



**TECHNICAL REPORT ON STUDENT
INDUSTRIAL WORK EXPERIENNCE SCHEME
(SIWES)**

UNDERTAKEN AT

**DE PREMIER MEDICAL DIAGNOSTICS
AND LABORATORY CENTER
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CHAPTER ONE

1.1 INTRODUCTION

SIWES was established by Industrial Training Fund (ITF) in 1973 to solve the problem of lack of adequate practical skills preparatory for employment in industrial by Nigerian graduates of tertiary institution.

The scheme exposes student to industry based skills necessary for a smooth transition from the classroom to the world of work. It affords student of tertiary institution the opportunity of being familiarized and exposed to the needed experience in handling machinery and equipment which are usually not available in the educational institution.

Participation in SIWES has become a necessary pre-condition for the award of Diploma and Degree Certificates in specific discipline in most institution of higher learning in the country, in accordance with the education policy of government.

1.2 PURPOSE OF SIWES

In the earlier stage, student are graduating without any technical knowledge or working experience and this makes them to undergo further training after securing an employment. With this reason, student industrial training was established.

During this programme, as designed by the ITF, student are expected to get technical assistance and acquire more experience scheme in their chosen field of study and exposed them to the usage of source machines and safety precaution where relevant before the completion of their programme in their various institutions.

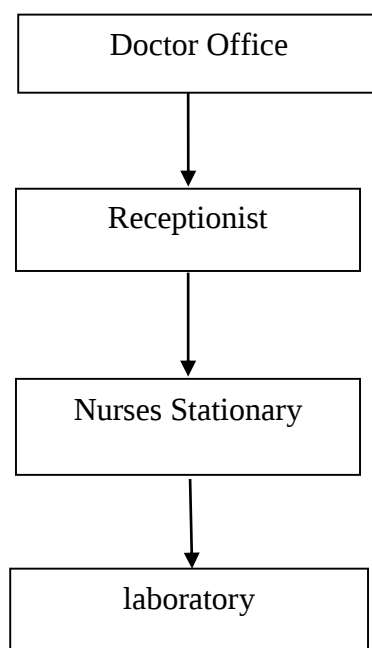
1.3 AIMS AND OBJECTIVE OF SIWES

1. To provide an avenue for student in the Nigerian Institution to acquire industrial skills and experience during their course of study.

2. To provide student with an opportunity to apply their theoretical knowledge in real work situation thereby bridging the gap between theory and practice.
3. To prepare students for the work situation they are likely to meet after graduation.
3. To expose the student to work method and techniques in handling equipment and machinery that may not be available in their institution.
4. To allow the transition phase from school to the world of working environment easier and facilitate students contact for later job placements.

CHAPTER TWO

2.1 ORGANIZATIONAL CHART OF THE COMPANY



2.2 PRECAUTION TAKEN IN THE MEDICAL LABORATORY

1. Always wear a laboratory coat when working in the laboratory.
2. Ensure wearing of disposable glove when carrying out any test in the laboratory.
3. Do not eat, drink or smoke whenever you are in the laboratory.
4. Always wash your hand before and after any test.
5. The laboratory must be well ventilated.
6. Handle all laboratory apparatus with care.
7. All needles and any other sharp object must be properly disposed.
8. Every sample must be corked and well labeled for easy identification.
9. The book of record must be kept properly.
10. There must not be any naked wire in the laboratory.
11. There must be a proper waste segregation in the laboratory.

12. There must be a fire extinguisher in the laboratory.

2.3 SOME LABORATORY EQUIPMENT AND THEIR USES

- i. **Wire Loop:** It is the instrument used for inoculating bacteria on a pour plate and is made of platinum or micro wire.
- ii. **Incubator:** It is an instrument used in the laboratory to provide optimum temperature for bacteria growth
- iii. **Microscope:** It is an equipment used for focusing organism that are not visible to the eye.
- iv. **Autoclave:** It is an equipment used for sterilization and preparation of media
- v. **Refrigerator:** It is an equipment used for preservation of specimen in the laboratory
- vi. **Bunsen Burner:** It is used for flaming
- vii. **Analytical Balance:** It is used for weighing such a sample reagents.
- viii. **Slides:** They are for routine work such as microscopy and staining purposes in the laboratory.
- ix. **Spectrophotometer:** It is used for checking the result of Fasting Blood Sugar (FBS).
- x. **Centrifugal Machine:** It is used for spinning sample in the laboratory.

