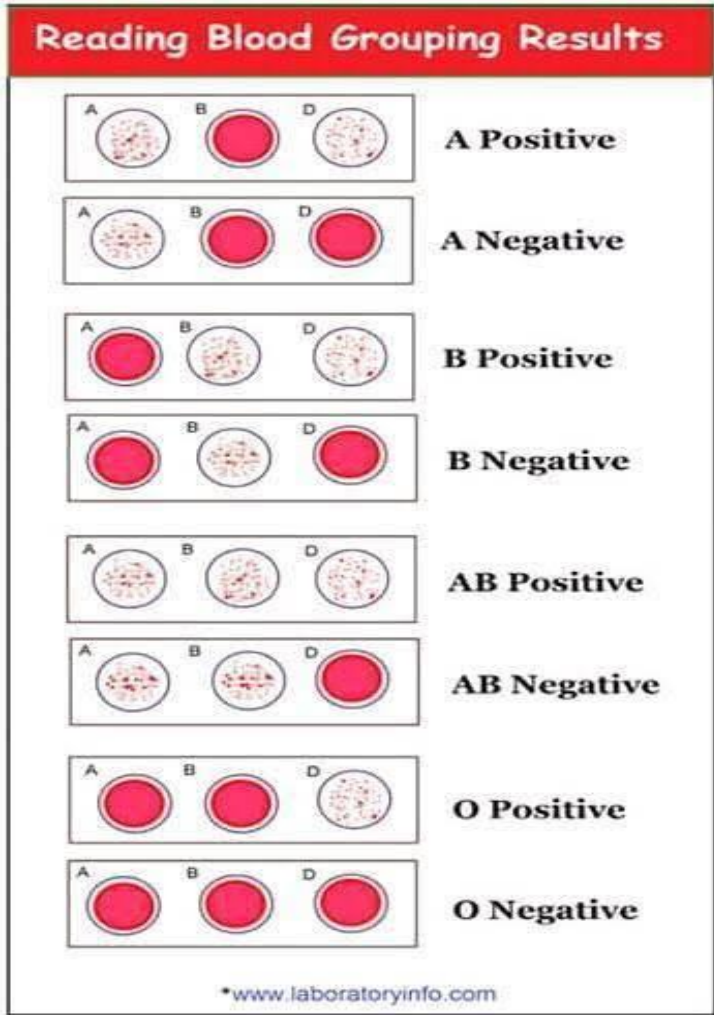
- Normal range for pH is 4.5 – 7.8.
- Normal range for SG (specific gravity) is 1.005 – 1.030.
- If the blood sugar level gets higher than 180mg/dl, kidney start to spill sugar into urine.
- And too much sugar can cause kidney damage.

BLOOD GROUPING:

- ABO blood grouping is based on agglutination technique.
- ABO blood grouping is proposed by Karl Landsteiner.
- There are 3 condition require for agglutination:
 1. Antigen is in particulate physical form.
 2. Antigen is multivalent.
 3. Antibody is bivalent or multivalent.
- Agglutination results into the formation of clumps called as criss cross networking, these clumps are visible through naked eye.

PROCEDURE:

- Dangle the hand down to increase the flow of blood in the finger.
- Clean the finger tip using spirit or 70% alcohol and gently massage the finger to increase the blood flow.
- With the help of sterile needle, pierce the fingertip and place 3 drop of blood on slide.
- Now add 1 drop of each antiserum into the blood and mix it.
- Interpret the result.



Result is B negative.

