RAS(M) 2012

FOR EVALUATOR'S USE ONLY

Sub. Code : **13**

Optional Paper

Electrical Engineering : Paper – II

Time : 3 Hours / Maximum Marks : **200** / Total Pages : **32**

Evaluation Table (For Evaluator's Use Only)

PART-A				PART-B				PART-C			
QN	E-1	E-2	AC	QN	E-1	E-2	AC	QN	E-1	E-2	AC
1				21				33			
2				22				34			
3				23				35			
4				24				36			
5				25				37			
6				26				38			
7				27				39			
8				28							
9				29							
10				30							
11				31							
12				32							
13											
14											
15											
16											
17											
18											
19											
20											
Total											
Evaluator's Sign											

Grand Total	
PART-A	
PART-B	
PART-C	
Total	
(–) Marks	
Final Total	

Marks in Words

Remarks of Evaluator/Chief Evaluator

Remarks of Scrutiniser

06 / 13-II

BLANK PAGE

PART – A

Marks : 40

Note : Attempt all the **twenty** questions. Each question carries 2 marks. Answer should not exceed **15** words.

1 Write down the condition for maximum power transfer from a source network to a variable load whose power factor can not be changed.

2 If a network has b, branches and n, nodes. What is the number of independent KVL equations ?

3 Write down the conditions of reciprocity and symmetry of a two-port network in terms of A, B, C, D parameters.

4 Write the name of transducers by which the following quantities can be measured : 7

(i) Displacement

(ii) Pressure

(iii) Frequency

(iv) Time

8

5 Define phase angle error for instrument transformer.

9 In

6 What is the purpose of Megger ?

measured :

7 What is piezo-electric transducer ?

8 What do you understand by "Phantom Loading" ?

9 In two Wattmeter method for measurement of power in three phase system, one Wattmeter gives negative indication. What is its interpretation ?

10 What is an I.G.B.T. ?

11 Draw a schematic diagram of an integrator using Op-Amp.

12 Draw the two transistor analogy of SCR.

13 Define the transfer function.

14 Define the gain crossover and phase crossover frequencies.

15 Write properties of state transition matrix.

16 Convert $(253)_{10}$ to Hexadecimal number.

19

17 Draw EX-OR gate using NAND gates.

20 On

18 Multiply $(1101.10)_2$ by $(0101.11)_2$.

19 What is Accumulator in 8085 microprocessor ?

20 On the basis of data entered and retrieved, classify the registers.

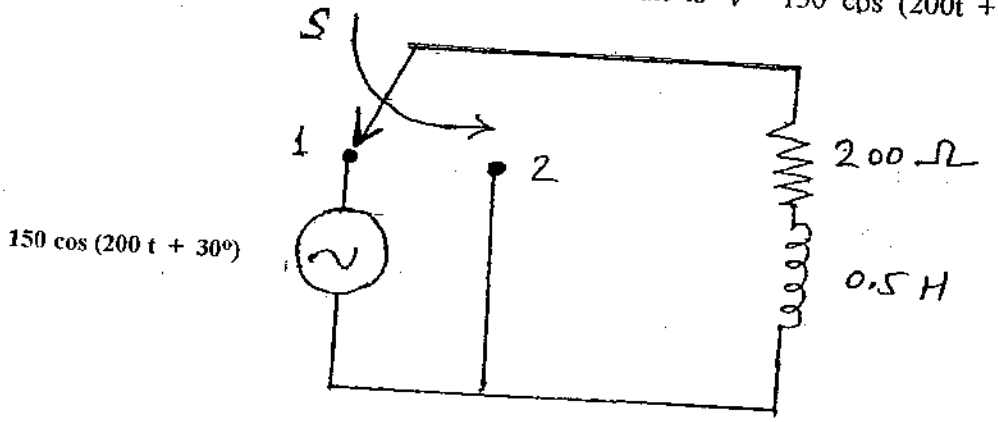
PART – B

Marks : 60

Note : Attempt all the **twelve** questions. Each question carries 5 marks. Answer should not exceed 50 words.

22

21 For the circuit shown in figure determine the transient current when the switch is moved from position 1 to position 2 at t = 0. The circuit is in steady state with the switch position 1. The voltage applied to the circuit is $v = 150 \cos (200t + 30^\circ)$ V.



