53 (IE 301) NWTH

2013

(May)

NETWORK THEORY

Paper : IE 301

Full Marks : 100

Pass Marks : 30

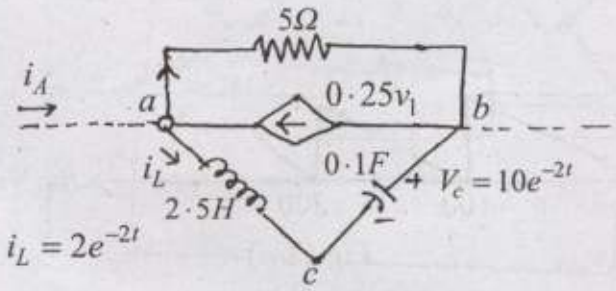
Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer ***any five*** *questions out of* ***seven.***

1. *(a)* State the Kirchhoff's Voltage Law and explain with the help of an example. 4

   (b) For the circuit shown in the *Fig.*(1.*b*), find the current i_A and v_{ab}. 6



Fig(1.*b*)

Contd.

(c) Find the power loss in 1Ω resistor of *Fig.*(1.c) 10

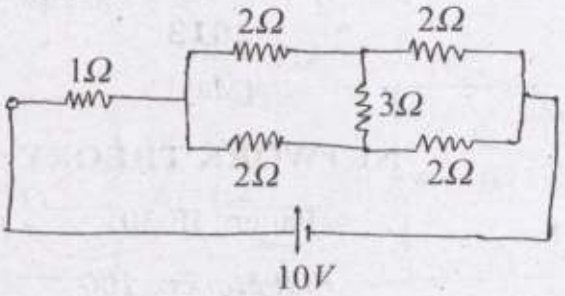


Fig.(1.c)

2. (a) A periodic voltage waveform has been shown in *Fig.*(2.a). Determine —

(i) frequency of the waveform

(ii) wave equation for $0 < t < 100\,msec$

(iii) r.m.s. value

(iv) average value

(v) form factor. 10

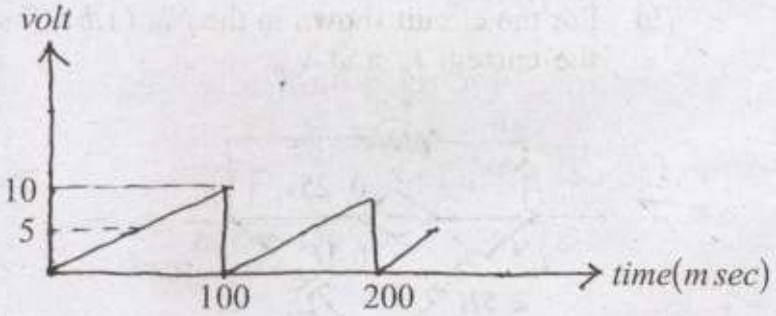


Fig.(2.a)

(ii) According to the passage, what is being damaged? 2

(a) Motorcycles

(b) the desert landscape

(c) Roads through the desert

(d) New plant species

(iii) According to the passage, the damage to plant is 2

(a) unnoticeable

(b) superficial

(c) long-lasting

(d) irreparable

(iv) According to the passage, what happens when the soil is compacted? 2

(a) little water seeps through

(b) better roads are made

(c) water is conserved

(d) deserts are expanded

(v) What is happening to the desert hillsides ? 2

(a) the topsoil is being eroded.

(b) the surface is being irrigated.

(c) there are fewer types of plants growing on them.

(d) there are fewer streams running through them.

(vi) According to the passage, what is happening to native plants in these areas ? 2

(a) they are becoming more compact.

(b) they are adapting

(c) they are invading other areas

(d) they are dying.

(vii) It can be inferred that which of the following people would probably be most alarmed by the scientists' findings ? 2

(a) historians

(b) mapmakers

(c) farmer

(d) ecologists.

(viii) What is the central idea of the given passage ? 2

(ix) According to the passage, how is the desert landscape damaged ? 2

(x) Give a suitable title to the given passage. 2

2. Write an essay from the following topics : ***(any two)*** 10×2=20

(i) Technical education

(ii) Social service

(iii) The sorrows and joys of life.

