

FACULTY OF ENGINEERING**B.E 3/4 (Civil) I- Semester (Backlog) Examination, December 2019****Subject: Transportation Engineering****Time: 3 hours****Max.Marks:75****Note: i) Answer all questions from Part-A & any five questions from Part-B.****ii) Assume any data missing suitably****PART – A (25 Marks)**

- 1 State the obligatory points to be considered in highway alignment. [2]
- 2 Explain what is off-tracking with a neat sketch? [3]
- 3 Explain PIEV theory. [2]
- 4 Differentiate between condition and collision diagram. [3]
- 5 Differentiate between bitumen and tar. [2]
- 6 What joints are provided in cement concrete road? [3]
- 7 Define cant deficiency and cant excess. [2]
- 8 What are the functions of ballast in railway track? [3]
- 9 Define cross wind component and wind coverage. [2]
- 10 The mean of maximum daily temperature is 48°C. The mean of average daily temperature is 24°C. Find the airport reference temperature. [3]

PART – B (50 Marks)

11. (a) Briefly explain the engineering surveys needed for locating a new highway. [5]
(b) Calculate the absolute minimum sight distance required to avoid a head on collision of two cars approaching from opposite directions at 90 kmph and 75 kmph. Assume a reaction time of 2.5 seconds, coefficient of friction of 0.85 and a brake efficiency of 50 percent, in either case. [5]
12. (a) Explain the level of service concept while deciding the design capacity of a road. [5]
(b) What is a rotary intersection? What are its advantages and limitations, in particular reference to traffic conditions in India? [5]
13. (a) What are the various tests for judging the suitability of bitumen for pavement construction? Discuss the objects of carrying out each of these tests. [5]
(b) Explain briefly the CBR method of flexible pavement design as per IRC guidelines. [5]
14. (a) What are the factors to be considered for the design of flexible pavements? [5]
(b) What are the different causes of traffic accidents? Explain the measures to be taken to prevent accidents. [5]
15. (a) Describe the functions and requirements of permanent way with a neat sketch. [5]
(b) What would be the equilibrium cant on a M.G curved track of 6° for an average speed of 60 kmph? Calculate the maximum permissible speed after allowing the maximum cant deficiency. [5]
16. (a) Explain the factors to be considered for the selection of an airport site. [5]
(b) The length of runway under standard atmospheric conditions is 1510 m. The airport site has an elevation of 610 m above MSL; its reference temperature is 28°C. If the maximum and minimum RL of the ground profile is 103.6 m and 101.71m, determine the corrected runway length. [5]
17. Write short notes on any **four** of the following: [10]
a) Camber b) 30th highest hourly volume c) ESWL concept
d) Coning of Wheels e) Runway orientation

FACULTY OF ENGINEERING**BE 3/4 (EEE/Inst.) I – Semester (Backlog) Examination, December 2019****Subject: Linear Integrated Circuits****Time: 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A & any Five questions from Part-B.****PART – A (25 Marks)**

- 1 What is CMRR? What is the CMRR of an ideal Op-Amp? (2)
- 2 Draw and explain the operation of a difference amplifier. (3)
- 3 How the precision diode is different from conventional diode rectifier? (3)
- 4 What is a peak detector and draw its relevant Op-Amp circuit? (2)
- 5 How the R-2R ladder DAC is superior to weighted resistor DAC? (2)
- 6 Draw the pin diagram of 555 timer and explain the importance of each pin. (3)
- 7 Mention the limitations of linear voltage regulators. (2)
- 8 What is fixed voltage regulator? How it is different from variable voltage regulator? (3)
- 9 What is a universal filter? (2)
- 10 Distinguish between passive and active filters. (3)

PART – B (5 x 10 = 50 Marks)

- 11 (a) Explain the working of an ideal integrator and its frequency response graph. (5)
(b) Derive the voltage gain equation for an inverting and non-inverting modes of Op-Amp. (5)
- 12 (a) Explain the operation of inverting Schmitt trigger circuit. (5)
(b) Explain any two applications of comparator in detail. (5)
- 13 (a) Explain in detail about the working of any one type of D/A converter. (5)
(b) Explain the operation of 555 timer as an astable multi vibrator. Derive the equation for the frequency of the oscillations. (5)
- 14 (a) Explain shunt regulator working principle with neat circuit diagram. (5)
(b) Draw and explain the operation of dual voltage regulator. (5)
- 15 (a) Design a wide-band pass filter having $f_l=400$ Hz, $f_h=2$ kHz and pass band gain of 4. Find the value of Q of the filter. (5)
(b) Explain the operation of a state variable filter. (5)
- 16 (a) Explain the frequency response of Op-Amp by drawing its high frequency model. (5)
(b) Explain the operation of precision full wave rectifier circuit with neat diagram. (5)
- 17 Write short notes on
(a) Balanced modulator and its applications. (5)
(b) Current fold back feature of voltage regulator. (5)

