FACULTY OF ENGINEERING

B. E.3/4 (Civil) I – Semester (Backlog) Examination, October 2020
Subject: Transportation Engineering

Time: 2 hours   **Max. Marks: 70**

Note: Answer any seven questions from Part-A. Answer any three questions from Part-B.

PART – A (7X3 =21 Marks)

1. What are the various requirements of Highway alignment?
2. State any three main recommendations of Jayakar committee for development of road network in India.
3. Write the significance of 'desire lines' in origin and destination studies.
4. Write the significance of 15th , 85th and 98th percentile speeds in traffic engineering.
5. Explain the concept of ESWL and ESAL with diagrams.
6. List out the functions of dowel bars and tie bars.
7. What do you understand by negative super elevation and cant deficiency?
8. If sleeper density of a M.G track is (n+4), find the number of sleepers required for 960 m long M.G track?
9. Explain:
   (i) cross wind component and
   (ii) wind coverage
10. The runway gradation plan indicates that there is a rising gradient of 1.4% meeting a falling gradient of 0.5%. There is again an upgrade of 0.5%. Design the longitudinal profile of the runway.

PART – B (3X18 = 54 Marks)

11. (a) Explain camber. What are the objects of camber? Discuss the factors on which the amount of camber to be provided depends.

    (b) An ascending gradient of 1 in 100 meets a descending gradient of 1 in 120. A summit curve is to be designed for a speed of 80 kmph so as to have an overtaking sight distance of 450m.

12. (a) List the various traffic engineering studies. Mention the objectives and importance of each study.

                                                                        ……2

(b) Explain the terms basic capacity, possible capacity, and practical capacity. Discuss briefly the various factors affecting the practical capacity of roads.

13. (a) Explain briefly the CBR method of pavement design. Discuss the advantages and limitations of CBR method of design.

(b) Classify different types of joints in CC pavements and mention the objects of each.

14. (a) Explain briefly the principle of Webster's method of signal design. Mention the advantages of this method.

(b) Using the data given below, calculate the wheel load stresses at (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/cm^2, pavement thickness, h = 25 cm, Poisson's ratio of concrete = 0.15, Modulus of sub-grade reaction, K=12 kg/cm^3, radius of contact area, a = 16cm.

15. (a) Explain the procedure for orienting the runway using wind rose diagram.

(b) The length of runway under standard conditions is 1620m. The airport site has an elevation of 270m. its reference temperature is 32.9°C. If the runway is to be constructed with an effective gradient of 0.2%. Determine the corrected length of runway.

16. (a) Describe the functions and requirements of permanent way with a neat sketch.

(b) If an 8°track diverges from a main curve of 5°in an opposite direction in the layout of a B.G. yard. Calculate the super-elevation and the speed on the branch line, if the maximum speed permitted on the main line is 45 kmph.

17. Write short notes on any four of the following:

(a) Grade compensation

(b) Parking studies

(c) Vehicle damage factor

(d) Creep in rails

(e) Aircraft characteristics

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FACULTY OF ENGINEERING

BE (EEE) V – Semester (CBCS) (Backlog) Examination October 2020

Subject: Electrical Machines – II

Time: 2 hours   **Max. Marks: 70**

Note: Answer any five questions from Part-A. Answer any four questions from Part-B.

PART – A (5x2 = 10 Marks)

1 A 10 kVA. 1000/250V single phase transformer supplies rated load. Find its i) transformation ratio ii) primary rated current iii) Secondary rated current.

2 Draw the phasor diagram of transformer on no load and explain its components.

3 Draw 3-phase delta-star transformer connection, mention the phase displacement between the primary and secondary emf.

4 Name the two transformers used in Scott connection and give relation between their transformation ratios.

5 Define per unit slip. What is its value i) at starting   ii) during running conditions

6 What is the condition for obtaining maximum torque at starting?

7 Pole changing method is not suitable for slip ring induction motor, Explain.

8 Is it possible to convert induction motor to induction generator? Explain with conditions.

9 Draw the circuit model of single phase permanent capacitor motor and list the applications.

10 Compare DC series motor and AC series motor

PART – B (4x15 = 60 Marks)

11 a) Deduce the approximate equivalent circuit of a transformer referred to primary side.

b) In a 25 kVA, 2000/200 V transformer, the iron loss and full load copper losses are 300 and 400W respectively. Calculate the efficiency on unity power factor at half full load and maximum efficiency at upf.