3. (a) Give *two* situations each for the following barriers mentioned : 5×2=10

(i) Variation in background and language

(ii) Wrong inferences.

(b) Transcribe the following words using IPA symbols. 5×2=10

(i) pen

(ii) boy

(iii) table

(iv) good

(v) both.

4. (a) Fill in the blanks with appropriate preposition : 5×1=5

(i) The plane flies from Delhi ——— Dubai.

(ii) I was born ——— 4th July, ———3pm ——— 1965.

(iii) He died ——— heart failure.

(b) Use single word for the following statements : 5×1=5

(i) friendly and pleasant

(ii) the art of beautiful handwriting

(iii) one who eats human flesh

(iv) A person who loves book

(v) A detailed narrative.

(c) Give the antonyms and synonyms of the following words : 5×2=10

(i) elegant

(ii) concrete

6. *(a)* Find the value of L so that the circuit shown in *Fig.* (6.*a*) is in resonance. 10

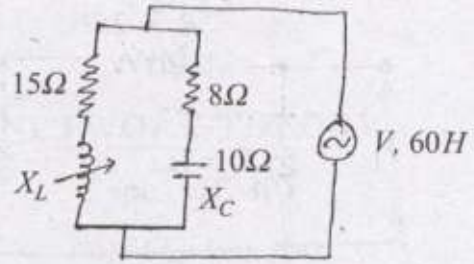


Fig.(6.*a*)

(b) A Δ connected load has a parallel combination of resistance (5Ω) and capacitive reactance ($-j5\Omega$) in each phase. If a balanced 3 phase $400V$ supply is applied between lines find the phase current and line currents. (*Fig.* 6.*b*) 10

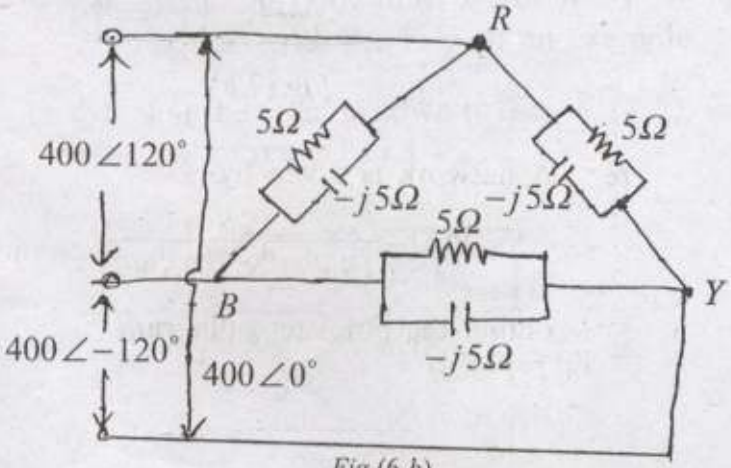


Fig.(6.*b*)

7. *(a)* Determine the Z parameters of the circuit of *Fig.*(7.*a*) : 10

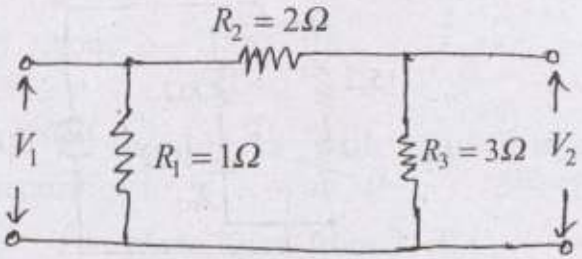


Fig.(7.*a*)

(b) Find the driving point impedance for the network shown in *Fig.*(7.*b*). 5

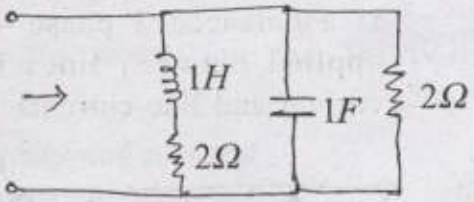


Fig.(7.*b*)

(c) A network is given by

$$P(S) = \frac{2S}{(S+2)\left(S^2+2S+2\right)}$$

obtain the pole–zero diagram. 5