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I – Semester (Backlog) Examination, December 2019

Subject: Automatic Control Systems

Time: 3 Hours

Max.Marks: 75

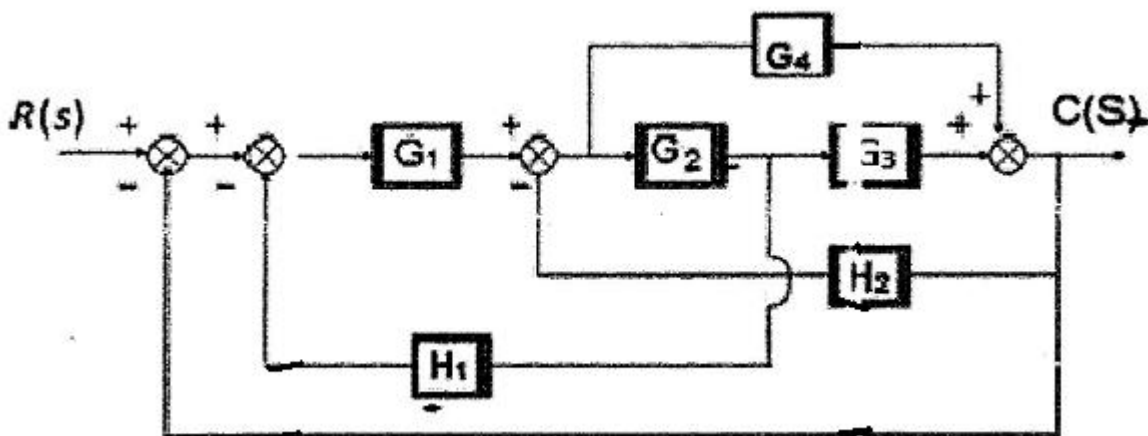
Note: Answer all questions form Part-A and any five questions from Part-B

PART – A (25 Marks)

- 1 Mention the advantages of a closed loop Control System
- 2 Define F-I analogy and write down the F-I electrical analogue of translational mechanical system.
- 3 The impulse response of a system is $12.5e^{-6t} \sin 8t$. Find the steady state error to a step I/P of 3 units
- 4 Define Routh – Hurwitz Criterion
- 5 Draw the Polar plot of the function $G(S) = \frac{10}{S(s+10)}$
- 6 Compare PI & PD Controllers
- 7 Derive the Transfer function of a basic Digital Control System
- 8 What are the disadvantages of a Digital Control System?
- 9 Define State & State variable.
- 10 List down the properties of State Transition Matrix.

PART – B (5x10 = 50 Marks)

- 11 Find the Transfer function of the following Block diagram.



12 a) Justify the stability of a system with characteristic equation

$$S^4 + 8S^3 + 18S^2 + 16S + 5 = 0$$

b) Find the value of K of the system with OLTF $G(S)H(S) = \frac{K}{s(0.1s+1)(0.05s+1)}$ such that it has a G.M. of 20 dB.

13 Construct the Root Locus diagram of a system with Open Loop Transfer function

$$G(S)H(S) = \frac{K}{s(s+4)(s^2+6s+10)}. \text{ Determine its stability Range.}$$

14 Investigate the stability of a system with the following Open Loop Transfer function

$$\text{using Nyquist stability criterion } G(S)H(S) = \frac{10}{s^2(0.2s+1)(0.5s+1)}.$$

15 a) Draw and explain the basic building blocks of Digital Control System.

b) Derive the transfer function of a Zero Order Hold filter.

16 A system is represented by the following differential equation

$$\frac{d^2y(t)}{dt^3} + \frac{dy(t)}{dt} + 8y(t) = 2\frac{dr(t)}{dt} + r(t)$$

where $r(t)$ and $y(t)$ are the input and output respectively.

a) Draw the State diagram and

b) Obtain the State space representation.

17 Write short notes on two of the following:

a) Signal Flow Graph

b) PID Controllers

c) Controllability and Observability

FACULTY OF ENGINEERING**B. E. 3/4 (Mech.) I – Semester (Backlog) Examination, December 2019****Subject: Manufacturing Processes****Time: 3 hours****Max. Marks: 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (10 x 2.5 = 25 Marks)**

1. What are the advantages of bottom gating system?
2. What are functions of chaplets and chills in sand casting?
3. What are the causes and remedies for the following casting defects?
(i) Blow holes (ii) Cold shuts (iii) Misruns (iv) Mismatch and (v) Dross.
4. Explain the manufacturing method of plastic bottles.
5. Differentiate between forge welding and friction welding.
6. What are the functions of shielding gases? Give any three shielding gases generally used in welding.
7. Define weldability. Enlist any three types of welding defects.
8. Briefly explain the principle of thermit welding.
9. Differentiate between blanking and punching operations.
10. What are the advantages and limitations of explosive forming process?