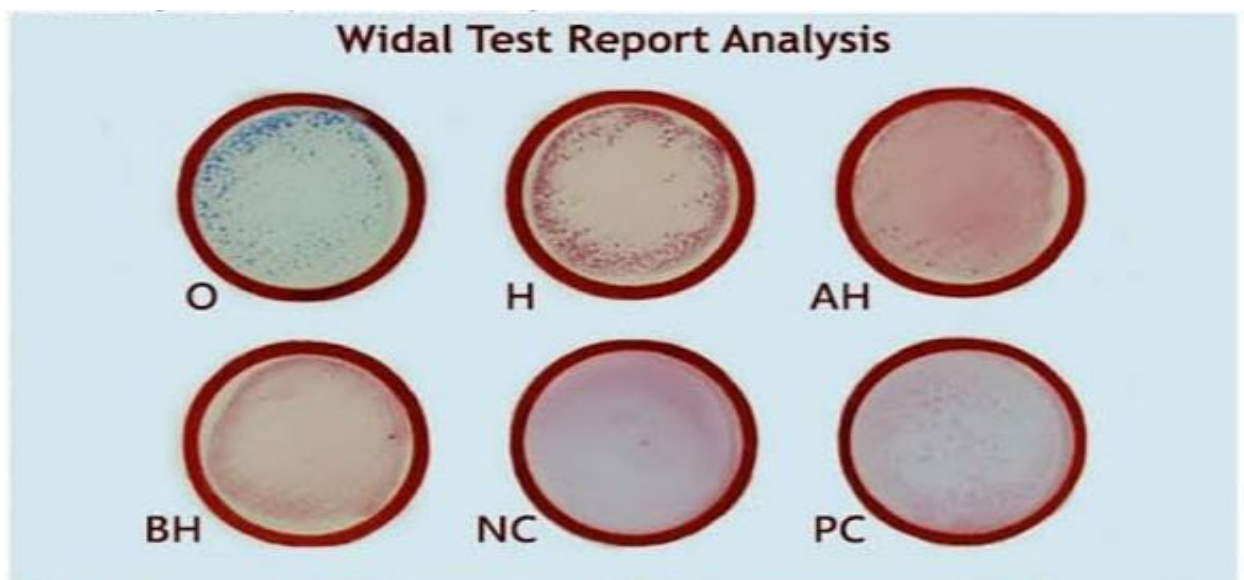
WIDAL TEST:

- Widal test is an advanced way to check for antibodies that your body makes against the *salmonella* bacteria that causes typhoid fever.
- Reason for typhoid:
- People would drink contaminating water or eat food that washed in contaminated water can develop typhoid fever.

PROCEDURE:

- Put 1 drop of patient's serum in 4 reaction circles i.e., O, H, AH, BH.
- Add 1 drop of positive control in the PC (positive control) circle and 1 in the NC (negative control) circle.
- Next add 1 drop of O antigen in the O circle, H in the H circle, AH antigen in the AH circle and BH antigen in the BH circle respectively.
- Add any antigen i.e., O, H, BH, AH in both PC and NC.

- Next mix the serum and antigen in each circle properly so that the mixture does not go out of the circle.
- Also 1 mixture should not mix with another, as it can influence the test result.
- Finally rotate the slide in slow circular motion to ensure the proper mixture of serum and reagent.



Widal test analysis.

ESR (Erythrocyte sedimentation rate):

- It is test to help the diagnosis condition that causes inflammation.
- Many types of condition cause inflammation including arthritis, infection and inflammatory bowel disease.
- Range of ESR:
Man = 0-22mm/hr
Woman = 0-31mm/hr

PROCEDURE:

- Take a cup and glass rod.
- Add a 400ml of citrate in the cup.
- Add 1600ml of whole blood (EDTA) and mix well.
- Take a glass rod and gently fill in the cup and gently rotate in the cup.
- After set at 0 in the ESR stand then after 1 hour note down the result.



MALARIA CARD TEST:

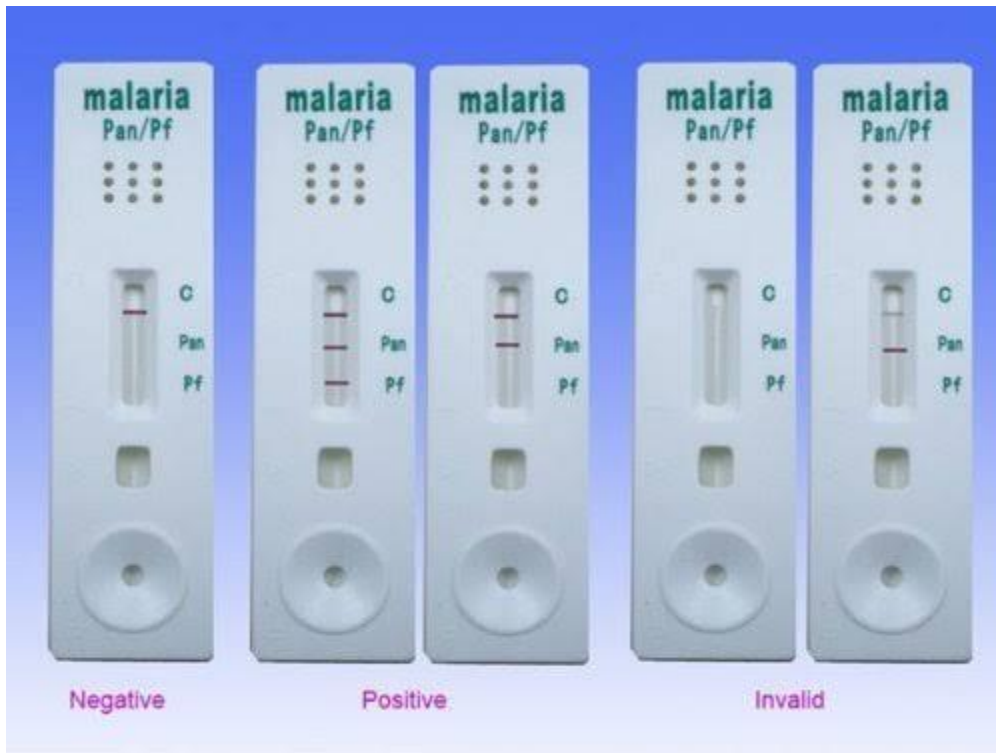
- It is done to check the severe anemia, hypoglycemia, malaria, acid base disturbance etc.
- Malaria parasite can be identified by examine with the card test.
- Malaria test look for parasite in the blood.