12 a) What is tertiary winding? What are its applications?

b) Two 110 V single phase furnace loads 400 kW and 600 kW both operating at unity power factor are supplied from a 6600 V, 3-phase Scott connected transformer. Calculate the currents in 3-phase lines, neglecting the losses. Draw the vector diagram.

13 a) Deduce the equivalent circuit of induction motor and compare it with that of transformer.

b) For an induction motor, Maximum torque is twice the full load torque and starting torque is 1.6 times the full load torque. Find the slip corresponding to maximum torque.

14 Explain speed control of induction motor by
   i)   Voltage control
   ii) Pole changing method
   iii) Rotor resistance control and
   iv) emf injection methods.

15 a) Deduce the equivalent circuit of single phase induction motor.

   b) Explain the principle of operation of AC series motor. List the applications.

16 a) Explain the excitation phenomenon in transformer and the importance of third harmonic component.

   b) Explain the principle of operation of phase shifting transformer.

17 Write short notes on any two:

   a) Double cage induction motor

   b) Induction generator

   c) Universal motor.

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FACULTY OF ENGINEERING

B.E. (ECE) V - Semester (CBCS) (Backlog) Examination, October 2020

Subject : Computer Organisation and Architecture

Time : 2 hours   Max. Marks : 70

Note: Answer any five questions from Part-A. Answer any four questions from Part-B.

PART – A (5 x 2 = 10 Marks)

1 What is normalization and alignment used in floating point arithmetic?
2 Show the hardware representation of 2's complement addition.
3 Explain instruction set completeness.
4 Write the sequence of micro operations for LDA instruction.
5 What is the purpose of addressing modes in general purpose computer?
6 Write the differences between CISC and RISC computers.
7 Explain source initiated data transfer using hand shaking.
8 What are the basic advantages of using interrupt initiated data transfer under program control without an interrupt?
9 How do you measure the performance of a cache memory?
10 What are the advantages of a set associative cache memory?

PART – B (4 x 15 = 60 Marks)

11 Derive an algorithm in flow chart form for the non-restoring method of fixed binary division and explain with the help of an example.

12 a) What is the difference between a direct and indirect address instruction? How many references to memory are needed for each type of instruction?
   b) Explain three basic computer instruction code formats in general purpose computer.

13 a) Explain register stack organization in general purpose computer.
   b) Explain three, two one and zero-address instruction with an example.

14 a) Explain polling and daisy chain priority interrupt initiated I/O mode data transfer.
   b) Differentiate between an isolated I/O and memory mapped I/O methods.

15 a) Explain memory hierarchy and what is the general relationship among access time, memory cost and capacity.
   b) What are the differences among direct mapping, associative mapping and set-associative mapping?

16 a) What are the IEEE standards for binary floating point numbers?
   b) What is the purpose of micro program sequencer and explain micro program sequencer for a control memory.

17 a) Formulate a six-segment instruction pipeline for computers specify the operations to be performed in each segment.
   b) Write the applications of DMA operation.

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FACULTY OF ENGINEERING

B. E. ¾ (CSE) (CBCS) V – Semester (Backlog) Examination, October 2020

Subject: Computer Graphics

Time: 2 hours   **Max. Marks: 70**

Note: Answer any five questions from Part-A. Answer any four questions from Part-B.