PART – B (10 x 5 = 50 Marks)

11. (a) What do you understand by the term “allowance”? Explain the various pattern allowances. 5
- (b) Differentiate between Jolting machine and sand slingers. Which one gives uniform ramming? 5
12. (a) Explain the principle, advantages and applications of lost Wax process. 5
- (b) Discuss the Injection moulding process with help of a neat sketch. 5
13. (a) Explain the various flames produced in gas welding. Give its applications. 5
- (b) Differentiate between GTAW and GMAW processes, in terms of principle, advantages and applications. 5
14. (a) Explain the principle and applications of and projection welding. 5
- (b) Discuss the principle and applications of Electron Beam welding with aid of neat sketch. 5
15. (a) Define yielding. Derive the equation of angle of bite in rolling. 5
- (b) Explain the Electro-magnetic forming process with aid of neat sketch and give its applications and limitations. 5
16. (a) Explain the principle and applications of rubber pad forming process. 5
- (b) Explain the process of shell moulding with aid of neat sketch. 5
17. Write short notes on any Two of the following: 2x5=10
- (a) Directional solidification (b) Wire drawing (c) Atomic hydrogen welding
- (d) Spinning process.

FACULTY OF ENGINEERING**B. E. 3/4 (Prod.) I – Semester (Backlog) Examination, December 2019****Subject: Metal Forming Technology****Time: 3 hours****Max. Marks: 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (10 x 2.5 = 25 Marks)**

1. What are the advantages and limitations of hot working? 2
2. Differentiate clearly between Engineering strain and True strain. 3
3. Elucidate the phenomenon of Plastic anisotropy of a sheet metal. 3
4. Sketch and label the parts of a progressive die. 3
5. Explain briefly about extrusion die-materials and their properties. 2
6. Give a classification of extrusion processes. 2
7. What is meant by trimming with respect to forging operations? Explain. 3
8. Enlist the common defects that may occur during forging operations. 2
9. What is Roll-pass sequence in rolling? Explain briefly. 3
10. Enlist various types of Rolling stand arrangements. 2

PART – B (5 x 10 = 50 Marks)

11. (a) Discuss the yield criteria in Metal forming process. 5
(b) Explain failure of material subjected to bi-axial stresses. 5
12. (a) Explain the principle of combination die with the help of a sketch. 5
(b) A circular blank of 60 mm is required to be cut from sheet metal of 4 mm thick. Calculate the cutting force required on punch. Take shear strength of the plate as 60 MN/m². 5
13. (a) Discuss the principle of wire drawing operation with neat sketch. 5
(b) Explain the Spinning operation with help of a sketch. 5
14. (a) Describe the Stretch forming operation? Mention its advantages. 5
(b) How flow forming operations is different from Spinning? Explain clearly. 5
15. (a) Discuss the advantages of press forging over drop forging. 5
(b) Explain the principle of isothermal forging. 5
16. (a) Describe the working of three rolling mills with the help of a neat sketch. 5
(b) Define the terms roll torque and mill power. 5
17. Write short notes on any TWO of the following: 2x5=10
(a) Spring back.
(b) Isostatic pressing.
(c) Planetary rolling mill.

FACULTY OF ENGINEERING**B.E. 3/4 (AE) I-Semester (Backlog) Examination, December 2019****Subject : Production Technology****Time: 3 Hours****Max. Marks: 75**

Note: Answer all questions from part-A and any FIVE questions from part-B

PART – A (25 Marks)

- 1 What are the constituents of green sand? [3]
- 2 List four pattern allowances [2]
- 3 Distinguish between brazing and braze welding [3]
- 4 Write electrode specification in detail [2]
- 5 Distinguish between blanking and piercing by sketch. [3]
- 6 Sketch grain flow in casting, machining and forging and hence state the advantage of forging. [2]
- 7 Recall the essential properties of a cutting tool material [3]
- 8 Define Machineability [2]
- 9 Distinguish between shaper and slotter [3]
- 10 Enlist any four superfinishing operations [2]

PART – B (50 Marks)

- 11 (a) Distinguish between Centrifugal casting and Centrifuging [5]
(b) Explain five properties of green sand [5]
- 12 (a) Explain Atomic Hydrogen Welding with a neat sketch [5]
(b) List the advantages and limitations of Friction welding over fusion welding [5]
- 13 (a) Distinguish between Forward extrusion and backward extrusion [5]
(b) Sketch a planetary roll mill and cluster roll mill. Label its parts. [5]
- 14 (a) Distinguish between orthogonal cutting and oblique cutting [5]
(b) With neat sketches, explain different types of chips and chip breakers [5]
- 15 Explain in detail with neat sketches, the different types of taper turning methods. [10]
- 16 (a) Enlist various casting defecting with neat sketches. Explain its causes and remedies to overcome the defects. [5]
(b) Explain the basic principle of Projection welding. State its applications [5]
- 17 (a) Explain Machine forging with a neat sketch [5]
(b) What are the essential properties of coolants used in machining operations [5]

