

**DECEMBER 2019**

**EXAMINATION TIME TABLE  
PROGRAMME - B.E. (Electronics ) (Choice Based)  
SEMESTER - VII**

<b>Days and Dates</b>	<b>Time</b>	<b>Paper Code</b>	<b>Paper</b>
Thursday, November 14, 2019	10:30 a.m. to 01:30 p.m.	42551	Instrumentation System Design Power
Monday, November 18, 2019	10:30 a.m. to 01:30 p.m.	42552	Electronics
Wednesday, November 20, 2019	10:30 a.m. to 01:30 p.m.	42553	Digital Signal Processing
Friday, November 22, 2019	10:30 a.m. to 01:30 p.m.	42554	Department Level Optional courses III: Neural Network & Fuzzy Logic
Friday, November 22, 2019	10:30 a.m. to 01:30 p.m.	42555	Advance Networking Technologies
Friday, November 22, 2019	10:30 a.m. to 01:30 p.m.	42556	Robotics
Friday, November 22, 2019	10:30 a.m. to 01:30 p.m.	42557	Integrated Circuit Technology Institute
Tuesday, November 26, 2019	10:30 a.m. to 01:30 p.m.	42558	Level Optional Course-I :- Product Life Cycle Management
Tuesday, November 26, 2019	10:30 a.m. to 01:30 p.m.	42559	Reliability Engineering Management
Tuesday, November 26, 2019	10:30 a.m. to 01:30 p.m.	42560	Information Systems Design of
Tuesday, November 26, 2019	10:30 a.m. to 01:30 p.m.	42561	Experiments Operations Research
Tuesday, November 26, 2019	10:30 a.m. to 01:30 p.m.	42562	Cyber Security Laws
Tuesday, November 26, 2019	10:30 a.m. to 01:30 p.m.	42563	Disaster Management & Mitigation Measures
Tuesday, November 26, 2019	10:30 a.m. to 01:30 p.m.	42564	Energy Audit & Management
Tuesday, November 26, 2019	10:30 a.m. to 01:30 p.m.	42565	Development Engineering
Tuesday, November 26, 2019	10:30 a.m. to 01:30 p.m.	42566	

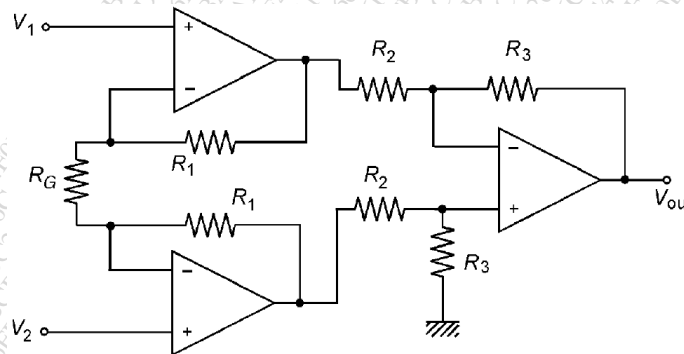
(3 hours)

[Total Marks: 80]

Note:

1. Question-1 is compulsory.
2. Answer any three questions from remaining five.
3. Assume suitable data if necessary.
4. Numbers in the right indicate marks.

1. Answer the following questions. (Each question carry 5 marks) 20
  - (a) Distinguish between linear valve and equal percentage valve.
  - (b) Draw circuit diagram of a basic RC band-pass filter. Sketch its frequency response clearly showing the expressions for cut-off frequencies.
  - (c) Describe any two discontinuous controller modes.
  - (d) What are two PLC operation modes? Describe both modes in brief.
2. (a) Draw basic pneumatic system and describe its components. 10  
 (b) Illustrate the working of V-to-I and I-to-V converters with neat circuit diagrams. 10
3. (a) Consider the instrumentation amplifier shown in figure below. Derive the expression for  $V_{out}$  and compute the resistors for the gain of 101. 10



- (b) What are the criteria for selecting controller mode for a given process? Describe the ratio controller with clearly specifying the types of processes for which it is used. 10
4. (a) An integral controller is used for speed control with a setpoint of 12 rpm within a range of 10 to 15 rpm. The controller output is 22% initially. The integral gain  $K_I = -0.15\%$  controller output per second per percentage error. If the speed jumps to 13.5 rpm, calculate the controller output after 2s for a constant  $e_p$ . 10  
 (b) Draw the basic structure of PLC and describe its components in detail. 10

[TURN OVER]

- 5. (a) Develop the physical ladder diagram for a motor with the following: NO start button, NC stop button, thermal overload limit switch opens on high temperature, green light turns on when running, red light turns on for thermal overload. 10
  - (b) What is a Data Acquisition System (DAS)? Describe, with clear diagram, working of a typical DAS. 10
  - 6. Answer any two of the following questions. 20
  - (a) Write a short note on SCADA.
  - (b) What is the scope of standard NEMA 250? Describe its features in brief.
  - (c) List any five SAMA symbols. Draw clear symbol with brief description.
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Time: 3 Hours

Total Marks: 80

NB: (1) Question No. 1 is compulsory.

