



SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

Approved by AICTE & Affiliated to Anna University
Accredited by NBA & Accredited by NAAC with 'A+' Grade,
Recognized by UGC saravanampatti (post), Coimbatore-641035.



Department of Biomedical Engineering

Vision Tit 2

Vision Title 3

Course Name: 19BMB301 Diagnostic & Therapeutic Equipment

III Year : V Semester

Unit 4- Sensory Equipment

Topic :Polygraph



A GENERAL INTRODUCTION:-

A **polygraph Test**, popularly known as a **lie detector test**, is used to prove truthfulness of a subject & measures and records several physiological indices such as:-

- ▶ Blood pressure
- ▶ Pulse
- ▶ Respiration,&
- ▶ Skin conductivity.

while the subject is asked a series of questions.

Lie detection is also known as deception detection.



OBJECTIVES OF POLYGRAPH EXAMINATION:-

- ▶ To verify the veracity of the statement of suspect, witness & complainant in all types of crime.
- ▶ To replace the third degree method of interrogation in a scientific manner.
- ▶ To examine white collar criminals, economic offenders, cyber criminals & other offenders.
- ▶ To corroborate or to refute the findings of the investigation.



HISTORY:-

The study of physiological methods for deception tests measuring emotional disturbances began in the early 19th century.

- ▶ Benussi was the first to work on practical deception tests based on physiological changes.
- ▶ And the first attempt to develop a scientific instrument to detect truth was made by Lombroso in 1895.



HISTORY:-

- ▶ Later, Larsen & Keelar independently designed instruments with new features to make it more versatile.
- ▶ John Reid, in 1947 further improved the instrument as well as the technique of administering the test.



THE POLYGRAPH INSTRUMENT.





PRINCIPLE:-

- ▶ The polygraph is based on the principle of **psychosomatic interaction** of an individual. This means, a change takes place in person who consciously holds feelings, which manifest into physiological changes in his blood pressure, pulse rate, respiration and electrodermal response. Hence it is the fear of detection & not the guilt which produces measurable physiological responses.



INSTRUMENTATION:-

A polygraph instrument is basically a combination of medical devices that are used to monitor changes occurring in the body. It includes:-

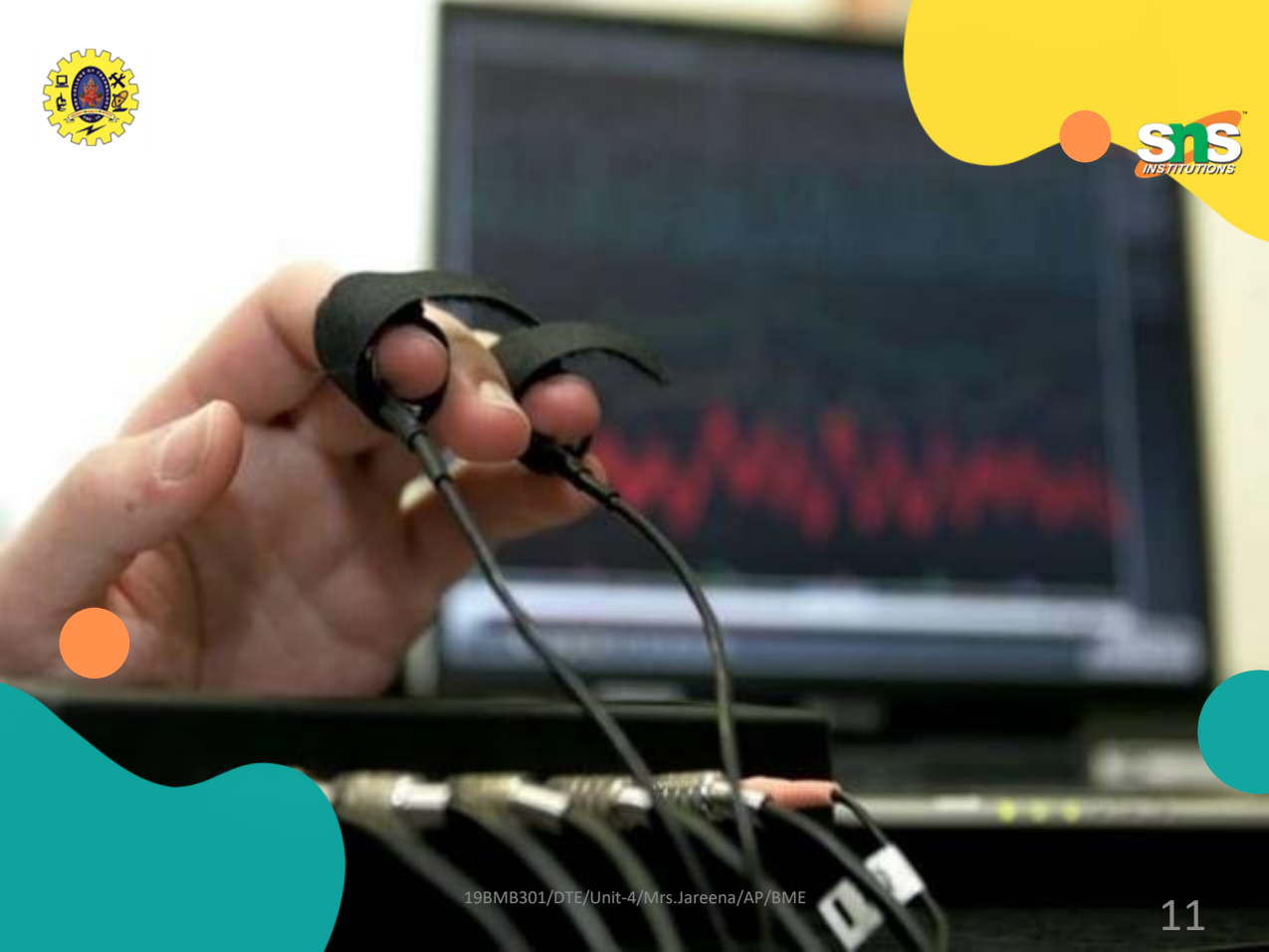
- ▶ One **pneumograph tube** is fastened around chest & another around abdomen to measure the variation in respiratory pattern.