2.4 SAFETY PRECAUTION IN THE LABORATORY

- i. Wear hand gloves while carrying out all laboratory procedures
- ii. Wash your hands with water and soap on removal of gloves
- iii. Keep the laboratory benches and floor clean
- iv. Do not recap used needles
- v. Avoid mouth pipeting
- vi. Do not store food or beverage in the laboratory refrigerator
- vii. Do not leave the working place or walk around the laboratory with glove hands
- viii. Eating, drinking, smoking and application of cosmetics is not allowed in the laboratory.

CHAPTER THREE

3.1 BLOOD COLLECTION

Blood collection is a process of bleeding the patient in order to take sample (blood) for investigation. Blood is one of the fluids used in the laboratory to detect any kind of ailment in a patient's body.

There are two methods of blood collection namely:

- i. Capillary method of blood collection
- ii. Venous method of blood collection

Capillary method of blood collection

This way of collecting blood from the body involve going below the outer layer of the skin to get the blood sample. The capillary is one of the blood vessels located in the body for passage of blood round the body.

Venous method of blood collection

This method involves searching for the prominent vein in order to make blood collection easier from the body. The vein is also one of the blood vessels in the body and it is the target.

3.2 BLOOD GROUP TEST

Blood Group Test is a test done in order to know the group a patient blood belong to and the rhesus factor. We have blood group A, B, AB, and O. The rhesus factors are positive (+) and negative (-)

Apparatus Needed: 23g Needle/lancet, cotton wool, methylated spirit, white tile, Antisera kit (organic solvents), pipette

Antisera Kit

Antisera kit is a carton that contain three bottles labeled:

Antisera A: The liquid in it has Blue colour

Antisera B: The liquid in it has Yellow colour

Antisera C: The liquid in it is colourless

PROCEDURES

- Perform capillary method of blood collection in order to get blood from the patient
- Collect the blood sample using pipette
- Make three spots of blood on white tile
- Add drops of each antisera beside each spot of blood
- Mix together each blood sample with each antisera. Note the locate of each

- Rock the tile in order for reaction to take place i.e. agglutination

Below are the following agglutination that can take place after adding Antisera A, B, and D to blood sample and rock the tile.

Anti A Anti B Anti D



+



+



-

AB rhesus D positive



+



-



-

AB rhesus D Negative



+



-



+

A rhesus D negative



-



+



-

A rhesus D positive



-



+



+

B rhesus D negative



-



-



-

B rhesus D positive



-



-



+

O negative



*



- It means agglutination i.e. Positive

*



- It means there is no reaction i.e. Negative

Everybody belongs to one of the blood group in the illustration above.

3.3 PACKED CELL VOLUME (PCV)

Packed Cell Volume (PCV) Test is a test carried out in the medical laboratory to know the level of blood in a patient's body.

APPARATUS:

Needle, Capillary tube, Cristadseal, Heamatocrit, Centrifuge, Heamatocrit Reader.

PROCEDURES

- Perform capillary method of blood collection to test blood sample
- Apply partial pressure on the site being pricked
- As blood is flowing out, bend the capillary tube and bring to the blood stream
- Continue to apply pressure on the thumb till the capillary tube is full
- Clean the blood on the thumb with swab
- Place dried swab on the spot
- Ask the patient to apply pressure to stop the flow of blood
- Seal the capillary tube using crystaseal
- Place the capillary tube on any of the revolving lines in Heamatocrit centrifuge
- Plug to the source of electricity
- Allow to spin for 5minutes. Then remove from the socket
- Bring out the capillary tube from heamatocrit centrifuge
- Place on the heamatocrit centrifuge
- Use the knob to adjust
- Note the point of separation of the plasma and settle blood
- Record your readings
-

Here are the possible Packed Cell Volume range in an individual depending on age and sex (gender)

Male: 40 – 50%

Female: 35 – 45%

Children: 40 – 60%

3.4 MALARIA PARASITE TEST (MP)

Malaria fever is one of the commonest fever in the world affecting people. This fever is caused by parasite. There are different types of parasites causing malaria fever in different parts of the world. In Nigeria, the parasite causing malaria fever is called Plasmodium falciparum. It cannot be seen with naked eyes but can be found inside the red blood cells. There are two methods to detect the presence of this parasite namely:

- Thin blood film
- Rapid Diagnosis Test (RDT)

Thin blood film for malaria

Apparatus: 23g needle, cotton wool, methylated spirit, pipette, cover slip, slide, leishman stain, buffer solution, water immersion oil, microscope and rack.

