

- 1 Explain briefly the signal processing and interfacing techniques in measuring instruments
- 2 Explain briefly the expert system instrumentation.

### Solution

2 Expert system is a part of the (AI) artificial intelligence, a solution software for complicated problems which solving the problems need experience and knowledge. It is a computer system emulating the decision-making ability of a human expert. An expert system is divided into two subsystems:

- i) the inference engine
- ii) the knowledge base

The inference engine applies the rules to the known facts to deduce new facts. It can also include explanation and debugging abilities.

The knowledge base represents facts and rules.

It is used in physical control systems by controlling a physical process based on monitoring. It is also used to monitor systems by comparing data continuously with observed system or with prescribed behaviour such as leakage monitoring in long petroleum pipelines.

1 Signal processing is an electrical engineer subfield that focuses on analysing, modifying and synthesising signals such as sound, images and scientific measurements.

Interfacing is used to describe the connection between a transducer or some other external device and the microcomputer. To interface it

is necessary that:

- the data generated by one instrument is converted correctly into a form acceptable by another.
- It must carry information between the two devices that shows what

the other is doing.

Techniques of interfacis includes

point to point protocol

modems and routers

modem interface

Technique of signal processing includes

s-plane

z-transform

transfer function

discrete fourier transform (DFT)

minimum phase