PART – A (5X2 = 10 Marks)

1. Explain Pen Plotter Model with the diagram.
2. Explain the Orthographic View of Projection.
3. What is double buffering. Explain with glut functions.
4. Find a homogeneous – coordinate representation of a plane.
5. Obtain OPENGL perspective projection matrices.
6. How z-buffer algorithm is used in hidden surface removal.
7. List the OpenGL API functions for specification of materials.
8. Write DDa scan-conversion algorithm for line segments.
9. Draw scene tree for drawing a color graph.
10. Represent parametric form of a curve in 3D.

PART – B (4X15= 60 Marks)

11. (a) Explain Simplified OpenGL pipeline with geometric primitives.

    (b) Explain the components of a graphic system.

12. (a) Explain the features for the good design of Interactive Programs.

    (b) Show that any sequence of rotations and translations can be replaced by a single rotation about the origin followed by a translation.

13. (a) Obtain the sequence of transformations for rotation about a fixed point.

    (b) Explain Perspective Projections and Orthogonal Projections with relevant equations.

14. What is clipping? And explain two Line-Segment Clippings in detail.

15. (a) Consider the explicit equations $y = f(x)$ and $z = g(x)$. What types of curves do they describe.

    (b) Why is ray tracing a good strategy for rendering a scene described by a CSG tree.

16. Explain Phong-Lighting Model and explain Illumination and Reflection with relevant matric equations.

17. (a) Explain Parallel Projection and Obtain Orthogonal-ProjectionMatrices.

    (b) Obtain relevant equations for rotation about an arbitrary axes.

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FACULTY OF INFORMATICS

B.E. (IT) V-Semester (CBCS) (Backlog) Examination, October 2020

Subject : Computer Networks

Time : 2 hours   **Max. Marks : 70**

Note: Answer any five questions from Part-A. Answer any four questions from Part-B.

PART – A (5X2 = 10 Marks)

1 Define congestion and discuss about causes for it.
2 What is principle of optimality?
3 What is meant by encapsulation?
4 Define Fragmentation and reassembly.
5 Mention the differences between normal data and urgent data.
6 What is meant by marshalling and unmarshalling in RPC?
7 Draw an example DNS name space.
8 Distinguish client-side cache and browser cache.
9 Draw and explain the encryption model for network security.
10 What are digital certificates?

PART – B (4X15 = 60 Marks)

11 Explain the ISO-OSI model. Differentiate between OSI and TCP/IP models.

12 Draw header format of IP protocol and explain its fields.

13 Explain advanced socket system calls.

14 Illustrate the architecture of WWW and explain its elements.

15 Explain about public key algorithms.

16 Write about three-way handshake in TCP.

17 Explain the network layer design issues.

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FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I – Semester (Backlog) Examination, October 2020

Subject: Automatic Control Systems

Time: 2 Hours   **Max.Marks: 75**

Note: Answer seven questions form Part-A and any three questions from Part-B

PART – A (7x3=21 Marks)

1   Find the step response of a UFBS with OLTF $G(S) = \dfrac{10}{s(s + 10)}$

2   Define F-V analogy and write down the F-V electrical analogue of mechanical system

3   Define steady state error and write down the expression for it

4   Discuss the special cases of Routh-Hurwitz criterion

5   Compare PI & PD controllers

6   List down the frequency domain specifications of a closed loop control system

7   Derive the transfer function of a basic digital control system

8   Derive the transfer function of a zero order hold filter

9   Define controllability and observability

10 What are advantages of state variable analysis?

PART – B (3x18 = 54 Marks)