PROCEDURES

- Perform capillary method of blood collection to get blood sample from the patient
- Clean the slide with dried swab
- Pipette little drop of blood sample on the slide
- Make a thin blood film with cover slip to achieve the tail
- Hang the slide on the rack to air dry
- Balance the slide on a long staining rack.
- Add Leishman to the slide containing thin blood film
- Wait for two minutes
- Add Buffer Solution to double dilute it
- Wait for eight minutes
- Pour water gently on the slide to rinse the solution on it.
- Clean the back of the slide with cotton wool
- Hang on rack to air dry for few minutes
- Add drops of immersion oil on the slide
- Place the slide on the microscope
- Switch the microscope on
- View the thin blood film on the microscope
- Switch the microscope off after viewing
- Remove the slide from the microscope

Notes:

- If malaria parasite is present, it will be seen in the red blood cells but if not present, there will be nothing in the red blood cells
- Immersion oil provides refractive index for dried thin blood film by connecting the image from the film to the observer's eyes through the eye piece on the microscope.

3.4.1 RAPID DIAGNOSIS TEST (RDT) FOR MALARIA FEVER

APPARATUS: RDT kit for malaria fever containing (diluent, small pipette, indicator), 23g Needle, cotton wool and methylated spirit

PROCEDURES

- Perform capillary method of blood collection to get blood sample
- Remove the indicator from the pack
- Use pipette to get little blood as indicated on it from the patient
- Add the blood sample to the assay window on the indicator
- Add three drops of diluent to buffer window
- Leave for few minutes
- Check the test
- Record your observation

Here are the possible result that can occur:

- If both the control line and ad test line are seen, it means malaria parasite is present in the body fluid of the patient
- If only the control line is shown, it means the patient has no malaria parasite in his/her body fluid (blood)
- If there is no line shown, it means the test must be repeated

3.5 HEPATITIS TEST

There are different types of hepatitis namely hepatitis A,B,C & E. hepatitis A & E cannot be transmitted through blood or any fluid but through fecal-oral route (from anus to mouth). Hepatitis B & C can be transmitted through blood while hepatitis D requires B to infect. Test in the laboratory is conducted to know if a patient is suffering from hepatitis B & C. both are having the same procedure but the strip to be used is different. When conducting the test the strip to use hepatitis B surface antigen test, the strip has HBsAg on it. Hepatitis C virus test, the strip has HCV on it, hepatitis is a viral disease that destroy the liver.

Apparatus: Needle & syringe, tourniquet, dried swab, methylated spirit, EDTA bottle, strip, bench centrifuge, pipette, plaster.

Procedure

- ❖ Perform venous blood collection to get sample from the patient.
- ❖ Pour the blood into EDTA bottle through the syringe.
- ❖ Cover the bottle with its lid.
- ❖ Label the sample using plaster and attach to the upper edge of the bottle to seal both the cover and bottle together.
- ❖ Place on any hole on the bench centrifuge.

- ❖ Balance the machine using another bottle having fluid in it.
- ❖ Plug the machine to source of electricity.
- ❖ Allow to spin for three minutes.
- ❖ Remove the labeled EDTA bottle.
- ❖ Unseal and uncover the bottle.
- ❖ Bring out the strip packet.
- ❖ Check before use to know if ideal for the test.
- ❖ Tear the pack and remove the strip.
- ❖ Balance the strip on a staining rack.
- ❖ Pipette three drops of plasma from the EDTA bottle on the strip.
- ❖ Wait for few minute for result to occur.
- ❖ Record your result.

Precaution

- ❖ Always check for the appropriate strip.
- ❖ Do not strip to air for long time before use.
- ❖ Check the result very well.

Result

Hepatitis is present if both test line and control lines are shown.

- ❖ Hepatitis is absent if only control line is shown.

3.6 HUMAN IMMUNE DEFICIENCY VIRUS (HIV) TEST

This test is carried out in the laboratory to know if the virus is present in the blood of the patient. The test is to be conducted only the, strip is different. Also has same apparatus, procedures and precautions.

Results:

- ❖ Control line and test line show positivity of the virus.
- ❖ Control line show negativity of the virus.