FACULTY OF ENGINEERING
BE 3/4 (CSE) I – Semester (Backlog) Examination, December 2019

Subject : Data Communication

Time : 3 Hours

Max. Marks: 75

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

- | | |
|--|---|
| 1 What are the Major Components of Data Communication System? | 3 |
| 2 Compare Guided and Unguided Media. | 3 |
| 3 What are the different types of Noises? | 3 |
| 4 Define three types of HDLC stations. | 3 |
| 5 Define Bit stuffing. | 2 |
| 6 Distinguish between Synchronous and Asynchronous transmission. | 3 |
| 7 What are the different services provided by ATM? | 2 |
| 8 Distinguish Bridge and Router. | 2 |
| 9 List some basic functions performed at MAC layer. | 2 |
| 10 Describe Handoff in Cellular Networks. | 2 |

PART – B (5X10 = 50 Marks)

- | | |
|--|----|
| 11 a) Explain Transmission Impairments. | 6 |
| b) Describe 2G of CDMA. | 4 |
| 12 Explain in detail Pulse Code Modulation (PCM) and Delta Modulation. | 10 |
| 13 a) Explain in detail about ATM Protocol Architecture. | 6 |
| b) Explain CRC with an example. | 4 |
| 14 a) Explain any two Collision free LAN Protocols. | 6 |
| b) Distinguish between Layer 2 and Layer 3 Switches. | 4 |
| 15 a) Describe cellular wireless networks of 3G systems | 6 |
| b) How Medium Access Control is done in Wireless LAN's? | 4 |
| 16 a) Explain in detail error Control Mechanism in Datalink layer. | 6 |
| b) Explain the concept of Parity check and CRC in error detection. | 4 |
| 17 a) Explain the functioning of ARP and RARP protocols. | 6 |
| b) List the merits of Digital transmission over Analog transmission. | 4 |

FACULTY OF ENGINEERING

B.E. ¾ (I.T.) I – Semester (Old) Examination, December 2019

Subject: Theory of Automata

Time: 3 Hours

Max. Marks: 75

Note: Answer all questions from Part-A & any five questions from Part-B

PART – A (25 Marks)

1. What is DFA and design a DFA that contains set of all strings ending with three consecutive zeros over the alphabet $\{0, 1\}$ 2M
2. Write the differences between NFA and DFA 3M
3. Define Parse tree with an example 2M
4. Convert the regular expression $(000)^*1+(00)^*1$ to an Epsilon-NFA 3M
5. Define Context Free Grammar and Write a CFG for the regular expression $r=0^*1(0+1)^*$ 3M
6. Eliminate useless symbols from the case given below: 2M
 $S \rightarrow aAa / aBC, A \rightarrow aS / bD, B \rightarrow aBa / b, C \rightarrow abb / DD, D \rightarrow aDa$
7. Define PDA and language accepted by empty stack 2M
8. Give the properties of CFL 2M
9. Define Turing Machine. How TM accepts a language 3M
10. Give applications of P and NP problems 3M

PART – B (5 x 10 = 50 Marks)

11. (a) Convert the following NFA to DFA: 5M

	0	1
$\rightarrow p$	{p,q}	{p}
q	{r}	{r}
r	{s}	ϕ
*s	{s}	{s}

- Minimize the following DFA whose δ is given by : 5M

(b)

	0	1
$\rightarrow q_0$	q_1	q_3
q_1	q_2	q_4
q_2	q_1	q_4
q_3	q_2	q_4
* q_4	q_4	q_4

12. (a) State and prove pumping Lemma for Regular Languages 5M
- (b) Design a DFA to accept the language given below: 5M
 $L = \{w/w \text{ is of even length and beings with } 0s\}$
13. (a) Show that the following grammar is ambiguous 5M
 $S \rightarrow a S b S$
 $S \rightarrow b S a S$
 $S \rightarrow \epsilon$
- (b) Define context-free Grammar and Chomsky Normal Form. Find a grammar equivalent to 5M
 $S \rightarrow AB/AC, A \rightarrow aA | bAa | a, B \rightarrow bbA | aB | AB, C \rightarrow aCa | aD,$
 $D \rightarrow aD | bC$ with no useless symbols2