11 a) Find the transfer function of the following block diagram.
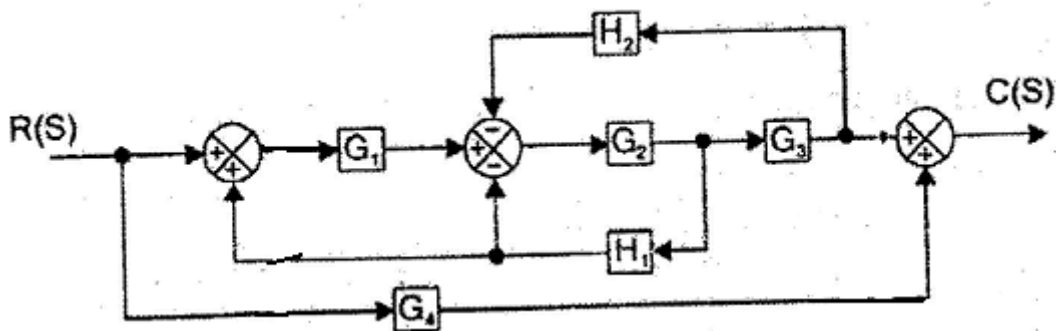
b) Verify the transfer function of the above system using Mason's Gain formula.

12 a) Justify the stability of a system with characteristic equation
$S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$

b) Determine the static error constants and the corresponding steady state error of a unity feedback system with the following open loop transfer function

$G(S) = \dfrac{1}{s^2(s^2 + 4s + 3)(s^2 + 3s + 12)}$.

..2

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

$$G(S)H(S) = \frac{K}{s(s + 4)(s^2 + 4s + 20)}$$. Determine its stability range.

14 Draw the Bode plot and determine the Gain margin and phase margin of a Unity Feedback System with the following Open Loop Transfer function

$$G(S)H(S) = \frac{5}{s(s + 1)(s + 4)}$$

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

b) Mention the disadvantages of Digital Control System.

16 a) Test the controllability and observability of a system with the following Model matrices.

$$A = \begin{bmatrix} -3 & 1 \\ -2 & 0 \end{bmatrix}, B = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

b) Find the State Transition matrix of the system with the above model matrices.

17 Write short notes on two of the following:

a) Error series

b) Lag-lead Compensators

c) Nyquist Stability criterion.

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FACULTY OF ENGINEERING

B.E. (Civil) V-Semester (CBCS) (Backlog) Examination,
October 2020
Subject : Transportation Engineering-I

Time : 2 hours   **Max. Marks:70**

Note: Answer any five Questions from Part-A, & Any four Questions from Part-B.

PART – A (5X2 =10 Marks)

1   What are the factors to be considered for highway alignment?
2   Explain PIEV theory.
3   Differentiate between Running speed and Overall Speed.
4   What are the advantages and disadvantages of Rotary intersection?
5   What are the different types of paving binders?
6   Explain the differences between flexible pavement and rigid pavement.
7   Compute the radius of relative stiffness of 15cm thick cement concrete slab, if modulus of elasticity is $2 \times 10^5 kg/cm^2$, poisons ratio is 0.15 and modulus of subgrade reaction is $3kg/cm^3$.
8   What are the different types of stresses that occur in rigid pavements?
9   What are Wet mix Macadam Roads?
10 Explain the causes of pavement failures.

PART – B (4X15= 60 Marks)

11 a) What is super elevation? Derive an expression for determining the rate of super elevation if the design coefficient of lateral friction is " f ".

   b) The design speed of a highway is 80km/hr. There is a horizontal curve of radius 200m on a certain locality. Calculate the super elevation needed to maintain this speed. If the maximum super elevation of 0.07 is not to be exceeded, calculate the maximum allowable speed on this horizontal curve as it is not possible to increase the radius. Safe limit of transverse coefficient of friction is 0.15.

12 a) Explain Highway capacity and Level of Service concept as per HCM manual.

   b) Draw a neat sketch of a partial Clover leaf interchange and show the movement of traffic.

13 a) Explain the Bituminous mix design by marshall stability Test with standard test values?

   b) Explain the different physical properties of aggregates that are to be tested for judging the suitability of aggregates for pavement layers construction.

14 a) Explain the necessity of ESWL and EALF in pavement design.

   b) Explain the concept of signal design by Webster method with a sketch?

15 a) Explain about Dense bituminous Macadam construction with standard specifications?

b) Explain the construction steps for Built-up Spray Grout.

