F 9215 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

Branch : Electrical and Electronics Engineering

INDUSTRIAL MANAGEMENT AND ECONOMICS (E)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*
All questions carry equal marks.
Answer Part A and Part B in **separate** *answer books.*

Part A (Industrial Management)

1. (a) Explain in detail the concept of scientific management.

   (b) Explain the key benefits of motivating employees.

Or

2. (a) Explain in detail the contributions made by F.W. Taylor and Gilbreth.

   (b) Explain in detail the contributions made by Henri Fayol and Gantt.

3. (a) Explain the design of organization structure.

   (b) Briefly explain the different organization theories.

Or

4. (a) Explain in detail the principles of management.

   (b) Briefly explain the different levels of management.

5. (a) Discuss any *four* methods of pricing strategies.

   (b) List out the various factors influencing pricing.

Or

6. (a) What are the objectives of training of employees ?

   (b) Explain in detail the steps involved in training process of employees.

Part B (Engineering Economics)

7. (a) Explain supply price and supply schedule.

   (b) Explain supply curve and Elasticity of supply.

Or

Turn over

8. (a) Define national income. Explain the concept of it.

   (b) What are the methods of estimation of National Income ? Explain.

9. (a) Explain in detail different types of banks.

   (b) Compare commercial bank with State Bank of India.

Or

10. (a) Write short note on any *two* insurance companies and its policies.

    (b) Explain the peculiarities of land and labour.

11. (a) Discuss the functions of share market.

    (b) Explain the economic impact of MNC's on Indian economy.

Or

12. (a) Discuss the differences between the capital and stock market.

    (b) Define demand. Illustrate the law of demand.

F 9225 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

Branch : Electrical and Electronics Engineering

LINEAR INTEGRATED CIRCUITS (E)

(Regular/Improvement/Supplementary)

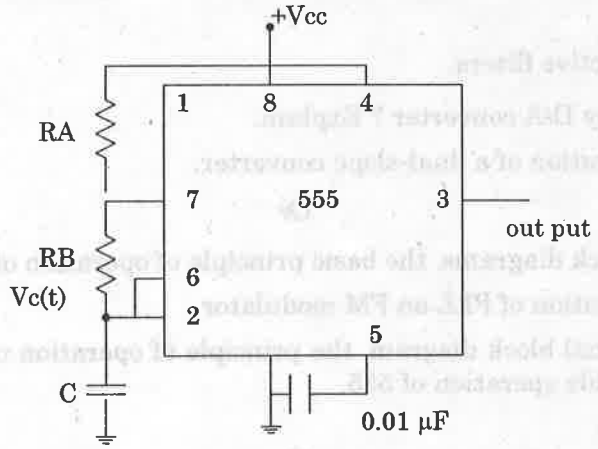
Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. List six characteristics of an ideal op-amp.
2. Explain the open loop and closed loop operation of an op-amp.
3. Define CMRR and slew rate.
4. Two signals V_1 and V_2 are combined to form an output signal $V_0 = -V_1 - 10\,V_2$. The minimum input impedance for both signal inputs should be no less than 10 kΩ. Design a circuit using op-amp.
5. Explain the working of a Schmitt trigger.
6. Sketch the ideal amplitude response of (i) low-pass ; (ii) high-pass ; (iii) band-pass ; (iv) band rejection filters.
7. Give an account of digital voltmeter.
8. Explain the basic principle of operation of PLL.
9. For an astable 555 timer design TH = 0.55 ms, TL = 0.45 ms. Select C = 0.01 μF. Determine RA and RB in the circuit shown below :



10. Draw the circuit of series op-amp regulator and briefly explain its working.

(10 × 4 = 40 marks)

Turn over

Part B

Each question carries 12 marks.

11. (a) Draw the block diagram of a typical op-amp and explain. (8 marks)

(b) Explain the operation of a voltage follower. (4 marks)

Or

12. (a) Draw the circuit of a closed loop differential amplifier using op-amp and derive the expression for output voltage. (8 marks)

(b) An inverting amplifier with an adjustable gain is desired for a particular application. The desired range of gain is from – 2 to – 12. If a 100 kΩ. potentiometer is available design a circuit to meet the requirements. (4 marks)

13. (a) Draw the circuits of and integrator and differentiator and explain its operation. (8 marks)

(b) Draw the circuit of a non-inverting summing amplifier and derive the output voltage in terms of the 3 input voltages. (4 marks)

Or

14. (a) Draw the circuit of a log amplifier and derive the expression for the output voltage. (6 marks)