14. For the PDA $P = (\{q_0, q_1, q_2, q_3\}, \{0, 1\}, \{X, Y, Z\}, \delta, q_0, z, \{q_3\})$ with δ defined as: 10M
1. $\delta (q_0, \epsilon, Z) = \{(q_1, XZ)\}$
 2. $\delta (q_1, 0, X) = \{(q_1, YX)\}$
 3. $\delta (q_1, 0, Y) = \{(q_1, YY)\}$
 4. $\delta (q_1, 1, Y) = \{(q_2, Y)\}$
 5. $\delta (q_2, 1, Y) = \{(q_2, Y)\}$
 6. $\delta (q_2, 0, Y) = \{(q_2, \epsilon)\}$
 7. $\delta (q_2, \epsilon, X) = \{(q_2, \epsilon)\}$
 8. $\delta (q_1, \epsilon, Z) = \{(q_3, Z)\}$
 9. $\delta (q_2, \epsilon, Z) = \{(q_3, Z)\}$
- Show that the sequence of IDs to demonstrate the processing of the strings given below to reach final state: (7) (i) 0110 (ii) 00100
15. Explain different types of Turing machines 10M
16. (a) Design a Turing Machine to accept the language: 5M
 $L = \{a^n b^n / n \geq 1\}$
- (b) What is PCP? And test whether the following PCP instance has a solution or not $A = (01, 001, 10)$ $B = (011, 10, 00)$ 5M
17. Write short notes on the following: (3+3+4)M
- i) Decision Properties of CFLs
 - ii) Recursive and recursively enumerable language
 - iii) Classes of P, NP, NP-Complete and NP-Hard Problems

FACULTY OF ENGINEERING

B.E. $\frac{3}{4}$ (IT) I – Semester (Backlog) Examination, December 2019

Subject: Theory of Computation

Time: 3 Hours

Max Marks: 75

Note: Answer All Questions from Part A and Any Five Questions from Part B

PART – A (25 Marks)

1. Draw the transition diagram for the DFA with following transition table 3M

	0	1
q0	q2	q1
*q1	q1	q1
q2	q2	q1

2. Give an example to show that union of two regular language is regular. 3M
3. Define parse tree with an example. 3M
4. Eliminate ϵ productions from the grammar. 3M
 $S \rightarrow ABa/bC, A \rightarrow BC/b, B \rightarrow b/\epsilon, C \rightarrow C/\epsilon$
5. Define PDA an language accepted by PDA by empty stack. 3M
6. When does a turning machine halt? 2M
7. What is post corresponds problem? Give one example. 2M
8. What is universal language? 2M
9. Draw ENFA for the R.E $0.0^*(0+1^*)$. 2M
10. What is undecidability? 2M

PART –B (50 Marks)

11. a) Convert the following NFA with ϵ moves to NFA without ϵ moves. 5M
 b) Construct an NFA with ϵ moves for the regular expression $(00+11)0^*$. 5M
12. a) Minimize the following DFA whose transitions are given below using table filling algorithm. 6M

	0	1
q0	q1	q3
q1	q2	q4
q2	q1	q4
q3	q2	q4
*q4	q4	q4

- b) Explain decision property of Regular languages. 4M
13. a) 1^Pr is not Regular prove using pumping lemma 7M
 b) Discuss church Hypothesis. 3M
14. Design PDA for $L=\{a^m b^m / m, n \geq 2\}$ 10M
15. Obtain TM for the language $L= \{ wwr / w = (0+1)^* \}$ 10M
16. a) Explain with example P and NP problems. 5M
 b) What is advantage of stack on PDA? 5M
17. a) Explain Rice theorem. 3M
 b) Discuss multitape and single tape TM. 7M

FACULTY OF ENGINEERING**B.E V Semester (CBCS) (Civil) (Main & Backlog) Examination, December 2019****Subject: Transportation Engineering-I****Time: 3 hours****Max.Marks:70****Note:** Answer All Questions in Part-A and any five Questions from Part-B.**PART-A (2x10=20 Marks)**

- 1 List the engineering surveys to be conducted for alignment of a new highway.
- 2 Write the classification of road system by third road development plan.
- 3 Explain time head and space headway.
- 4 Define 30th highest hourly volume.
- 5 What is the significance of flash and fire point test.
- 6 Differentiate between cut-back bitumen and bitumen emulsion?
- 7 Explain the concept of ESWL.
- 8 Compute the equivalent radius if resisting section of 20 cm thick slab, given the radius of contact area of wheel load is 15 cm.
- 9 Explain the difference between prime coat and tack coat.
- 10 Explain the causes for mud pumping in CC pavements.

