Pharm.D - Year 2

Pharmaceutical Microbiology

Complete subject manual: 14 practicals and activities. Each chapter includes a student observation or work record.

Use the PDF bookmarks to navigate. The table gives each practical's content-page count; the combined manual has continuous page numbers.

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Microbiology Laboratory Apparatus

Experiment 1 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To identify apparatus, its function and the records needed to show correct use.

Principle

Equipment selection depends on the purpose of the measurement or containment task. A biosafety cabinet, chemical fume hood and clean-air workstation have different protection functions.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Identify devices

Label the microscope, steriliser, incubator, balance, colony counter and containment equipment in the assigned photographs or demonstration.

3. Match purpose and limitation

For each device, state its measurement or process role. Distinguish worker/environment protection from product protection.

4. Review performance records

Examine a supplied calibration, maintenance or process-check record. Identify date, acceptance criterion and responsibility for release.

5. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

6. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Device / identifier	_____
Purpose	_____
Protection or measurement limitation	_____
Calibration / check status	_____

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Why is a clean-air workstation not a substitute for a biosafety cabinet?

Its protection purpose differs; equipment must match the risk assessment.

2. Why keep an equipment record?

It links a result to a device whose performance and maintenance status can be checked.

Glassware Sterilisation and Culture-media Quality

Experiment 2 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To interpret sterilisation records and recognise the information in media quality documentation.

Principle

A sterilisation process requires validated conditions and appropriate monitoring. Media suitability depends on formulation, quality control and intended use; appearance alone cannot establish performance.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Inspect glassware preparation records

Identify the cleaning, packaging and labelling information from the supplied process sheet.

3. Read a sterilisation record

Locate cycle identification, load description and recorded process/indicator outcomes. Decide whether the stated release criteria were met.

4. Read a media record

Identify medium name, lot, purpose, appearance, assigned sterility/performance control and expiry status without preparing or inoculating a culture.

5. Investigate a failed control

Write which result cannot be released and which responsible person should review the process failure.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Glassware / load code	_____
Sterilisation record and indicators	_____
Media lot / intended use	_____
Quality-control finding	_____
Release or hold rationale	_____

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Does a colour-change indicator alone prove every item sterile?

No. It must be interpreted as part of the validated process and load-monitoring system.

2. Why perform media quality control?

A medium must be suitable for its intended method; a correct label does not establish performance.

Simple Gram and Negative Staining - Slide Interpretation

Experiment 3 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To compare prepared staining images and describe their findings.

Principle

Simple stains emphasise shape, Gram staining differentiates staining patterns associated with cell-envelope properties, and negative staining shows cells against a stained background.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Simple stain

Draw the cell shape and arrangement from the prepared image; record whether individual cells are resolved.

3. Gram stain

Record the observed colour and morphology, compare control images and distinguish Gram-positive from Gram-negative appearance.

4. Negative stain

Describe the background and cell outline. Compare apparent morphology with the simple-stain image.

5. Evaluate variation

Identify mixed staining, poor contrast or possible artefact in supplied examples; do not assign species from morphology alone.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Stain and slide code	_____
Observed colour / contrast	_____
Cell shape and arrangement	_____
Control appearance	_____
Supported interpretation	_____

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Does Gram appearance identify a species?

No. It provides preliminary classification together with morphology.

2. Why use a control image?

It helps distinguish a meaningful staining pattern from technical variation.

Motility - Interpretation of Demonstration Images

Experiment 4 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To recognise motility evidence from supplied videos or images.

Principle

Directional movement of cells must be distinguished from random Brownian motion and movement caused by liquid drift.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Review the image sequence

Observe the same field across the supplied sequence and mark the movement of several cells.

3. Compare motion

Distinguish purposeful displacement, random vibration and common movement of the whole field.

4. Assess the supplied motility result

Compare the observation with the assigned positive and negative controls; record uncertainty rather than forcing a positive result.

5. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

6. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Video / image code	_____
Observed displacement	_____
Brownian motion / drift evidence	_____
Control comparison	_____
Motility conclusion	_____

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. What is Brownian motion?

Random movement associated with collisions in the surrounding fluid; it does not establish active motility.

2. Why inspect several cells?

One moving object may be an artefact or may not represent the population.