16 a) A vehicle is travelling at an average speed of 120km/hr on a descending gradient of 2% with a total reaction time as 2.5 seconds and coefficient of friction between vehicle tyres and surface pavement as 0.35. Determine the safe stopping sight distance.

b) What are the objectives of traffic volume studies. Briefly explain the methods of collecting and presentation of traffic volume data.

17 Write short notes on the following:

a) Extra widening on curves
b) Intersection delay studies
c) 0.45 power gradation curve
d) Prime and Tack coats.

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FACULTY OF ENGINEERING
B.E. (Inst.) V – Semester (CBCS) (Backlog) Examination, October 2020
Subject: Instrumentation Systems

Time: 2 hours   **Max. Marks: 70**

Note: Answer any five questions from Part-A. Answer any four questions from Part-B.

PART – A (5X2 =10 Marks)

1. State working principle of Piezoelectric accelerometer.

2. What is AC Tachogenerator?

3. What are Load cells?

4. Mention various torque measurement methods.

5. An accelerometer has a seismic mass of 0.04 kg and a spring constant of $3x10^3$ N/m, maximum mass displacement is $\pm$ 0.05m. Calculate (a) maximum measurable acceleration and (b) natural frequency.

6. Classify flow meters.

7. Draw the block diagram of Voltage divider method.

8. Define Relative Humidity.

9. What are the significant characteristics of piezo-electric microphone?

10. Give the classification of various microphones.

PART – B (4X15 = 60 Marks)

11. (a) Explain the working of a AC tacho-generator with suitable diagram.

    (b) A seismic accelerometer sensing displacement has an under damped frequency of 20Hz and a damping ratio of 0.8. Calculate (1) its damping frequency (2) Amplitude ratio.

12. (a) Explain the various force measurement using suitable diagram.

    (b) Explain in detail construction of Thermocouple with suitable diagram describing various protective sheaths.

13. Explain various kinds of Head-type flow meter depending on the physical principle of operation and other characteristics with suitable diagrams and equations.

14. (a) Explain the measurement of Liquid level with variable permeability method.

    (b) Explain with suitable diagram the working of Resistive and Aluminum Hygrometer.

15. Explain the Dynamic Microphone in detail with suitable diagram.

16. (a) A piezo-electric accelerometer has a transfer function of 61mV/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.

    (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. $E = 200GN/m^2$ $v = 0.29$

17. (a) A venture meter is to be fitted in the horizontal section at a 0.15m pipeline. Calculate the cylindrical throat diameter, if the maximum differential pressure obtained is 0.5cm for a maximum flow rate of 5.0Kg/s for water of 20^0C. Assume discharge coefficient of 0.99.

    (b) Write short notes on Installation of PH meters.

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FACULTY OF ENGINEERING

B.E. (M/P/AE) V-Semester (CBCS) (Backlog) Examination, October 2020

Subject : Operation Research

Time : 2 hours   **Max. Marks : 70**

Note: Answer any five questions from Part-A. Answer any four questions from Part-B.

PART – A (5 x 2 = 10 Marks)

1. What is the scope for OR?
2. Differentiate between a feasible solution & an optimum solution.
3. State features of duality in L.P.P.
4. State the conditions to be satisfied in order to apply dual simplex method.
5. Explain degeneracy in transportation problem.
6. What is an unbalanced assignment problem?
7. What is replacement problem? When does it arise?
8. What is game theory? State its application.
9. List out the assumptions in sequencing problem.
10. Write about kendell's notation & mention the terms involved in it.