(b) Draw and explain the operation of a sample and hold circuits. (6 marks)

15. (a) Explain with circuit diagram and waveforms the operation of an astable multivibrator using op-amp. (6 marks)

(b) Explain with circuit diagram and waveforms the operation of a Schmitt trigger. (6 marks)

Or

16. (a) Explain with diagrams the operating of a zero-crossing detector and peak detector. (6 marks)

(b) Write notes on active filters. (6 marks)

17. (a) What is meant by D/A converter ? Explain. (4 marks)

(b) Explain the operation of a dual-slope converter. (8 marks)

Or

18. (a) Explain with block diagrams, the basic principle of operation of a PLL. (6 marks)

(b) Explain the operation of PLL on FM modulator. (6 marks)

19. Explain with functional block diagram, the principle of operation of 555 timer. Draw the circuit diagram for monostable operation of 555. (12 marks)

Or

20. (a) Explain the working principle of a Zener voltage regulator. (4 marks)

(b) Explain the working principle of IC 723 regulator. (8 marks)

[5 × 12 = 60 marks]

F 9206 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

Branch : Electrical and Electronics Engineering

COMMUNICATION ENGINEERING (E)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Explain the need for modulation.
2. Derive the Mathematical representation of FM wave.
3. What are highlevel and lowlevel modulation systems ?
4. What is a TRF receiver ? Explain.
5. What is Interlaced scaning ? Explain its principle.
6. Explain the advantages of VSB transmission.
7. What are ambiguous and unambiguous radar ranges ?
8. What is ILS ? Explain.
9. What are GEO, LEO, MEO satellites ? Explain.
10. What are uplink and downlink frequencies ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the principle of SSB transmission with neat sketches.

Or

12. Define and explain FM and AM compare the parameters of FM and AM.
13. Draw a neat block diagram of AM transmitter and explain its principle.

Or

14. Draw a neat block diagram of superheterodyne receiver and explain its principle.
15. Explain the principles of positive and negative modulation.

Or

16. Explain the block schematic of monochrome TV receiver in detail.

Turn over

17. Draw a neat diagram of basic radar system and explain its principle in detail.

Or

18. Derive basic radar range equation.

19. Explain the basic principle of TDMA with neat sketch.

Or

20. Explain the advantages and applications of satellite communication systems.

(5 × 12 = 60 marks)

F 9197 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

Branch : Electrical and Electronics Engineering

DIGITAL CIRCUITS (E)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Briefly explain various number systems.
2. What is a half adder ? How it is realised using logic gates ?
3. What is meant by Fan-in, Fan-out of a logic circuit ?
4. What is a multiplexer ? Draw the block diagram of 4 : 1 line multiplexer.
5. Briefly explain the various types of flip-flops.
6. What is ripple counter ? Mention its advantages and disadvantages.
7. Write the difference between Synchronos and Asynchronous counter.
8. Write the features of IC 7490.
9. What is meant by ring counter ?
10. Briefly explain the SISO, DISO shift registers.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Reduce the following Boolean expressions :

    (i) $(X'Y' + Z)' + Z + XY + WZ$ to three literals. (6 marks)

    (ii) $(A' + C)(A' + C')(A + B + C'D)$ to four literals. (6 marks)

Or

12. Simplify using K-map and implement using NAND gates only :

    $F(A, B, C, D) = \Sigma (0, 1, 2, 5, 8, 9, 10)$.

(12 marks)

Turn over

13. (a) Draw and explain CMOS characteristics. (5 marks)

(b) Draw a two-input TTL NAND gate and explain its operation. (7 marks)

Or

14. (a) Design 4 : 1 Mux using logic gates. (5 marks)

(b) Draw a decimal to BCD encoder and explain its operation. (7 marks)

15. Draw and explain the working of Master slave J-K flip-flop. (12 marks)

Or

16. Draw and explain the working of Asynchronous up-down counters. (12 marks)

17. Design a 4-bit binary synchronous counter with D-flip flops. (12 marks)

Or

18. Design a counter to count 0, 1, 2, 4, 6, 0,1, 2. Use D-flip-flops. (12 marks)

19. Draw and explain PISO shift register. (12 marks)

Or

20. Design a self starting ring counter. (12 marks)

[5 × 12 = 60 marks]

F 9192 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

Branches : Civil/Mechanical/Electrical and Electronics/Electronics and Communication/ Polymer Science/Applied Electronics and Instrumentation/Electronics and Instrumentation/ Automobile/Aeronautical Engineering

ENGINEERING MATHEMATICS—IV (CMELPASUF)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **one** *question from each module.*
All questions carry equal marks.