Total and Viable Counts - Calculation Exercise

Experiment 5 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To calculate counts from instructor-supplied counting records.

Principle

A direct count measures counted objects, whereas a viable count estimates colony-forming units under the stated test conditions. Cell clumps and method limits affect interpretation.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Read the count sheet

Record method, dilution, measured volume, raw counts and replicate identifiers supplied by the instructor.

3. Direct count

Use the stated counting volume and dilution to calculate objects per unit volume; explain whether viability is established.

4. Viable count

Use only the supplied count and dilution record. Calculate CFU per unit volume and compare replicates.

5. Compare endpoints

Explain why total count and viable count can differ and avoid treating a CFU as necessarily one individual cell.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Raw count / counting volume	_____
Dilution factor	_____
Calculated total count	_____
Calculated CFU per mL	_____
Replicate agreement / limitation	_____

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- CFU/mL = count × reciprocal dilution / measured volume in mL.
- Illustration only: a supplied count of 46, dilution factor 1000 and measured volume 0.1 mL gives 460,000 CFU/mL. This is a calculation from supplied results, not an experimental culture instruction.

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. What does CFU mean?

Colony-forming unit, an operational estimate that can originate from one cell or a cluster.

2. Does a direct count establish viability?

Not by itself; the method must include a validated basis for that distinction.

Pure-culture Isolation - Concept and Result Assessment

Experiment 6 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To compare supplied isolation diagrams and assess evidence of purity.

Principle

An isolation method separates growth into distinguishable populations. A visually isolated colony is a starting point for assessment and is not absolute proof of a pure identity.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Compare method diagrams

Explain the purpose of spatial separation in the supplied streak, spread and pour-method diagrams without carrying out live isolation.

3. Inspect assigned results

Mark separate versus overlapping growth in the prepared images and identify which observations remain ambiguous.

4. Evaluate purity evidence

Compare supplied repeated morphology, staining and identification results. State why a single colony image cannot establish identity.

5. Record the assessment

Write the supplied sample code, evidence for a consistent population and evidence requiring further laboratory review.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Diagram / result code	_____
Separation observed	_____
Consistency of morphology	_____
Additional evidence supplied	_____
Purity-assessment limitation	_____

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Is an isolated colony sufficient to name an organism?

No. Identification needs additional validated evidence.

2. Why compare different observations?

Mixed populations or artefacts may be missed by one method.

Biochemical Identification - Profile Interpretation

Experiment 7 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To interpret a supplied biochemical-test panel.

Principle

A biochemical profile reflects metabolic reactions under the specified test system. Identification uses a combination of valid results and a defined interpretation scheme.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Read the panel

List the named tests, coded result reactions and quality-control outcomes supplied.

3. Classify reactions

Record each result as positive, negative or invalid using the panel definition, rather than relying on an unlabelled colour.

4. Compare with the assigned matrix

Use the instructor-provided identification matrix to identify compatible candidates and conflicting results.

5. Assess confidence

State whether the panel supports a likely group, an identification or a need for further validated tests.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Panel / sample code	_____
Test reactions	_____
Control validity	_____
Compatible identification	_____
Conflicting / missing evidence	_____

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Why use a profile?

Several independent characteristics can be more discriminating than one reaction.

2. How is an invalid result handled?

It is not interpreted as positive or negative; the responsible laboratory reviews the cause.

Culture Reports and Antimicrobial Susceptibility

Experiment 8 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To read a supplied culture and susceptibility report.

Principle

A culture report and susceptibility result must be interpreted using the organism, specimen context, method and valid current interpretive criteria. A larger inhibition zone is not automatically a better clinical drug.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Check the report context

Record coded specimen, reported identification, report status and collection/treatment context supplied.

3. Read susceptibility measurements

Enter zone diameters or MIC values exactly as supplied with units and method.

4. Apply the assigned criteria

Use the current method-specific organism-drug criteria provided for the exercise; do not compare zones across different drugs as a potency ranking.

5. Discuss the clinical limitation

Consider infection site, patient factors and possible colonisation with the supervisor. Laboratory susceptibility alone does not select a complete treatment plan.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Specimen / organism code	_____
Method and measurement	_____
Assigned interpretive table version	_____
Reported category	_____
Clinical-context questions	_____

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Can the same zone diameter be interpreted identically for every drug?