PART- B (4X15 =60 Marks)

11. Solve using Simplex method

    Maximize $Z= 4x_1+10x_2$

    Subject to constraints

    $\qquad 2x_1+8x_2 \le 48$

    $\qquad 6x_1+2x_2 \le 42$

    $\qquad 2x_1+2x_2 \le 18$

    $\qquad x_1,x_2 \ge 0$

12. Use Dual Simplex method& solve

    Minimize $Z= 2x_1+2x_2+4x_3$

    Subject to constraints

    $\qquad 2x_1+3x_2+5x_3 \ge 2$

    $\qquad 3x_1+x_2+7x_3 \le 3$

    $\qquad x_1+4x_2+6x_3 \le 5$

    $\qquad x_1, x_2, x_3 \ge 0$

13. Evaluate the following TP using VAM method & find its optimum solution.

Ware house

		D_1	D_2	D_3	D_4	Supply
	S_1	19	30	50	10	7
Origin	S_2	70	30	40	60	9
	S_3	40	8	70	20	18
	Demand	5	8	7	14	

….2

14. Find the shortest route for the following Traveling salesman problem.

	1	2	3	4
1	∞	30	80	50
2	40	∞	140	30
3	40	50	∞	20
4	70	80	130	∞

15. A computer contains 10,000 resistors. When any resistor fails, it is replaced. The cost of replacing a resistor individually is Re.1 only. If all the resistors are replaced at the same time, the cost per resistor would be reduced to 35 paise. The percentage of surviving resistors say S(t) at the end of month(t) and the probability of failure P(t) during the month t are as follows:

t	0	1	2	3	4	5	6
S(t)	100	97	90	70	30	15	0
P(t)	--	0.03	0.07	0.20	0.40	0.15	0.15

Determine the optimal replacement plan.

16. Use the graphical method to solve the following sequencing problem and hence calculate the total elapsed time to complete both jobs.

Job 1

	Machine				
Sequence	A	B	C	D	E
Time (hrs)	3	4	2	6	2

Job 2

	Machine				
Sequence	B	C	A	D	E
Time (hrs)	5	4	3	2	6

17. A self-service store employs one cashier at its counter. Nine customers arrive on an average every 5 minutes while the casher can serve 10 customers in 5 minutes. Assuming Poisson distribution for the arrival rate and exponential distribution for service time, find
   1. Average number of customers in the system.
   2. Average number of customers in the queue.
   3. Average time a customer spends in the system.
   4. Average time a customer waits before being served.
   5. Probability that there is no customer in the queue.
   6. Probability that there are 5 customers in the queue.

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FACULTY OF ENGINEERING

B.E. 3/4 (A.E) I – Semester (Backlog) Examination, October 2020

Subject: Production Technology

Time: 2 hours   **Max. Marks: 75**

Note: Answer any seven questions from Part-A. Answer any three questions from Part-B.

PART – A (7X3 = 21 Marks)

1. Enlist pattern materials and pattern allowances.
2. Name 5 components manufactured by continuous casting.
3. Write the specification of electrode and explain it.
4. Distinguish between Brazing and Soldering.
5. Sketch Cluster roll mill and planeteary roll mill and mark its salient points.
6. Sketch the principle of Tube drawing.
7. Define Machininability. On what factors machinability depends?
8. Distinguish between Orthogonal cutting and oblique cutting.
9. Distinguish between capstan and turret lathe.
10. Sketch a Twist drill Nomenclature.

PART – B (3X18 = 54 Marks)

11. (a) Distinguish between centrifugal casting and centrifuging with necessary sketches.

    (b) Name different casting defects, causes and remedies.

12. (a) Explain with neat sketches the weld metal transfer methods in MIG welding.

    (b) Distinguish between Projection welding and Seam welding.

13. (a) Distinguish between Punching, blanking and piercing with neat sketches.

    (b) Explain with neat diagrams, different types of forging.

14. In orthogonal cutting of a 120 mm diameter mild steel bar on a lathe the following data were obtained. Cutting force = 120 kg, Feed force = 30 kg, Back Rake angle = 15^0 Feed = 0.2 mm/rev., chip thickness is 0.3 mm, Cutting speed = 100 m/min. Depth of cut = 0.4 mm. Calculate the (a) Shear angle (b) Coefficient of friction (c) Chip thickness ratio (d) Shear angle (e) Friction angle.

15. (a) Distinguish between Up milling and down milling with sketch.