(2) Attempt any three questions from remaining five questions.

(3) Assume suitable data if required but justify the same.

(4) Figures to the right indicate full marks

- Q.1. Attempt any four from following 20
- a Describe different modes of operation of SCR with the help its static V-I characteristics and explain what is holding current and latching current.
  - b Explain single phase full-bridge inverter with R load.
  - c Explain with the help of neat circuit diagram and waveforms what the effect of freewheeling diode is on the performance of single phase half wave controlled rectifier with RL load.
  - d What are turn on methods of SCR? What are the basic requirements for successful turn on of SCR? Which is the best method of SCR triggering explain why?
  - e Describe the principle of on-off control and phase control.
- Q.2. a Draw ramp and pedestal trigger circuit used for single phase semi converter. 10  
Describe its operation with appropriate waveforms
- b What are turning off methods of SCR. Explain the Class D commutation 10  
method with the help of neat circuit diagram and waveforms, also give the design concepts of class D commutation.
- Q.3. a Discuss the effect of source inductance on the performance of single phase 10  
fully controlled converter, indicating clearly the conduction of various thyristors during one cycle. Derive an expression for its output voltage in terms of
- (1) Maximum voltage  $E_m$ , Firing angle  $\alpha$  and overlap angle  $\mu$ .
  - (2)  $E_m$ ,  $\alpha$ ,  $L_s$  (source inductance) and  $I_d$  (load current).
- b A single phase fully controlled bridge converter supplies an inductive load. 10  
Assuming that the output current is virtually constant and is equal to  $I_d$ , determine the following performance measures, if the supply voltage is equal to 230 V and if the firing angle is maintained at  $(\pi/6)$  radians.
- (i) Average output voltage (ii) Supply RMS current (iii) Supply fundamental RMS current (iv) Fundamental power factor (v) Supply power factor
  - (vi) Supply harmonic factor (vii) Voltage ripple factor

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- Q.4. a Draw and explain the basic series inverter circuit employing class A type commutation. Draw and discuss the important waveforms. State the limitations of this series inverter. **10**
- b A single phase full bridge inverter is operated from a 48 V battery and is supplying power to a pure resistive load of  $10 \Omega$ . Determine **10**
- (i) Fundamental output voltage and the first five harmonics.
  - (ii) RMS value by direct integration method and harmonic summation method.
  - (iii) Output RMS power and output fundamental power.
  - (iv) Transistor switches ratings.
- Q.5. a Draw the schematic of step-up and step-down choppers and derive an expression for output voltage in terms of duty cycle for a step-up and step-down chopper. **10**
- b The input voltage to the boost DC-DC switch mode regulator is 6 V. The average output voltage is 18 V and the average load current is 0.4 A. The switching frequency is 20 KHz of  $L = 250 \mu\text{H}$  and  $C = 420 \mu\text{F}$ . Determine **10**
- i) The duty cycle  $\alpha$ , ii) The ripple current of inductor, iii) The peak current of inductor, and iv) The ripple voltage of filter capacitor
- Q.6. Write a short note on **any three** of the following. **20**
- (i) Single phase cyclo-converter
  - (ii) Battery charging systems
  - (iii) Static characteristics of IGBT
  - (iv) Protection of SCR against  $dv/dt$ ,  $di/dt$ , over current and over voltage.

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(3 Hours)

[Total Marks: 80]

**NOTE:-1) Question 1 is compulsory**

- 2) Solve **any three** from the remaining five questions
- 3) Assume suitable data if necessary.
- 4) Figures to the right indicate full marks

- Q.1. a.** What is the need of multirate processing? Give some examples of multirate digital systems. **20**
- b.** What is Digital Signal Processor and explain it's basic characteristics.
- c.** What is the relation between digital and analog frequency in impulse invariant transformation .What is aliasing ?
- d.** What do you mean by overflow limit cycles ? How it can be avoided?
- Q.2. a.** Design a high pass filter using Hamming window with cut off frequency of 1.2 rad/sec and number of coefficients =9. **10**
- b.** Explain Gibb's phenomenon in FIR filter design. **10**
- Q.3. a.** Explain frequency warping effect in BLT in detail. **10**
- b.** The digital filter with system function  $H(z) = \frac{0.5Z}{z-0.5}$  Find the output noise power from digital filter when input is quantized to have 8- bits. **10**
- Q.4. a.** Explain the application of DSP in speech. **10**
- b.** Explain how higher throughput is obtained in DSP using the VLIW architecture. **10**
- Q.5. a.** Find DFT of  $x(n)=2^n$  using the 8-point DIT-FFT algorithm. **10**
- b.** Develop a radix -2 DIF -FFT algorithm for computing 8 point DFT. **10**
- Q.6. a.** Explain in detail polyphase decomposition. **10**
- b.** What is the need for multistage filter implementation. Explain it's drawbacks. **10**