Module I

1. (a) Evaluate $\int_C z^2 dz$, where C is the curve passing through the points $1+i$ and $2+4i$ and specified as (i) the arc $y = x^2$; (ii) the straight line joining the points $1+i$ and $2+4i$. (10 marks)

(b) Find the Laurent's expansion for $\frac{7z-2}{(z+1)z(z-2)}$ in the region given by (i) $0 < |z+1| < 1$; (ii) $1 < |z+1| < 3$; (iii) $|z+1| > 3$. (10 marks)

Or

2. (a) Use Cauchy's integral formula to find $\oint_C \frac{1}{1-z^2} dz$, where C is (i) $|z| = ½$; (ii) $|z| = 2$; (iii) $|z-1| = 1$. (10 marks)

(b) Evaluate $\int_0^{2\pi} \frac{d\theta}{(a+b\cos\theta)^2}$, $a > b > 0$ by contour integration. (10 marks)

Module II

3. (a) Using the method of bisection, find a root of the equation $x^3 - x^2 + x - 7 = 0$ correct to 3 decimal places. (10 marks)

Turn over

(b) Use Jacobi method to solve :

$$\begin{aligned} 2x - y + 11z &= 20 \\ x + 9y - z &= 10 \\ 10x - 2y + z &= 12 \end{aligned}$$

correct to 4 decimal places.

(10 marks)

Or

4. (a) Use Gauss Seidel to solve

$$\begin{aligned} 2x + 5y - 2z - 3 &= 0 \\ x + y - 3z + 6 &= 0 \\ 8x - y + z - 18 &= 0 \end{aligned}$$

correct to 4 decimal places.

(10 marks)

(b) Derive a Newton-Raphson iteration formula for finding the cube root of a +ve number C. Hence find (i) C = 12 ; (ii) C = 25.

(10 marks)

Module III

5. (a) Given : $y' = x^2 - y$, $y(0) = 1$, $y(.1) = .90516$, $y(.2) = .82127$, $y(.3) = .74918$. Obtain the value of y (.4) using Milne's method.

(10 marks)

(b) Use Taylor's series to find the values of y for $x = .1, .2, .3$, given $\frac{dy}{dx} = 1 - y$, $y(0) = 0$. Tabulate the numerical and exact solutions.

(10 marks)

Or

6. (a) Solve using Runge-Kutta method :

$$\frac{dy}{dx} + \frac{y}{x} = \frac{1}{x^2},\ y(1) = 1.$$

Find the value of y when $x = 1.1$.

(10 marks)

(b) Use Euler's method to obtain y (.2), y (.4) and y (.6) correct to 3 decimal places if y satisfies $y' = y - x^2$, $y(0) = 1$.

(10 marks)

Module IV

7. (a) Solve $y_{k+2} + 2y_{k+1} + y_k = k$ where $y_0 = y_1 = 0$. (10 marks)

(b) Find $Z^{-1}\left(\frac{z^2+1}{z^2-2z+2}\right)$. (10 marks)

Or

8. (a) Find (i) $z\,(-2)^n$; (ii) $z\,(na^n)$; (iii) $z\,(1/(n+2)\,(n+1))$. (10 marks)

(b) State and prove the convolution theorem of z-transform. (10 marks)

Module V

9. (a) Apply graphical method to solve :

Maximize $Z = x_1 - 2x_2$ subject to

$-x_1 + x_2 \le 1$, $6x_1 + 4x_2 \ge 24$, $0 \le x_1 \le 5$, $2 \le x_2 \le 4$ and $x_1, x_2 \ge 0$.

(10 marks)

(b) Solve the Transportation problem :

	A	B	C	D	E	Available
P	4	1	2	6	9	100
Q	6	4	3	5	7	120
R	5	2	6	4	8	120
Demand	40	50	70	90	90	

(10 marks)

Or

10. (a) Use duality to solve the L.P.P. :

Minimize $Z = 2x_1 + 2x_2$ subject to

$2x_1 + 4x_2 \ge 1$, $-x_1 - 2x_2 \le -1$, $2x_1 + x_2 \ge 1$ and $x_1, x_2 \ge 0$.