INSTRUMENTATION:-

- ▶ A **blood pressure cuff** or a **sphygmomanometer**, similar to the one used by physicians, is attached to the subjects upper arm.
- ▶ **Electrodes** or **galvanograph** are attached to the hand or index & ring fingers, through which a weak electric current is passed to measure the galvanic skin response (GSR).
- ▶ **Plethysmograph** is a transducer. It is attached to the thumb. It measures blood volume reflecting the pulse rate.





Pneumatic
rubber tubes

Blood
pressure
suff

Electrodermal
electrodes





THE QUESTIONING TECHNIQUE:-

In questioning the subject , generally the basic approaches are followed:-

- ▶ **Relevant/Irrelevant Question Technique-** Both relevant & irrelevant questions, pertaining to the case in hand are asked.
- ▶ **Control Questions-** These are interspread among the relevant & irrelevant questions. They do not directly relate to the crime under investigation, but to a similar situation in which the answers may have a feeling of concern with respect to either its truthfulness or its accuracy.



THE QUESTIONING TECHNIQUE:-

- ▶ **Peak of tension questions-** It is framed when some of the important details of the offence in question are not made known to the subject. The test questions in this case are framed in such a way that only one question will have bearing upon the matter under investigation & all others coming close to the guilty knowledge. The series of questions framed are first read to the subject & later they are administered with the instrument attached.





ANALYSIS OF THE POLYGRAPH CHART: –

The polygraph examiner considers the following aspects while analyzing the results of the test-

- ▶ Simultaneous occurrence in respiration & increase in blood pressure immediately after the subject's reply.
- ▶ Heavier breathing immediately after reply to a relevant question.
- ▶ Decrease in blood pressure several seconds after the subject's reply.



ANALYSIS OF POLYGRAPH

- ▶ Slowing up pulse rate after the questioning session & after the subject is informed that there will be no more questions.
- ▶ Variation in the blood pressure curve during the test e.g. downward trend indicate release of tension i.e. the subject feels at ease, horizontal trend indicates no change in the emotional state, upward trend indicate increase in tension, suggesting deception or guilty.

