VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

REG.NO.:

SCHOOL OF BIOSCIENCES AND TECHNOLOGY
CONTINUOUS ASSESSMENT TEST - II
WINTER SEMESTER 2025-2026

Programme Name & Branch	**: MSc. Integrated Biotechnology**
Course Code and Course Name	**:TBIT413L and Epidemiology and Public Health**
Slot(s)	**:E2+TE2**
Faculty Name(s)	**:Dr. Subhash Kumar**
Class Number(s)	**:VL2025260503501**
Date of Examination	**:20 March 2026**
Exam Duration	**:90 minutes**

Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

<table>
<tr><th>Q. No</th><th>Question</th><th>M</th><th>CO</th><th>BL</th></tr>
<tr><td>1.</td><td>Describe how you would design a case–control study to investigate risk factors associated with COVID-19 infection during an outbreak. Explain the selection of cases and controls, measurement of exposure, potential biases, and limitations of the study design.</td><td>10</td><td>2</td><td>4</td></tr>
<tr><td>2.</td><td>During a suspected outbreak in a community, outline the first three critical steps of outbreak investigation. Discuss how each step helps in confirming the outbreak and preventing further spread of disease.</td><td>10</td><td>3</td><td>2</td></tr>
<tr><td>3.</td><td>A diagnostic test was evaluated among 300 individuals for a particular disease. The results are summarized below:
<table>
<tr><td>Test Result</td><td>Disease: Yes</td><td>Disease: No</td><td>Total</td></tr>
<tr><td>Positive</td><td>85</td><td>25</td><td>110</td></tr>
<tr><td>Negative</td><td>15</td><td>175</td><td>190</td></tr>
<tr><td>Total</td><td>100</td><td>200</td><td>300</td></tr>
</table>
Based on the above data, answer the following, along with an interpretation:
a) Calculate the Sensitivity and Specificity of the test.
b) Calculate the False Positive Rate (FPR) and False Negative Rate (FNR).</td><td>10
(5+5)</td><td>2</td><td>3</td></tr>
<tr><td>4.</td><td>A pharmaceutical company is developing a new oral drug for Type 2 diabetes and wants to evaluate its real-world effectiveness across different regions of India.

(A) Design a pragmatic clinical trial for this purpose. Clearly justify your choices regarding: Study population, Inclusion/exclusion criteria, Outcome measures, Follow-up strategy.

(B) Explain how converting this study into a multicenter trial would improve the reliability and generalizability of the results.</td><td>10
(5+5)</td><td>3</td><td>4</td></tr>
</table>

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5.	A new diagnostic test is compared with the standard clinical diagnosis for detecting a particular disease. The results from 120 subjects are summarized below: Compute the Cohen's Kappa (κ) statistic and interpret the strength of agreement between the new test and the standard diagnosis.	10	2	3

	Standard: Disease	Standard: No Disease	Total
Test: Disease	40	10	50
Test: No Disease	8	62	70

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