PART-B [Marks: 50]

11. (a) Explain various factors to be considered for highway alignment [4]
 (b) The design speed on a highway is 50 kmph; the radius of a horizontal curve is 90 m. The design coefficient of lateral friction is 0.15. (i) What is super-elevation needed if full lateral friction is available? (ii) What is the coefficient of friction needed if no coefficient of is provided? (iii) What is the equilibrium super-elevation if the pressure on the inner and outer wheels should be same? [6]
12. (a) What are the objects of traffic volume studies? Explain how the traffic volume data is presented and the results interpreted for use in traffic engineering design. [5]
 (b) What is a rotary intersection? What are its advantages and limitations, in particular reference to traffic conditions in India? [5]
13. (a) What are the various tests for judging the suitability of aggregates for pavement construction? Discuss the objects of carrying out each of these tests. [5]
 (b) Explain the Marshall method of bitumen mix design with appropriate sequence of the steps involved. [5]
14. (a) Explain 'Flexible and Rigid' pavements and bring out the points of difference. [4]

- (b) Using the data given below, calculate the wheel load stresses at [6]
(i) interior (ii) edge (iii) corner regions of a cement concrete pavement using Westergaard's stress equations. Also determine the probable location where the crack is likely to develop due to corner loading. Wheel load, $P = 5100$ kg, Modulus of elasticity of cement concrete, $E = 3 \times 10^5$ kg/cm², pavement thickness, $h = 18$ cm, Poisson's ratio of concrete = 0.15, Modulus of sub-grade reaction, $K = 6$ kg/cm³, radius of contact area, $a = 15$ cm.
- 15.(a) Briefly explain the construction steps for WBM road along with the specifications of materials required [5]
(b) Describe the significance of pavement evaluation for better maintenance of pavement facilities. [5]
16. (a) Explain highway capacity and level of service concept as per HCM 2000. [5]
(b) Explain the CBR method of flexible pavement design. What are its limitations? [5]
17. Write short notes on any **four** of the following: [10]
a. PIEV theory
b. Condition diagram and Collision diagram
c. Dowel bars & Tie bars
d. Polymer Modified Binders
e. Joints in CC Roads

FACULTY OF ENGINEERING**BE (EEE) V – Semester (CBCS) (Main & Backlog) Examination, December 2019****Subject: Electrical Machines – II****Time: 3 hours****Max. Marks: 70****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (10x2 = 20 Marks)**

- 1 What are the characteristics of an ideal transformer?
- 2 Define all day efficiency of a transformer.
- 3 Compare single unit of 3-phase transformer with a bank of three single phase transformers
- 4 What happens if the ratio of reactance to resistance of two transformers operating in parallel is not same?
- 5 Compare various types of rotors used for 3-phase induction motors.
- 6 Define synchronous speed and explain why induction motor cannot run at synchronous speed.
- 7 Explain the necessity of starter for an induction motor.
- 8 What are the applications of induction generator?
- 9 Draw the circuit model of capacitor start single phase induction motor and its torque slip characteristics.
- 10 What are the applications of A C series motor?

PART – B (5x10 = 50 Marks)

- 11 a) Derive the condition for maximum efficiency of transformer
b) The following test results are obtained for a 20kVA, 50 Hz, 2400/240 V transformer
O C Test (L V): 240 V, 1.0 A, 120W
S C Test (H V) : 55 V, 8.0A, 250 W
Find the efficiency and regulation at full load, 0.8 pf lagging.
- 12 a) Explain various types of 3-phase transformer connections with phase displacements and applications.
b) Two single phase transformers rated 800 kVA and 400 kVA with per unit impedances $(0.02 + j 0.07)$ and $(0.025 + j 0.0875)$ respectively are operated in parallel. If the total load is 1000 kW at 0.8 p.f lagging find the load shared by each transformer and operating power factors.
- 13 a) Explain the torque-slip characteristics of an induction motor with the help of torque equation.
b) A 6-pole, 3 phase, 50 Hz induction motor runs at a speed of 960 rpm with an input of 35 kW. The stator loss at this operating condition is 1200 W while the frictional losses are 600 W. Find a) rotor copper loss b) Gross torque developed
c) Net output and d) efficiency.
- 14 Explain various methods of starting of induction motor with diagrams
- 15 a) Explain double field revolving theory
b) Explain the principle of operation of repulsion type motor.
- 16 a) Explain Sumpner's test with a neat diagram
b) Illustrate on load tap changing transformer
- 17 Explain how performance of induction motor can be evaluated from circle diagram.