Note:

- ❖ The test must be conducted carefully.

3.7 PREGNANCY TEST (PT)

PROCEDURE: The pregnancy test is used to detect the presence of pregnancy in the female body. It can be done either by the urine pregnancy test or the blood pregnancy test.

Materials: Anti coagulated blood sample, Pregnancy test strip and the centrifuge machine.

METHOD

1. Put the blood sample into the centrifuge and spin at 3000R/M for 5mins
2. Allow the centrifuge to stop before bringing out the sample
3. Dip the pregnancy strip into plasma for 2mins
4. Read the result

RESULT

The appearance of a single line on the control indicates Negative

The appearance of double line on the control indicates Positive

NOTE: If there is red line on both the test region and the control region, it indicates invalid and the test must be repeated using a new test strip.

3.8 URINALYSIS TEST

This is a test carried out to detect the rate of some component present in the urine. It is used to know the physical, chemical properties of the patient's urine.

Apparatus: Urinalysis strip (Combi 2,9 &10), hand gloves plane universal bottle, toilet roll, stop clock.

Regent: Patient's urine.

Procedures:

- ❖ Put on hand gloves.
- ❖ Give the plane universal bottle to the patient to bring his/her urine.
- ❖ Examine the urine physically from the universal bottle.
- ❖ Bring out one of the strip from the Combi.
- ❖ Insert it into urine sample.
- ❖ Place the strip immediately you remove it from the urine on tissue paper in order to get rid of excess urine from the back of the strip.
- ❖ Read the result within 30 seconds to 60 seconds.
- ❖ Record your result.

Physical Examination of Urine

1. Check for color: Normal urine is slightly yellow or amber.
2. Check for odour: Uninfected urine is slightly aromatic.
3. Urine sample must be transparent.

Chemical Properties of Urine

This indicates any abnormality present in the urine sample. The chemical component/properties using Combi 10 includes: blood, urinobilinogen, bilirubin, protein, nitrite, ketones, glucose, PH, specific gravity, leukocytes.

Precautions

- ❖ Check for the expiring date of the strip used.
- ❖ Put on hand gloves.
- ❖ Bring out the only strip needed.
- ❖ Handle the urine sample carefully.
- ❖ Read the result within the normal time.

3.9 FASTING BLOOD SUGAR (FBS) TEST.

This is a test being performed in the laboratory to know the level of sugar (Glucose) present in a patient. The patient must stop eating early at evening while the test is conducted very early in the morning.

Apparatus: Lancet, glucose strip, lancet device, glucometer, alcohol pad/wet swab.

Procedure:

- ❖ Position the patient on a seat.
- ❖ Fix the lancet into lancet device and screw up.
- ❖ Clean the patient thumb with alcohol pad.
- ❖ Tune the revolving part of the lancet device on any mark on it depending on the softness of the patients thumb.
- ❖ Insert glucose strip into the glucometer.
- ❖ Pick the patients with lancet device.
- ❖ Apply pressure to the site being prick.
- ❖ Bring the glucometer near the site.
- ❖ Collect blood sample on to the glucose strip.
- ❖ Allow the glucometer to give it final reading.
- ❖ Record the readings.

Notes :

- ❖ Fasting blood sugar test must not be done around 12:00 noon upward because accurate result will not be gotten.
- ❖ Never expose glucose strip to air for long time before use.

3.10 WIDAL TEST PROCEDURE

- Collection of blood sample from a patient.
- Allows the blood to settle to form a serum.
- Put the serum inside a small straight bottle.
- Prepare a plate which contain four, four rows.
- Prepare the antiserum
- A drop of each antiserum should be drop on a each hole and plate.
- Then draw a drop of serum with pipette on each antiserum on the plate
- Mix both the antiserum and the serum together.
- View with your eyes if positive or negative by checking of
- agglutination or non.

NOTE: If agglutination occurs, it is positive

If non agglutination it is negative.

CHAPTER FOUR

4.1 CONCLUSION

The student industrial work experience scheme (SIWES) helps students to expand their knowledge and experience in their field of study. It will also help student whenever they come across it in future career.

4.2 RECOMMENDATION

I wish the government and the school authority to provide necessary materials for the students during this programme. They should also try to pay the students allowance so as to serve as help for the students in one way or the other.zs

Also, the supervisors should make sure they visit the students in their place's of attachment for proper monitoring, improvement and progress for the benefit of the societies as a whole.