    (b) Explain any 3 work holding and tool holding devices in lathe with neat sketches.

16. (a) Distinguish between blow moulding and injection moulding.

    (b) Explain Ultrasonic Welding in detail with neat sketch.

17. (a) Explain different types of chip breakers.

    (b) Explain Shell moulding with net sketch.

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FACULTY OF ENGINEERING
BE 3/4 I – Semester (Backlog) Examination, May / June 2020
Subject : Data Communications

Time : 2 Hours   Max. Marks: 75

Note: Answer any seven questions of Part - A and answer any three questions from Part-B.

PART – A (7X3 =21 Marks)

1   What are the advantages of Layered approach to protocols?
2   What are the two functions performed by Antenna?
3   What are the advantages of synchronous transmission?
4   How data exchanges over transmission lines are classified.
5   List three benefits of spread spectrum?
6   What is the difference between virtual channel and virtual path?
7   What is the difference between Hub and Switch?
8   What are the Key elements of LAN ?
9   What is CSMA/CD?
10 List the ways to increase the capacity of a cellular system.

PART – B (3X18 = 54 Marks)

11 a) List the Layers of OSI Model and explain their functionalities.
   b) What are some major advantages and disadvantages of microwave transmission?

12 a) Explain in detail about CRC detection technique with suitable example.
   b) What are the station types and transfer modes supported by HDLC explain.

13 a) Explain about synchronous time division multiplexing and statistical time division multiplexing.
   b) Compare and Contrast Circuit Switching and Packet Switching.

14 a) What is the difference between In channel signaling and Common channel signaling?
   b) What are the services provided by AAL?

15 a) Explain about the MAC frame format of IEEE 802.3 protocol.
   b) Explain about binary exponential backoff   algorithm.

16 Explain about IEEE802.11 Architecture and services.

17 List and explain about three versions of Automatic repeat request (ARQ).

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FACULTY OF ENGINEERING

B.E 3/4 (I.T) I-Semester (OLD) Examination, October 2020

Subject: Theory of Automata

Time: 2 Hours   **Max. Marks: 75**

PART –A

Note: Answer any Seven Questions   **(7x3 = 21 Marks)**

1. Define NFA and give an example.

2. Compare and Contrast DFA, NFA, Є-NFA.

3. Write the Regular Expression to Accept Strings of 0's and 1'shaving consecutive 0's.

4. What is Deterministic PDA? Give its Formal Defination.

5. State Pumping Lemma for CFL.

6. Eliminate Left Recursive from the following Grammar

   E-> E+T/T

   T-> T*F/F

   F-> (E)/id

7. Define Type2 Grammar.

8. Briefly Explain Multiple Track Turing Machine.

9. Define P, NP and NP-complete problems.

10. What is a Satisfiability Problem.

PART-B

Note : Answer any Three Questions   **(3 x 18 = 54 Marks)**

11. Convert the following NFA into its Equivalent DFA.

	->q_0	q_1	q_2
a	q_0	q_2	Ø
b	{q_0, q_1}	q_3	Ø

12. State and Prove Pumping Lemma for regular languages.

13. Construct a PDA to accept the language **L(M)={ WW^R/W (0+1)*}** where w^{R}is the reverse of W.

14. Explain the Programming Techniques for Turing Machines with Eg.

15. Construct a Turing Machine to accept the language L={$0^n 1^n 2^n$ | n>=1}.

16. State and Explain Chomsky Hierarchy in Detail.

17. Find the solution for the given PCP

	List A	List B
i	W$_i$	X$_i$
1	110	110110
2	0011	00
3	0110	110

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FACULTY OF ENGINEERING

B.E. 3/4(EEE/Inst.) I – Semester (Backlog) Examination, October 2020

Subject : Linear Integrated Circuits

Time : 2 Hours   Max. Marks: 75

Note: Answer any seven questions of Part - A & answer any three questions from Part - B.