No. Interpretation is organism-, drug- and method-specific.

2. Does susceptibility guarantee clinical success?

No. Exposure, infection site, patient factors and the overall treatment plan also matter.

Sterility Testing of Powders and Liquids - Record Review

Experiment 9 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To evaluate supplied powder and liquid sterility-test records.

Principle

A sterility test examines defined test portions using a validated method and controls. A passing test does not prove absolute sterility of every unit in a batch.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Identify the test

Record product type, test method, sample basis and the supplied batch/test code.

3. Read control records

Identify method suitability and control results; note product interference or invalid controls.

4. Review the observations

Compare the coded powder and liquid test outcomes with their stated acceptance rules.

5. Conclude correctly

Distinguish a valid passing result, a failed test and an invalid test requiring investigation. Relate the result to the broader manufacturing control system.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Product type / code	_____
Assigned method	_____
Suitability / control finding	_____
Reported test outcome	_____
Supported batch-test conclusion	_____

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Why is method suitability important?

The product can interfere with detection, making an apparent negative result misleading.

2. Does a passing test prove every unit sterile?

No. Assurance depends on validated manufacturing controls as well as the test.

Minimum Inhibitory Concentration - Supplied Data

Experiment 10 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To identify an MIC from a supplied concentration-response table.

Principle

The MIC is the lowest tested concentration meeting the defined inhibition endpoint in a valid test. It is method dependent and differs from a killing endpoint.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Check the data table

Read the concentration units, response definition and growth/control outcomes supplied.

3. Identify the first inhibitory level

Find the lowest listed concentration that meets the specified absence-of-visible-growth endpoint.

4. Handle bounds

If all or none of the levels meet the endpoint, state the appropriate upper or lower bound rather than inventing a value.

5. Interpret separately

Use only the assigned current interpretive criteria to discuss a reported category; do not infer clinical dosing from the MIC.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Data code / concentration units	_____
Control status	_____
Lowest qualifying level	_____
MIC or bounded result	_____
Assigned category / limitation	_____

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- Illustration: supplied readings show growth at 1 and 2 units/mL and no growth at 4 and 8 units/mL. The MIC in that teaching table is 4 units/mL, if the controls are valid.

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Is the MIC a bactericidal concentration?

No. Inhibition and killing are different endpoints.

2. Why can an MIC be reported as a bound?

The endpoint can fall outside the range that was tested.

Antibiotic Cup-plate Assay - Data Analysis

Experiment 11 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To evaluate supplied standard and test zone data.

Principle

A microbial assay estimates antibiotic activity by comparing response with a reference standard under a validated common test design. Zone response depends on assay conditions.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Read the design

Identify the standard, test dilution basis, replicate positions and response measurements supplied.

3. Assess response pattern

Plot the assigned standard response against the prescribed concentration or log-concentration scale.

4. Estimate activity

Apply the supplied validated calibration/model and dilution factor; do not treat a single zone diameter as a universal concentration conversion.

5. Assess validity

Check replicate agreement and model suitability before reporting activity in the assigned units.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Reference standard / units	_____
Assigned calibration equation	_____
Test mean response	_____
Dilution-corrected activity	_____
Validity / replicate assessment	_____

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- If the supplied calibration is y = a + b log10(C), then C = 10^((y − a)/b); apply the recorded dilution factor.
- Illustration only: a = 10, b = 5 and y = 20 give C = 100 assigned units before dilution correction.

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Why compare with a reference standard?

Activity is defined against a specified reference in the same assay system.

2. Why check the response model?

A poor or unsuitable fit makes an estimated potency unreliable.

Vitamin Microbiological Assay - Turbidimetric Data

Experiment 12 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To estimate vitamin content using a supplied calibration and response table.

Principle

A vitamin-dependent test response can be compared with a standard calibration. Turbidity is an indirect response affected by the specified assay system and controls.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Check supplied standards

Record standard amounts, blank response and replicate turbidity readings.

3. Plot the calibration

Use only the response region validated in the exercise and inspect the fit.

4. Calculate the test result

Interpolate the test response on the supplied calibration, then account for extraction and dilution already stated in the record.