Symptoms of malaria:

Fever, headache, nausea, vomiting, body ache etc.

PROCEDURE:

- Clean the skin with antiseptic
- Put an elastic band above the area to get the veins to swell with blood
- Insert a needle into a vein and pull the blood sample into a vial or syringe.
- Take off the elastic band and remove the needle from vein.
- Put this blood sample into EDTA tube.
- Take 5micro litre of whole blood into the cassette and add 4 drop of buffer into it.
- Wait for 10-15 minutes and then observe the result.



CREATININE TEST:

- To make a diagnosis if you have signs or symptoms of kidney disease, diabetes, high BP.
- Creatinine is one of substances that our kidney normally eliminate from the body.

RANGE OF CREATININE:

Male: 0.74 – 1.35mg/dl.

Female: 0.59 – 1.04mg/dl.

PROCEDURE:

- Bring the reagent R1 (mixture of picric acid + alkaline buffer) at room temperature from the refrigerator.
- Take a blood sample from the patient in the plain tube (red).
- Put this tube inverted for 3-5 minute (for clotting) and then centrifuge at 5000 rpm for 4-5 minute.
- Take out the tube from centrifuge.
- Add R1 in the test tube and add blood serum (50micro litre) into it.
- Mix properly and touch this mixture to the probe of CRP machine (CHEM – 7).
- Result will display on screen in graph and digit form.

SGPT AND SGOT TEST:

SGPT = serum glutamic pyruvate transaminase

SGOT = serum glutamate oxaloacetic transaminase

- If a child has signs of possible liver problem such as jaundice (yellow skin or eyes), nausea, dark pee, vomiting or belly pain.
- It is done to measure the enzyme created in the liver called alanine transaminase

RANGE:

SGPT = 7 – 56 unit/L of blood serum

SGOT = Male 14 – 20 units/L

Female 10 – 36 units/L

PROCEDURE:

SGPT:

- Take 400micro litre R1(tris buffer, L – alanine, LDH) and 100micro litre R2 (NADH, alpha keto glutarate, detergent, preservative).
- Take 50micro litre serum sample and mix it.
- Direct put this mixture into the machine (EM – 200).

SGOT:

- Take 400micro litre R1 (NADH, oxogluterate) and 100micro litre R2 into the test tube.
- Take 50micro litre serum sample and mix it.
- Direct put this mixture into the machine (EM – 200).

HIV TEST:

- The HIV tri dot is sensitive and accurate immune assay for the detection of HIV 1 and HIV2 antibody in human serum or plasma.
- HIV antigens are immobilized on a nitrocellulose membrane.

PROCEDURE:

- Using a micropipette collect 10micro litre of serum or plasma.
- Add serum to the well of cassette (20 micro litre).
- Now add 3 drops of buffer into the well of cassette.
- Read the test results after 10 minute.
- The test can be read up to 20 minutes.



CONCLUSION:

- During the internship we got to know about new methods and things about which we had no knowledge.
- We learn so many new things and new tests there.
- We got to know about how to do proper pipetting, measure the pH, sterilization of equipments.
- The internship was a useful experience and we have found out what our strength and weakness are.
- The overall experience was positive and everything we learned would be useful in my future career in this field.

