C 21544

(Pages : 3)

Name...

Reg. No...................................

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION, APRIL 2022

Instrumentation

INS 4B 06—ELECTRIC CIRCUITS AND MEASURING INSTRUMENTS

(2019 Admission onwards)

Time : Two Hours

Maximum : 60 Marks

Section A

Answer atleast **eight** *questions.*
Each question carries 3 marks.
All questions can be attended.
Overall ceiling 24.

1. State Thevenin's theorem.

2. Prove Kirchhoff's voltage law.

3. List the procedure to solve maximum power transfer theorem.

4. Compare PMMC and PMMI instruments.

5. What is the significance of damping torque in indicating instruments ?

6. Compare attraction and repulsion type instruments.

7. List advantages and disadvantages of dynamometer type watt meter.

8. What is the operating principle of a.c. potentiometer ?

9. Derive balance condition for A.C. bridges.

10. List any two applications of CRO.

11. What are the different modes of Digital Storage Oscilloscope ?

12. What is the working principle of Digital Multimeter ?
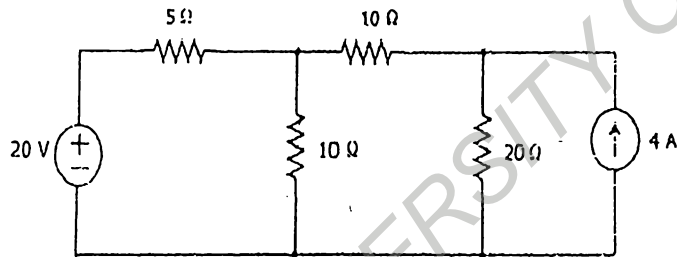
(8 × 3 = 24 marks)

Turn over

Section B

Answer atleast **five** *questions.*
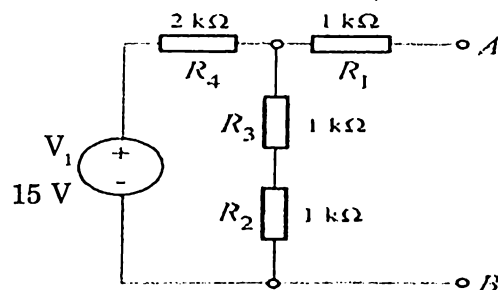*Each question carries 5 marks.*
All questions can be attended.
Overall ceiling 25.

13. Describe how delta is converted into star circuit.

14. Find the current flowing through 20 Ω resistor of the following circuit using Nodal analysis :

15. Describe the working of PMMC instruments with diagram.

16. Derive balance equation for Schering bridge.

17. Find V_{Th} and R_{Th} from the circuit :

18. Explain the construction and working of three-phase energy meter.

19. Derive balance equation of Wheatstone's bridge.

$(5 \times 5 = 25$ marks$)$

Section C

Answer any **one** *question.*
The question carries 11 *marks.*

20. State and prove superposition theorem. Describe steps involved to find out solution.

21. Draw block diagram of CRO and explain its working.

$(1 \times 11 = 11$ marks$)$

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2022

Instrumentation

INS 4B 05—INDUSTRIAL INSTRUMENTATION—II

(2019 Admission onwards)

Time : Two Hours   Maximum : 60 Marks

Section A (Short Answer Type Questions)

*Answer at least **eight** questions.*
Each question carries 3 marks.
All questions can be attended.
Overall Ceiling 24.

1. How is volumetric flowrate different from mass flowrate ?

2. Explain the working principle of variable head flowmeters.

3. Differentiate between laminar and Turbulent flow.

4. Illustrate the advantages of using valve positioners.

5. What is the role of a final control element ? Give example.

6. Mention some applications of rupture disc.

7. Differentiate between Absolute and Kinematic Viscosity.

8. What is air quality index ? What is its range of measurement ?

9. What is relative density ?

10. What is the working principle behind float densitometers.

11. What is an analyser ? Give examples.

12. How does density differ from viscosity ?

(8 × 3 = 24 marks)

Turn over

Section B (Paragraph Type Questions)

Answer at least **five** *questions.*
Each question carries 5 marks.
All questions can be attended.
Overall Ceiling 25.

13. With suitable diagram, derive the velocity equation of a transit time ultrasonic flowmeter.

14. Write short notes on Pitot tube.

15. Explain about spring and diaphragm actuators with suitable diagram.

16. What are the 3 valve characteristics ? Explain.

17. Illustrate the working ORSAT Apparatus.

18. What are the different types of air pollutants and their harmful effects ?

19. Explain about Fahrenheit hydrometer.

(5 × 5 = 25 marks)

Section C (Essay Type Questions)

Answer any **one** *question.*
The question carries 11 marks.