Marks : 60

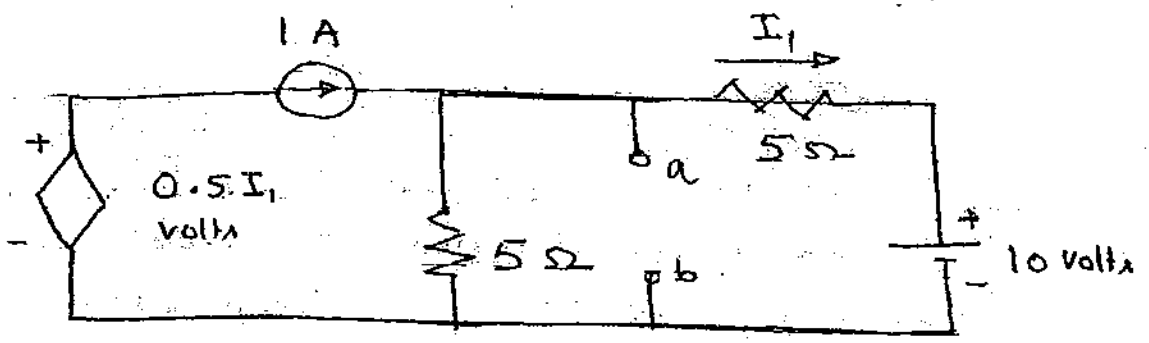
nswer should

the switch is
state with the
)0t + 30°) V.

Ω

H

22 For the circuit shown, find Thevenin's voltage and Thevenin's equivalent resistance across the terminal a and b.



23 A moving coil instrument gives a full scale deflection of 10 mA when the potential difference across its terminals is 100 mV. Calculate (a) the shunt resistance for a full scale deflection of 100 A. (b) the series resistance for full scale reading with 1000 V. Calculate the power dissipation in each case. 25

24 What is the difference between Resistance Thermometer and Thermistor. Write down their applications. 26 Brief

the potential
nce for a full
with 1000 V.

25 What are the limitations of strain gauge ?

rite down their

26 Briefly explain the four-quadrant operation of a dc motor drive.

27 For variable frequency control of induction motor (a) for speed below base speed, the (V/f) ratio is maintained constant, why ? (b) For speed above base speed, the terminal voltage is maintained constant, why ?

28 Draw the circuit diagrams and write transfer functions of the following :

(i) Lag compensator

(ii) Lag-lead compensator.

29 D
is

G

(i)

(ii)

30 Describe

ase speed, the
d, the terminal

29 Determine the following for a given control system whose open loop transfer function is given as :

$$G(S)H(S)=\frac{K(S+1)}{(S+4)\left(S^2+2S+2\right)}$$

(i) Break away point

(ii) Point of intersection with imaginary axis.

30 Describe the logic diagram of a 4-bit ring counter.

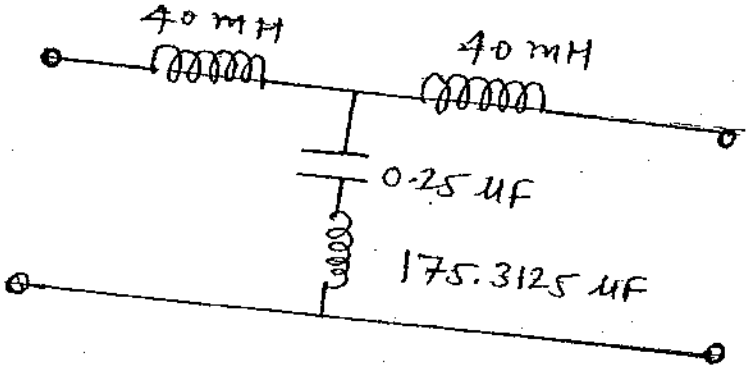
31 Prove that $A + \overline{A}B = A + B$

32 Draw the programming model of 8085 microprocessor.

PART – C

Note : Attempt any 5 questions. Each question carries 20 marks. Answer should not exceed **200** words. **Marks : 100**

33 In the figure shown a T-section of an m-derived LP filter the parameters of the filter are given. Calculate (a) K, (b) m, (c) L and C of the prototype constant K-LP filter (d) cut off frequency and (e) resonant frequency. Also compute the parameters of the π-section of this m-derived LP filter.



Marks : 100

should not exceed

eters of the filter
istant K-LP filter
parameters of the

34 What are the problems associated with low resistance measurement ? Explain the working of Kelvin's Double bridge. How effect of contact resistance of leads is eliminated ?

in the working
; eliminated ?

35 What is Strain Gauge ? A single strain gauge having resistance of 120 ohms is mounted on a steel cantilever beam at a distance 0.15 m from the free end. An unknown force, F is applied at the free end produces a deflection of 12.7 mm of the free end. The change in gauge resistance is found to be 0.152 ohms. The beam is 0.25 m long with a width of 20 mm and depth of 3 mm. The Young's modulus for steel is 200 GN/m^2. Calculate gauge factor.

unted
force,
hange
width
culate

36 Describe the operation of single phase fully controlled bridge converter with source inductance.

ource

37 Derive the transfer function of armature controlled dc servo motor. State the assumptions made.

38 Interface 1024 (1 K) bytes of R/W memory to an 8085 system, with the memory map from 3000 H to 33 FFH. Use 2114 (1024 × 4) memory chips and the 74 LS B8 (3 to 8 decoder)

ry map
LS B8

39 Draw logic diagram of a BCD ripple counter and explain its working clearly.

SPACE FOR ROUGH WORK / रफ कार्य के लिए जगह