Sample paper: ESE: Power Electronics Systems Design-April 2021

* Required

1. Email address *

   _____

Academic Year: 2020-21		
Subject: Power Electronic System Design		
Semester: M.E.I (CBCS)	Branch: Electronics Engineering	
Date: 11/4/2021	Time: 2:30PM-4:30PM	Marks: 80

Theory Examination

Instructions: 1) All questions in Q1 are Multiple Choice Questions.

2) Select the correct answer from the choices.

3) Upload the answers in PDF format for Q2 and Q3.

2. Name: *

   _____

3. Email address: *

   _____

4. Class: *

   _____

Q.1 All questions are compulsory. Each question carries 2 marks.

5.   1. The Silicon Controlled Rectifier (SCR) can be turned on by *

Mark only one oval.

( ) decreasing dv/dt above rated

( ) reducing breakover voltage

( ) By applying sharp rising pulse at anode

( ) increasing dv/dt above rated value

6.   2. Which among the following power devices has highest current and voltage handling capability? *
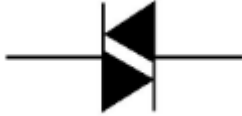
Mark only one oval.

( ) power BJT

( ) power MOSFET

( ) SCR

( ) IGBT

7.   3. The minimum requirement to turn on IGBT is *

Mark only one oval.

( ) Vds>0, Ig>Igth

( ) Vds=0, Ig<0

( ) Vds<0, Ig>0

( ) Ig>0

8.   4. This symbol is for *

Mark only one oval.

    ◯ TRIAC

    ◯ DIAC

    ◯ SCR

    ◯ IGBT

9.   5. The advantage of class B commutation circuit over class A is that *

Mark only one oval.

    ◯ On time of SCR is controllable

    ◯ Off time of SCR is controllable

    ◯ SCR carries the load current

    ◯ commutation circuit does not carry the load current.

10.   6. The advantage of auxiliary commutation circuit over other classes of commutation circuits is *

Mark only one oval.

    ◯ On time of SCR is controllable

    ◯ Off time of SCR is controllable

    ◯ Commutation circuit does not carry the load current

    ◯ On time and off time of SCR controllable and commutation circuit does`t carry load current

11.　7. Which of the following triggering method doesn`t allow change in firing angle of SCR beyond 90 degrees? *

Mark only one oval.

　⭕ R triggering

　⭕ RC triggering

　⭕ UJT triggering

　⭕ cosine triggering

12.　8. Which among these can be used for over current protection of SCR? *

Mark only one oval.

　⭕ FACLF

　⭕ MOV

　⭕ snubber circuit

　⭕ zener diode

13.　9. Inductor is used in series with SCR for *

Mark only one oval.

　⭕ overcurrent protection

　⭕ overvoltage protection

　⭕ high dv/dt

　⭕ high di/dt

14.   10. The major sources of Electromagnetic Interference in power circuits are *

Mark only one oval.

- ( ) high current flowing in circuits
- ( ) high dv/dt and high di/dt
- ( ) derating of power devices
- ( ) low frequency operation

15.   11. Snubber circuit used to limit dv/dt of SCR consists of_____ and is connected in_____ with SCR. *

Mark only one oval.

- ( ) resistor in parallel to capacitor, series
- ( ) resistor in series with a capacitor, parallel
- ( ) only resistor, series
- ( ) MOV, paralle

16.   12. The capacitance of reverse biased junction of the SCR is 25µf. The limiting value of charging current to turn on the SCR is 16mA. Find the critical value of dv/dt of SCR is *

Mark only one oval.

- ( ) 800V/µsec
- ( ) 640V/µsec
- ( ) 460V/µsec
- ( ) 500V/µsec

17.   13. The two common EMC issues are *

Mark only one oval.

( ) emission and susceptibility

( ) high current and voltage fluctuations

( ) high frequency

( ) derating of components

18.   14. Anti-saturation protection circuit for BJT is used for *

Mark only one oval.

( ) temperature protection

( ) reducing switching time

( ) increasing current capability

( ) decreasing di/dt

19.   15. Heatsinks are used for *

Mark only one oval.

( ) temperature protection

( ) reducing dv/dt

( ) reducing di/dt

( ) reducing EMI issues

20.   16. In single phase ac voltage controller with R load *

Mark only one oval.

     ◯ only positive cycle can be controlled

     ◯ both cycles can be controlled

     ◯ only negative cycle can be controlled

     ◯ control over 90 degree is possible

21.   17. A _____ distribution system is more reliable than the _____ distributionsystem. *

Mark only one oval.

     ◯ parallel, radial

     ◯ parallel, ring

     ◯ radial, parallel

     ◯ ring, parallel

22.   18. Which block is mandatory in Matlab simulink for power electronics simulations? *

Mark only one oval.

     ◯ FFT analysis

     ◯ powergui

     ◯ powergrid

     ◯ scope

23.   19. _____is a program to simulate analog and digital logic circuits. *

Mark only one oval.

( ) PSpice

( ) Matlab

( ) Scilab

( ) NS3

24.   20. 3 phase controlled rectifier consists of _____diodes and _____SCRs. *

Mark only one oval.

( ) 0,6

( ) 6,0

( ) 3,3

( ) 6,6

Q2. Solve any 2 out of 3. (10 marks each)

25.   1. Explain 3 phase controlled rectifier with R load. 2. Explain distributed generation
system with block diagram. 3. Differentiate between various types of simulation
platforms used in power electronics designs. *

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Q3. Solve any 2 out of 3. (10 marks each)

26.   1. What is Heun`s method? Given a initial value problem y(1)(t)=1-t.y(t) with y(0)=1
use Heun `s method to approximate y(1) and y(0.5). Use step size h=1. 2. Explain
parallel operation of inverters in master and slave mode of control. 3. Explain PID
controlled closed-loop control system of AC/DC converter. Also comment on its
stability with first order load. *

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