1 DIV. = 5 s

Thoracic respiration

Abdominal respiration

Electrodermal activity

Cardiovascular activity

|1|-

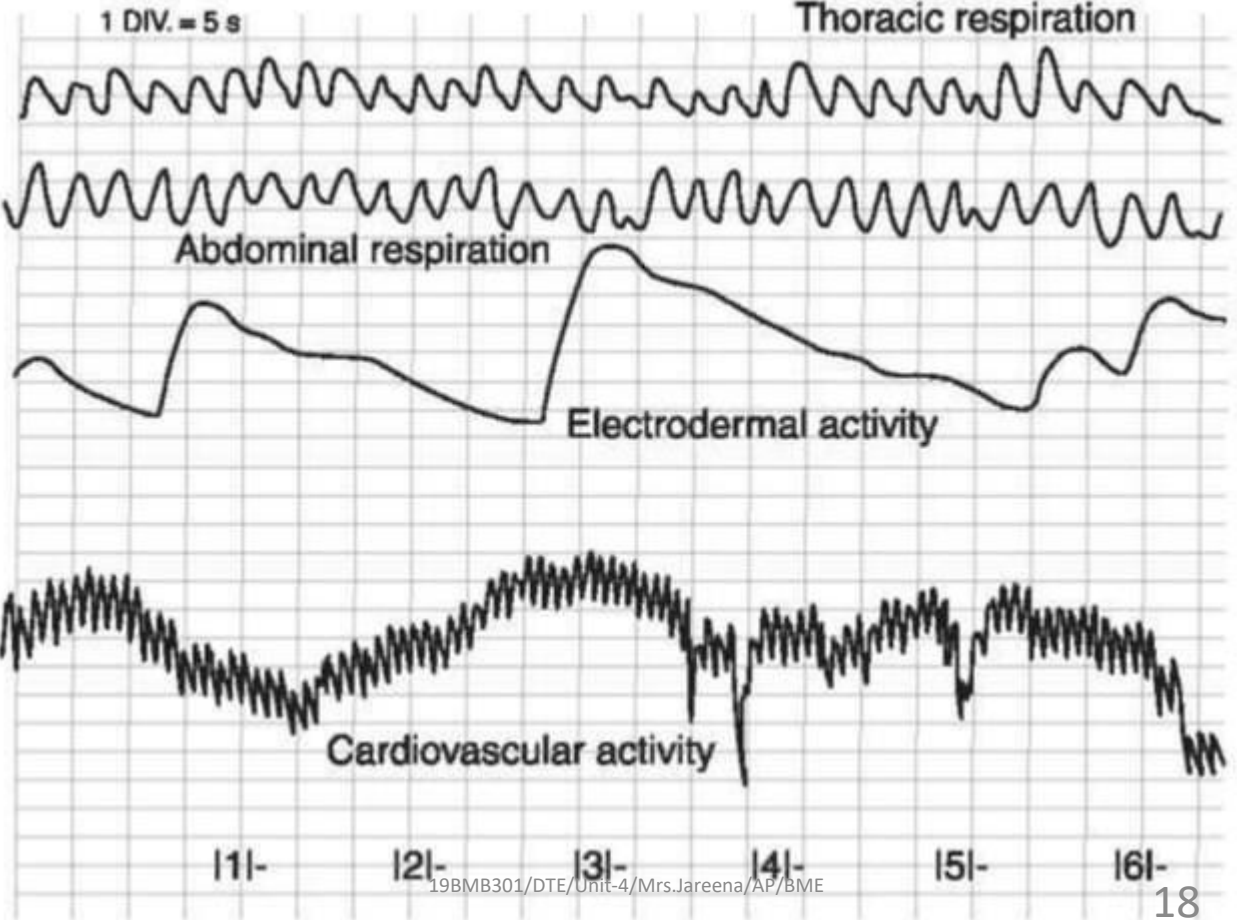
|2|-

|3|-

|4|-

|5|-

|6|-





WORKING:-

The working process briefly involves following aspects-

- ▶ The subject is asked about the crime he has committed. He knows that if he answers the question truthfully ,he would be punished for the same.
- ▶ He wants to tell lies to avoid punishment.
- ▶ His mental faculties set in to find lies to substitute truth. This shielding process is called Defence Mechanism.



WORKING:-

- ▶ The Defence Mechanism interacts with the body & creates physiological changes in the form of increased blood pressure, increased respiration rate, increased heart beat & lower GSR.
- ▶ Evaluations of these responses are done by the psychologists personally or he uses the computer to evaluate the results.



LEGAL ASPECTS OF POLYGRAPH TEST IN INDIA:-

- ▶ The main provision regarding crime investigation & trial in the Indian constitution is Article 20(3).
- ▶ It deals the privilege against self incrimination. The privilege against self incrimination is a fundamental canon of common law of criminal jurisprudence.
- ▶ Article 20(3) which embody this privilege reads-
“No person accused of any offence shall be compelled to be a witness against himself”.

The result of polygraph examination is not accepted in Indian courts.