20. Explain in detail about any *two* Industrial type viscometers.

21. Explain the principle, construction and working of Venturi meter. Also Derive the expression for volumetric flowrate.

(1 × 11 = 11 marks)

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2022

Instrumentation

ITN 4B 06—ELECTRICAL AND ELECTRONIC INSTRUMENTATION

(2018 Admissions)

Time : Three Hours   Maximum : 80 Marks

Section A (Objective Type Questions)

Answer **all** *questions.*

1 mark each.

1. A 100 Ω resistor is to be used in a circuit carrying a current of 0.5A. Its power rating should be ————— watt.

    (a) 50.   (b) 25.

    (c) 200.   (d) 500.

2. While Thevenizing a circuit between two terminals, V_{th}, equals —————.

    (a) Short-circuit terminal voltage.

    (b) Open circuit terminal voltage.

    (c) Net voltage available in the circuit.

    (d) None of the above.

3. The maximum power is delivered from a source to its load when the load resistance is ————— the source resistance.

    (a) Greater than.   (b) Less than.

    (c) Equal to.   (d) Less than or equal to.

4. The sensitivity of a voltmeter is given by the :

    (a) Ohms/Volt.

    (b) Reciprocal of full scale deflection current.

    (c) Both (a) and (b).

    (d) None of the above.

Turn over

5. The function of shunt in an ammeter is to :

   (a)   By pass the current.

   (b)   Increase the sensitivity of the ammeter.

   (c)   Increase the resistance of the ammeter.

   (d)   None of the above.

6. Basic principle of a Q-meter is :

   (a)   Electromagnetic induction.

   (b)   Kirchhoffs voltage law.

   (c)   Series resonance.

   (d)   Wheat stones principle.

7. An oscilloscope caiinot be used to indicate :

   (a)   Voltage.   (b)   Energy.

   (c)   Wave shape.   (d)   Frequency.

8. In a Dual trace CRO ———— used to generate two traces.

   (a)   One electron beam is.

   (b)   Two electron beams are.

   (c)   Two vertical amplifiers are.

   (d)   None of the above.

9. A digital multimeter suffer ———— from electric noise.

   (a)   More.   (b)   Less.

   (c)   Free.   (d)   None of the above.

10. An instrument which generates different types of waveforms are called :

   (a)   Digital storage oscilloscope.

   (b)   Phase shift oscillator.

   (c)   Function generator.

   (d)   Square wave generator.

                                                          $(10 \times 1 = 10$ marks$)$

Section B

Short answers type questions (one or two sentences each).

Answer **ten** (2 *marks*).

11. What is an ideal-constant voltage source ?

12. State Thevenin's theorem.

13. What is Kirchhoffs current law ?

14. Sketch and explain a shunt type ohmmeter,

15. What are thermal type watt meters ?

16. What are the advantages of Hay's bridge ?

17. A 2mA meter with an internal resistance of 100 Ω is to be converted to 0 – 150 mA ammeter. Calculate the value of the shunt resistance required.

18. What is meant by the loading effect of the voltmeters ?

19. Briefly explain electronic voltmeters.

20. Explain the principle and operation of Hall effect.

21. Give an account of Analog phase meter.

22. Explain the use of multimeter for resistance measurement.

(10 × 2 = 20 marks)

Section C (Paragraph Type Questions)

Answer any **six** *questions.*

5 *marks each.*

23. State and explain superposition theorem.

24. Briefly explain Delta/ Star transformation.

25. With a diagram explain the principle of moving coil galvanometer.

26. Draw and explain Analog frequency meter.

27. Distinguish between Dual trace CRO and Dual beam CRO.

28. Draw and explain digital phase meter.

29. With a suitable diagram, explain DC ammeter.

30. Explain the calibration of the shunt type Ohmmeter.

31. State and explain the compensation theorem.

(6 × 5 = 30 marks)

Section D (Essay Type Questions)

Answer any **two** *questions.*

10 *marks each.*

32. State and prove Norton's theorem.

33. Explain : (a) Digital Storage Oscilloscope ; and (b)Transistor voltmeter.

34. Give an account of : (a) Maxwell's inductance bridge ; (b) Triggered sweep in a CRO.

35. With a relevant diagram explain the principle and working of : (a) Standard signal generator ; (b) Function generator.

(2 × 10 = 20 marks)