5. Evaluate interference

Discuss whether matrix effects or invalid controls make the estimate unsuitable for reporting.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Vitamin / standard code	_____
Blank-corrected response	_____
Calibration or fitted equation	_____
Dilution factor	_____
Estimated content and unit	_____

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- For a validated linear teaching calibration A = mC + b, C = (A − b)/m.
- Example: A = 0.45, b = 0.05 and m = 0.20 per microgram/mL give 2.0 micrograms/mL before dilution correction.

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Does turbidity measure the vitamin directly?

No. It measures a biological response that must be calibrated.

2. Why include a matrix check?

Other sample constituents may influence the response.

Rideal-Walker Coefficient - Historical Method Interpretation

Experiment 13 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To calculate and critique a coefficient from a supplied historical test table.

Principle

The historical phenol-coefficient approach compares disinfectant and phenol performance at the method-defined endpoint. It is limited by its test conditions and is not a universal measure of real-world disinfection.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Read endpoint definitions

Identify the contact-time comparison and response definitions stated in the instructor-provided record.

3. Locate qualifying dilutions

Identify the highest qualifying disinfectant and phenol dilution denominators from the supplied table.

4. Calculate the ratio

Divide the qualifying disinfectant denominator by the qualifying phenol denominator.

5. Discuss applicability

Explain that organic load, surface, formulation and method affect performance; use the product-authorised method for actual disinfection.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Supplied method / table code	_____
Disinfectant denominator	_____
Phenol denominator	_____
Coefficient	_____
Method limitation	_____

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- Coefficient = qualifying disinfectant dilution denominator / qualifying phenol dilution denominator.
- Illustration: denominators 600 and 100 give a coefficient of 6. The example is a calculation from supplied data; no live-organism challenge is performed.

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Does a coefficient apply to every practical setting?

No. It depends on the defined historical test conditions.

2. What is compared?

The qualifying dilution endpoint of the test disinfectant with that of phenol in the same method.

Widal and Malaria Diagnostic Reports

Experiment 14 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To describe supplied Widal results and prepared malaria images without making an unsupported diagnosis.

Principle

Widal measures an antibody-agglutination response and has important specificity limitations. Malaria diagnosis requires a validated diagnostic method and appropriate interpretation of the clinical context.

Requirements

- Instructor-prepared fixed slides, labelled images, demonstration records or coded teaching data for this practical.
- Activity form, microscope for prepared slides where applicable and calculator.

Procedure

1. Identify the teaching material

Record the slide, image or data code, method name and the assigned comparison. Use prepared material and supplied results for this exercise.

2. Read a Widal report

Record the reported antigens, titres, timing and context. Explain that a single titre does not confirm typhoid; Widal is not recommended by CDC for diagnosis because false positives are common.

3. Review prepared malaria images

Use the instructor-labelled fixed images to identify the shown parasite stage and the relationship to the red cell. Do not infer species from an incomplete unlabelled image.

4. Compare diagnostic evidence

Distinguish direct parasite evidence from an antibody response. Record test limitations and the need for authorised clinical/laboratory review.

5. Document

Keep each finding with its method, date and supplied interpretation; do not combine the two tests into a diagnosis of an individual patient.

6. Assess controls and limitations

Confirm the meaning of the positive, negative, blank or process controls supplied. State which conclusions the results support and which require additional evidence.

7. Complete the record

Enter observations separately from interpretations. Record units, method conditions given with the data and the instructor-reviewed conclusion.

Observations and Record

Record component	Entry
Teaching report / image code	_____
Reported titre or visible stage	_____
Method and timing	_____
Limitations	_____
Need for confirmatory clinical review	_____

Result

Material / data code: ____. Observed result: ____. Control assessment: ____. Interpretation and limitation: ____.

Precautions

- This activity uses prepared material and data interpretation; it is not a live microbial culture or pathogen-handling procedure.
- Keep morphological, quantitative and clinical interpretations separate.
- Use the method-specific assigned quality controls and current interpretive criteria where relevant.

Viva Questions and Answers

1. Does one Widal titre confirm typhoid?

No. Background antibodies, prior exposure and cross-reactions can mislead interpretation.

2. Why use prepared diagnostic images?

They permit study of morphology without handling infectious specimens.

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