M.Sc. (Semester—II) (CBCS Scheme) Examination

2-PHY-4(I) : PHYSICS

(Network Theorems and Solid State Devices)

Time : Three Hours] [Maximum Marks : 80

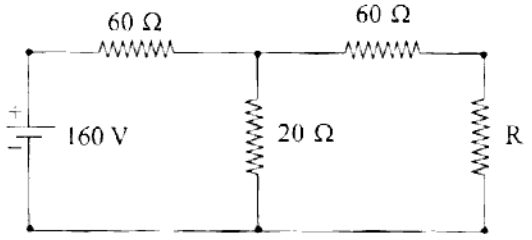
N.B. :— All questions are compulsory and carry equal marks.

EITHER

1. (A) What are passive components ? Explain the functions of Capacitor and Inductor in an electric circuit. 5

(B) State and explain Kirchhoff's Voltage and Current law with sign conventions. 6

(C) Find the value of 'R' in the circuit given below for transferring maximum power in it. What is the amount of this power ? 5

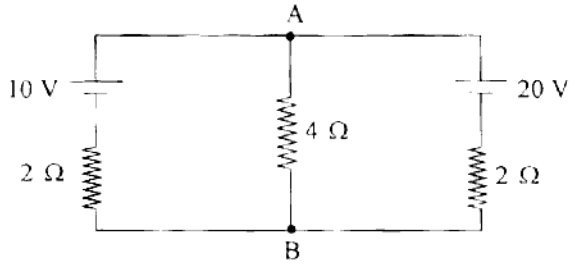


OR

(P) Discuss the various steps involved for solving network by using Norton's theorem. 5

(Q) State and prove Maximum power transfer theorem. 5

(R) Find the current through '4Ω' resistor in the circuit below, using superposition theorem : 6



EITHER

2. (A) Explain the working of p-n junction diode under forward and reverse bias. 4

(B) Explain the principle and construction of n-channel enhancement MOSFET. 4

(C) Explain the use of UJT as time-base generator. 4

(D) Explain the terms Depletion region and Potential Barrier. 4

OR

(P) Discuss an avalanche breakdown and zener breakdown. 4

(Q) Distinguish between BJT and JFET. 4

(R) Give the construction and uses of LED. 4

(S) A battery of 10 V is connected between bases of Silicon UJT. Intrinsic stand off ratio of UJT is 0.4. Find the value of peak point voltage. 4

EITHER

3. (A) Explain construction, working and characteristics of SCR. 8

(B) Explain with neat circuit diagram, the working of bridge rectifier. Obtain an expression for its ripple factor. 8

OR

(P) Explain in brief construction, working and characteristics of TRIAC. 8

(Q) Explain with circuit diagram, the working of full wave rectifier using two diodes. Show that the maximum rectification efficiency of FWR is 81.2%. 8

EITHER

4. (A) Describe Class A, Class B and Class C operation of transistor amplifier, using loadline and operating point. 6

(B) What are different types of Noise ? Explain thermal noise and shot noise. 6

(C) A voltage gain of the amplifier is reduced from 60 to 15 due to negative feedback. What is feedback factor ? 4

OR

(P) What are positive and negative feedback in amplifier ? Obtain an expression for transfer gain with feedback. 6

(Q) Explain the input and output characteristic of BJT. 6

(R) Explain the concept of Current Feedback and Voltage Feedback. 4

EITHER

5. (A) Explain active transducer and passive transducer. Describe construction and working of condenser microphone. 8

(B) Explain the principle, construction and working of LVDT with suitable diagram. 8

OR

(P) Explain with suitable block diagram, the construction and working of function generator. 8

(Q) Draw block diagram of general purpose CRO. Explain the use of time base signal in CRO. State advantages of CRO. 8