( 3 Hours )

[ Total Marks: 80 ]

- N.B.:** 1. **Question No. 1 is compulsory.**  
2. Answer **any three** from remaining questions.  
3. **All questions carry equal marks.**

Q. 1 Answer **any four**:

20

- What is need for Wireless Sensor Network (WSN)? Mention applications.
- How cell switching is done in Asynchronous Transfer Mode (ATM).
- Explain the steps for completing access layer design.
- What is IEEE 802.15.3a Ultra Wide Band (UWB)?
- Differentiate between unicast routing and multicast routing protocols.

Q.2 (a) With a neat diagram explain Bluetooth protocol stack with neat diagram.

10

(b) Explain network security threats and safeguards in detail.

10

Q. 3 (a) What is Remote Monitoring (RMON)? Explain the benefits of RMON.

10

(b) Bring out the advantages of optical networking with a neat diagram, explain SONET hardware components.

10

Q.4 (a) Enlist and explain various deployment models of cloud computing.

10

What are key drivers to adoption of cloud?

(b) Draw and explain Dense Wavelength Division Multiplexing (DWDM) architecture in detail.

10

Q.5 (a) Explain 802.11 Media Access Control (MAC) frame format.

10

Describe the services offered by MAC.

(b) Explain Open Shortest Path First (OSPF) protocol in detail.

10

Q.6 Write a short note on **any four** :

20

- Compare Infrastructure networks and Ad-hoc networks.
- Zigbee technology.
- Impact of cloud on users.
- Packet filtering.
- Radio Frequency Identification (RFID).

Time: 3 Hours

Marks: 80

- N:B** (1) Question 1 is Compulsory.  
(2) Attempt any three from the remaining questions.  
(3) Figures to the right indicate full marks.

- Q.1** Attempt any four **5\*4=20M**  
**A** What is information system? Explain the necessary element with neat diagram  
**B** Define Big Data and discuss its basic characteristics?  
**C** Explain the Ethical issues and threats of information security?  
**D** Describe how social computing inspires customer service  
**E** Differentiate between computer network wired and wireless technology
- Q.2 A** List the types of Information system? Explain in brief **10M**  
**B** Discuss competitive advantage achieved in Information System **10M**
- Q.3 A** Explain the architecture of Data mart and Data warehouse in an organization **10M**  
**B** Discuss the Impact of BI on Decision Making. **10M**
- Q.4 A** What are the potential benefit of social commerce to the customers and to the business? **10M**  
**B** What are major security threats to the information system? Discuss the measures taken to control information security. **10M**
- Q.5 A** Discuss the significance of social computing in marketing in detail **10 M**  
**B** What are the functional areas of Information system. Explain in detail **10 M**
- Q.6 A** Define CRM. Describe the different types of CRM **10M**  
**B** Design MIS for the Educational System **10M**

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( 3 Hours )

( Total Marks : 80 )

- N.B:** 1) **Q.1** is compulsory.  
2) Attempt **any THREE** questions from the remaining questions.  
3) Assume suitable **data** if **necessary**.

**Q.1** Attempt **any four** :

- a) Compare active attacks vs Passive attacks. [5]
- b) Explain various types of key-loggers in brief. [5]
- c) Classify the cybercrimes and explain any one briefly. [5]
- d) Explain how the appeals can be made under The IT ACT 2000. [5]
- e) Write brief note on : Cyber-terrorism. [5]

**Q.2 a)** How criminals plan the attack? Discuss various steps involved [10]

b) Explain how Intellectual property laws protect the rights of the owner of the intellectual Property. [10]

**Q.3 a)** Compare Vishing, Phishing and Smishing in cyber security. [10]

b) What is E-commerce? Explain different types of e-commerce with suitable examples. [10]

**Q.4 a)** What is Bluetooth hacking? Explain Bluetooth hacking tools in brief. [10]

b) How the Indian penal code IPC 1860 addresses cybercrime? [10]

**Q.5 a)** Discuss basic security precautions to be taken to safeguard Laptops and wireless devices. [10]

b) What is E-contract? Discuss E-contract Act 1872. [10]

**Q.6** Write short note on (**Any 2**) : [20]

- 1) Computer Sabotage.
- 2) Indian Information Technology Act 2000
- 3) Write key IT requirements for SOX and HIPAA.