(10 marks)

(b) Use Simplex method to :

Minimize $Z = x_2 - 3x_3 + 2x_5$

subject to :

$$\begin{aligned} 3x_2 - x_3 + 2x_5 &\le 7 \\ -2x_2 + 4x_3 &\le 12 \\ -4x_2 + 3x_3 + 8x_5 &\le 10 \text{ and} \\ x_2, x_3, x_5 &\ge 0. \end{aligned}$$

(10 marks)

[5 × 20 = 100 marks]

F 9232 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Fifth Semester

Branch : Electrical and Electronics Engineering

POWER ELECTRONICS (E)

(Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 marks.

1. Classify the various power devices according to their controllability (i.e, fully controllable, semi-controllable, and uncontrollable).
2. A thyristor is connected in series with a series combination of a resistor 2Ω and an inductor 2H. The whole combination is connected across a d.c. supply of 400 V, such that the thyristor is forward biased. If the latching current of the thyristor is 250 mA, what is the minimum duration of the gate pulse required to turn-on the thyristor ?
3. What is the significance of I^2t rating of SCRs ?
4. Show the triggering circuit for Triac using a diac. Explain briefly its working.
5. Show the variation of average output voltage of a single-phase half-controlled converter feeding an R-L load, against the firing angle 'α'.
6. Explain the inversion mode of operation of single-phase fully controlled converter.
7. What is auxiliary voltage commutation ?
8. Write a short note on the voltage control in inverters.
9. Explain briefly the working of a Type-C chopper.
10. Why line synchronisation is needed in the triggering circuit controls of controlled rectifiers ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Explain the turn-on process in a thyristor based on the two-transistor analogy, with relevant equations. (8 marks)

(b) Explain the gate characteristics of an SCR. (4 marks)

Or

Turn over

12. (a) An IGBT is connected in anti-parallel with a diode (i.e, the emitter of IGBT is connected to the anode of the diode and the collector, to the cathode). Comment on the polarities of the blocking-voltage and conducting current in the combined switch. If the devices are assumed to be ideal, show the characteristics of the combined device in the V-I plane.

(4 marks)

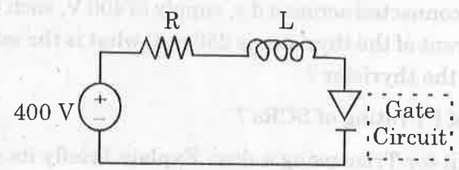
(b) Draw the static and dynamic V-I characteristics of an SCR. Mark the salient features and regions of operation.

(8 marks)

13. (a) Explain the principle of snubber circuits for thyristor protection. Give examples of snubber circuits.

(6 marks)

(b) The thyristor in the switching circuit of Figure below has a $\frac{di}{dt}$ rating of 50 A/μs. Determine the minimum value of L needed so that the thyristor will not have a $\frac{di}{dt}$ failure.



A switching circuit

(6 marks)

Or

14. (a) An SCR dissipates 75 W it to while operating in a circuit. The thermal resistance of the heat sink is 0.7° C/W. The ambient temperature is 55° C. The thermal resistance of the SCR from junction of case is 0.4° C/W. Will the SCR survive a thermal failure, if the maximum allowable junction temperature is 125 degrees ?

(6 marks)

(b) Show the circuit of RC triggering for an SCR in a half-wave controlled rectifier. State the design considerations.

(6 marks)

15. (a) Draw the expression for average output voltage of a single-phase half-controlled converter feeding R-L load.

(6 marks)

(b) What is the effect of source inductance in controlled converters ? (6 marks)

Or

16. Draw the circuit diagram and waveforms of a three-phase fully controlled converter feeding an RL load, for a firing angle of 30 degrees.

(12 marks)

17. (a) Explain the operation of a series inverter with circuit diagram and waveforms. (6 marks)

(b) How the voltage harmonics in the output of an inverter can be controlled ? (6 marks)

Or

18. Explain the working of a Mc Murray inverter with circuit diagram and relevant waveforms.

(12 marks)

19. (a) A step-down chopper is feeding an R-L load with large inductance. The d.c. input voltage is 220 V. The operating frequency is 2.5 kHz. What should be the duty ratio of the switching device if the average output voltage is 180 V. What is the ON time of the switch in the case ?

(6 marks)

(b) Explain the principle of cyclo-converters. (6 marks)

Or

20. (a) Draw the scheme of a digital firing pulse generation circuit for three-phase controlled rectifiers.

(6 marks)

(b) Show the circuit diagram and relevant waveforms of a chopper which works only in the first and fourth quadrants of the V-I plane (current in x-axis and voltage in y-axis).

(6 marks)

[5 × 12 = 60 marks]