FACULTY OF ENGINEERING**B.E. (Inst.) V – Semester (Main & Backlog) Examination, December 2019****Subject: Instrumentation systems****Time: 3 hours****Max. Marks: 70****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (20 Marks)**

1. State working principle of Electrical tacho-generator. 2
2. How much degrees the strain gauges should be mounted along the shaft axis? 2
3. Mention the law of Thermocouple. 2
4. Explain measurement of stress in hollow shaft with diagram. 2
5. An accelerometer has a seismic mass of 0.05 kg and a spring constant of 3×10^3 N/m, maximum mass displacement is ± 0.02 m. Calculate (a) maximum measurable acceleration and (b) natural frequency. 2
6. Draw the diagram of electromagnetic flow-meter. 2
7. Explain basic principle of measurement of flow. 2
8. Define absolute Humidity and Relative Humidity. 2
9. What are the significant characteristics of Piezo-electric microphone? 2
10. Explain the working of carbon microphone. 2

PART – B (50 Marks)

11. (a) Explain the working of a DC tachogenerator with suitable diagram. 5
(b) Write short notes on Strain gauges. 5
12. (a) Explain the Magneto-Strictive transducer used for Torque measurement using suitable diagram. 5
(b) A bimetallic strip element has one end fixed and other free with length of cantilever being 40mm. The thickness of each metal is 1mm and element is initially straight at 20C. Calculate the movement in free end in perpendicular direction from the initial line when the temperature is 180C. 5
13. Explain various kinds of Head-type flow meter depending on the physical principle of operation and other characteristics with suitable diagrams and equations. 10
14. (a) Explain the measurement of Liquid level with variable permeability method. 5
(b) Explain with suitable diagram the working Ultrasonic method of measurement of Liquid. 5
15. (a) Explain the briefly installation of pH meter with suitable diagram. 5
(b) Explain the working of Inductive microphone with suitable diagram. 5
16. (a) A piezo-electric accelerometer has a transfer function of 61 mV/g and a natural frequency of 4500Hz. In a vibration test at 110Hz, a reading of 3.6V peak is obtained. Find the vibration peak displacement. 5
(b) A load cell consist of a solid cylinder of steel 40mm in diameter with four strain gauges bonded to it and connected into four arms of voltage sensitive bridge. The gauges are mounted to have Poisson arrangement. If $G_f = 2.1$, the bridge excitation voltage 6V, determine the sensitivity of the cell in V/kN. $E = 200 \text{ GN/m}^2$ $\nu = 0.29$ 5
17. (a) Discuss the various types of liquid level meters. 5
(b) Write short notes on capacitive Hygrometer. 5

FACULTY OF ENGINEERING**B.E. (ECE) V - Semester (CBCS) (Main & Backlog) Examination, December 2019****Subject : Computer Organisation and Architecture****Time : 3 hours****Max. Marks : 70****Note: Answer all questions from Part-A. Answer any Five questions from Part-B.****PART – A (10 x 2 = 20 Marks)**

- 1 Differentiate between computer organization and architecture.
- 2 Draw the flowchart for a multiplication operation.
- 3 Write the differences between hardwired control and micro programmed control unit.
- 4 Draw the microinstruction format and specify each field.
- 5 What are the advantages of stack organized computer?
- 6 Determine the number of clock cycles that it takes to process 200 tasks in a six-segment pipeline.
- 7 List the advantages of the memory-mapped I/O techniques.
- 8 Why does DMA have priority over the CPU when both request a memory transfer?
- 9 Distinguish between RAM and CAM (Associative memory).
- 10 What is address space and memory space in virtual memory system?

PART – B (5 x 10 = 50 Marks)

- 11 Explain floating point addition and subtraction with the help of an example. 10
- 12 a) Explain common bus system in a general purpose computer with a neat sketch. 5
 b) Explain the following memory reference instructions 5
 i) BUN ii) BSA iii) ISZ
- 13 a) What is the need for addressing mode? Explain various addressing modes of general purpose computer. 7
 b) Compare between pipeline and super pipeline processors. 3
- 14 a) Draw and explain the block diagram of asynchronous communication interface. 6
 b) Explain initial and final operation of an interrupt. 4
- 15 a) Explain in detail about virtual memory address translation. 6
 b) A digital computer has memory unit of 64K x 16 and a cache memory of 1K words, the cache uses direct mapping with a block size of four words. 4
 i) How many bits are there in the tag, index block and word fields of the address format?
 ii) How many bits are there in each word of cache and how are they divided into functions? Include a valid bit.
- 16 a) Draw the flow chart for booth's multiplication algorithm. 5
 b) Explain interrupt cycle in general purpose computer. 5
- 17 a) Explain cycle stealing, burst mode and interleaved modes operation of a DMA controller. 5
 b) Explain pipeline hazards and its remedies. 5

FACULTY OF ENGINEERING**B.E V- Semester (CBCS)(MP/A.E)(Main & Backlog) Examination, December 2019****Subject: Operation Research****Time: 3 hours****Max. Marks: 70****Note: Answer all questions from Part-A & any five questions from Part-B.****PART – A (20 Marks)**

1. What are the areas of applications of OR?
2. State the assumptions made in L.P.P.
3. Define dual of an L.P.P
4. What is the use of sensitivity analysis?
5. Differentiate between unbalanced transportation problem & unbalanced assignment problem.
6. Classify the replacement policies.
7. Explain the terms: (i) Saddle Point (ii) Value of the game
8. Define sequencing.
9. Explain the terms: (i) Balking (ii) Jockeying
10. State Dominance Principle used in game theory.

