



Remarks: No. of pages: 2 No. of questions: 6 Allowed Tables and Charts: (None)  
 Assume any required data

Answer the following Questions [100Mark] (أجب عن الأسئلة التالية ( 100 درجة )

Question (1)	(20Marks)	Marks
[a]	Compare between power electronics controlled switches Thyristor, GTO, BJT, MOSFET and IGBT from point of view basic of operation, Ratings, switching frequency, commutation and best applications.	[7]
[b]	The thyristor in fig. (1), is used to control power delivered to the load, supply voltage is DC source with 400 V, maximum allowable $di/dt$ and $dv/dt$ for thristor are $50 \text{ a}/\mu\text{sec}$ and $200 \text{ v}/\mu \text{ sec}$ respectively. Determine the values of the inductor " L " and snubber circuit components $R_s$ and $C_s$ .	[13]

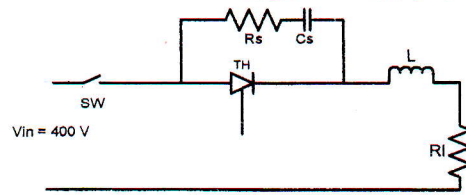


Fig.1

Question (2)	(25Marks)	Marks
[a]	Discus the fault finding procedure in power electronic circuits and fault clearance steps for section of the circuit?	[5]
[b]	A full bridge single phase inverter shown in fig.2 used to fed a load with 1 Kw, supplied from solar cell system. the load parameters are: 220 volt, 50 Hz, at duty cycle with turn on time 0.01 sec. for all switches, power factor 0.85 and ripple voltage 5 % of output and ripple current is 20 % of load current. Assume the transformer loaded by 80 % of full load power. Design the inverter to choose all switches data and inductance, capacitor at output terminals.	[20]

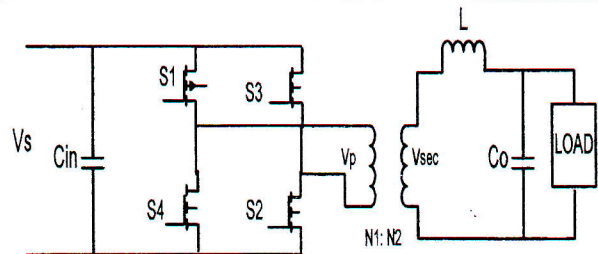


Fig. 2

Question (3)	(25Marks)	Marks
[a]	An AC Fly back Converter shown in the figure(3) with input power 100 W, input voltage 35v,output voltage 35v, line frequency 60 hz at maximum duty cycle 0.5 and the switching frequency is 12 khz. The converter is an ideal one. design the fly back converter to choose the inductance $L_m$ , output capacitor, the input power factor at full load and the parameter of the input filter and Calculate the output voltage transferred to transformer primary side and the turns ratio. Assume that the input filter capacitor is $20 \mu \text{ F}$ , the maximum current at primary side 10.5A and the output voltage ripple 2v.	[25]

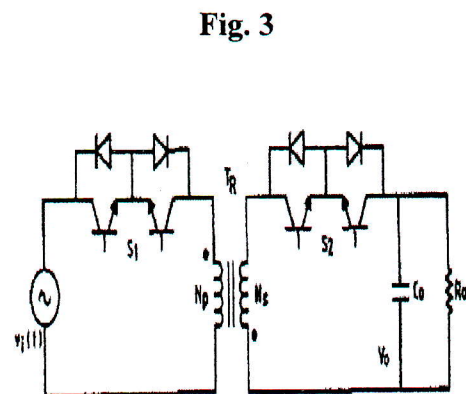
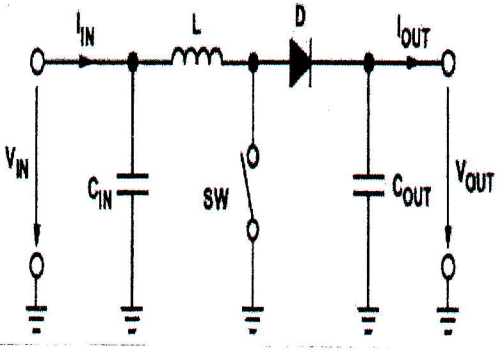


Fig. 3

**Question (4)**

**(30Marks)**

**Marks**

[a]	Discuss the principle of operation of cyclo-converter ?	[10]
[b]	<p>The DC- DC switching boost converter will take a 5 Volt DC voltage supply and deliver 15 Volts to the load . The maximum current delivered to the load will be 0.4 A . The switching frequency of the MOSFET equal 50 KHZ and inductor ripple current will be 10% of the output current . The output voltage ripple will be 5% of the output voltage . Design the power circuit of this Boost Converter .</p>	 <p style="text-align: center;">Fig . 4-a</p>

Field	National Academic Reference Standard(NARS)								
	Knowledge & Understanding				Intellectual Skills	Professional Skills			General Skills
Course ILOs	a-4-1	a-8-1	a-8-2	a-19-1	b-2-1	c-13-1	c-13-2	c-17-1	-----
Question No.	1(a), 3(a)	1(b), 3(a),	1(b), 2(a,b), 4(a,b),	2(a), 3(a),	3(a),	1(b), 2(a),	3(a),	2(a), 3(a), 4(b),	-----

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