PART – B (50 Marks)

11. Solve the following L.P.P. using Simplex method.

$$\text{Maximize: } Z = 6x_1 + 10x_2 + 8x_3$$

$$4x_1 + 6x_2 \leq 16$$

$$4x_2 + 10x_3 \leq 20$$

$$6x_1 + 4x_2 + 8x_3 \leq 30$$

$$x_1, x_2, x_3 \geq 0$$

12. Use Dual Simplex Method & solve

$$\text{Maximize } Z = 12x_1 + 20x_2$$

$$\text{Subject to constraints } 6x_1 + 8x_2 \geq 100$$

$$7x_1 + 12x_2 \geq 120$$

$$x_1, x_2 \geq 0$$

13. Evaluate the optimum solution for the following Transportation problem.

Ware house

	D ₁	D ₂	D ₃	D ₄	Supply
Origin S ₁	2	3	11	7	6
S ₂	12	10	6	1	1
S ₃	5	8	15	9	10
Demand	7	5	3	1	

14. Find the optimum solution to the given assignment problem

	1	2	3	4	5
A	5	11	10	12	4
B	2	4	6	3	5
C	3	12	5	14	6
D	6	14	4	11	7
E	7	9	8	12	5

-2-

15. An engineering company is offered a material handling equipment. It is priced at Rs.60,000 including cost of installation. The cost for operation and maintenance are

estimated to be Rs.10,000 for each of the first five years, increasing every year by Rs. 3,000 in the sixth and subsequent years. The company expects a return of 10 percent on all its investment. What is the optimum replacement period?

16. Find the sequence which minimize the total time required in performing jobs on three machines in the order A,B,C. Processing time(in hours) are given in the following table.

Job:	1	2	3	4	5
Machine A:	8	10	6	7	11
Machine B:	5	6	2	3	4
Machine C:	4	9	8	6	5

17. Solve the following game whose payoff matrix is given below:

Player A	B ₁	B ₂	B ₃	B ₄
A ₁	3	2	4	0
A ₂	3	4	2	4
A ₃	4	2	4	0
A ₄	0	4	0	8

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FACULTY OF ENGINEERING**B. E. (CSE) (CBCS) V – Semester (Main & Backlog) Examination, December 2019****Subject: Computer Graphics****Time: 3 hours****Max. Marks: 70****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (20 Marks)**

1. What are physical and synthetic images in Computer Graphics?
2. Give an example of mapping from World coordinates to Screen coordinates.
3. What are input modes that input devices provide for a graphics program?
4. Design vertex-list representation of a cube.
5. What is perspective Normalization?
6. Explain linear function of Affine Transformations.
7. Describe ambient Reflection.
8. What is Gamma Correction?
9. Draw tree representation of robot arm movement.
10. Explain NURBS.

PART – B (50 Marks)

11. (a) The pipeline approach to image generation is non physical. What are the main advantages & disadvantages of a nonphysical approach? 5
- (b) What is Orthographic view and explain Orthographic Projection for viewing a Projection Plane. 5
12. (a) Write short notes on Window Management. 5
- (b) Explain the OpenGL function to design hierarchical menus. 5
13. Prove that any sequence of rotations and translations can be replaced by a single rotation about the origin followed by a translation by following all relevant equations. 10
14. Explain three Polygon Shading methods in detail. 10
15. Explain three types of General B-SPLINES with relevant equations. 10
16. Write OpenGL program to show transformations of scaling, shift & rotation in 2D. 10
17. Write OpenGL program for Logic Operations of XOR mode using Color buffer. 10

FACULTY OF ENGINEERING

B.E. (IT) V-Semester (CBCS) (Main & Backlog) Examination, December 2019

Subject : Computer Networks

Time : 3 hours

Max. Marks : 70

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (20 Marks)

- 1 What is the principal difference between connectionless and connection-oriented communication?
- 2 What are quality of service parameters?
- 3 What is meant by tunneling in the context of mobile IP?
- 4 Define a socket. Write the range for standard ports.
- 5 Mention the differences between these system calls send, sendto and recv, recvfrom.
- 6 What is meant by out band data?
- 7 Name the fields of a resource record.
- 8 Distinguish between plug-in and helper application.
- 9 What is cryptography?
- 10 What is the difference between private key and public key?

PART – B (50 Marks)

- 11 Explain about routing algorithms with examples.
- 12 Classify IP addresses and explain the concept of subnetting.
- 13 Explain the architecture and design issues of RPC.
- 14 Describe the architecture of electronic mail.
- 15 Explain about symmetric key algorithms.
- 16 What are network layer design issues?
- 17 Write a brief notes on Internet super server.