PART – A (7x3=21 Marks)

1. What is slew rate? Explain its significance.
2. What is frequency compensation? Why it is required in OP AMPS?
3. Draw the pin diagram of IC741.
4. Draw the circuit of a voltage limiter.
5. Write the advantages of series voltage regulators over shunt regulators.
6. Explain about the voltage follower circuit?
7. Write the advantages of R-2R D/A converter over weighted resistor D/A converter.
8. Why current sensing protection is required for the voltage regulator?
9. Define the terms with respect to voltage regulators
   (i) Line Regulation (ii) Load Regulation (iii) Ripple Rejection
10. What is balanced demodulator?

PART – B (3x18=54 Marks)

11.a) Explain the working of V to I converter with floating load and grounded load.
   b) Derive the voltage gain equations for an inverting and non-inverting modes of Op-Amp

12. Draw the circuit of a full wave precision rectifier circuit and explain its operation.

13. Explain the operation of a triangular waveform generator. Derive the equation for frequency of oscillations

14.a) Explain the operation of voltage to frequency converter. Derive the necessary equations.
   b) Explain the working of D/A converter.

15 .a) Explain the operation of a set up switching regulator with a block diagram.
   b) Explain the current fold back feature of the voltage regulator by drawing a neat diagram

16. Design a fourth order Butterwork low pass filter having an upper cut off frequency of 2.5KHz. Assume the remaining data.

17. Discuss the following in detail.
   (a) Instrumentation Amplifier
   (b) Positive clipper and positive damper

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FACULTY OF ENGINEERING

B.E. 3/4 (Prod.) I Semester (Backlog) Examination, October 2020

Subject: Metal Forming Technology

Time : 2 Hours   Max. Marks: 75

Note: Answer any seven questions of Part - A & answer any three questions from Part - B.

PART – A (7x3=21 Marks)

1 What is plasticity cycle? Explain briefly.
2 Differentiate between blanking and piercing.
3 Sketch and label the parts of a simple die.
4 How a sheet metal press is specified? Explain.
5 Explain the advantages of backward extrusion.
6 What is impact extrusion? Explain briefly.
7 Why draft is provided on a drop-forging die?   Explain.
8 Enlist various defects that may occur during forging operations.
9 What is meant by grain grow in case of rolled components? Explain.
10 Sketch and label the parts of three high rolling mills.

PART – B (3x18=54 Marks)

11. a) Discuss the yield criteria for a ductile material.
    b) Explain about plane stress and plane strain conditions.

12. a) A hole of 10 mm X 20 mm is to be cut in a 2 mm thick sheet. Calculate the press load required to cut the hole taking shear strength of the material as 80 MPa.
    b) Sketch and explain the working of a compound die.

13. a) Describe the deep drawing process with the help of a neat sketch.
    b) What are the significant process variables in wire drawing? Explain.

14. a) Explain the phenomenon of metal flow in extrusion process.
    b) Discuss the effect of friction and die angles during extrusion process.

15. a) What are the important forging machines? Explain any one in detail with a sketch.
    b) Explain the design aspects for the forging dies with a suitable example.

16. a) Explain the principle of cluster rolling mills. Mention its advantages.
    b) Discuss the rolling procedure for typical shapes with the help of neat sketches.

17. Write short notes on any TWO of the following:
    a) Stretch forming b) Drop forging c) Roll bending

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FACULTY OF ENGINEERING
B.E. 3/4 (IT) I – Semester (Backlog) Examination, October 2020
Subject: Theory of Computation

**Time : 2 Hours**   **Max. Marks: 75**

Note: Answer any seven questions of Part - A & answer any three questions from Part - B.

PART – A (7x3=21 Marks)

1. Give two application of FA.
2. Show that regular languages are closed under union and concatenation.
3. What is homomorphism?
4. Define ambiguity in grammar with example.
5. Write any three programming techniques for Turing machines.
6. What is meant by undecidability?
7. State the pumping lemma for CFL'S.
8. Define PCP And MPCP.
9. What is universal language?
10. Discuss church hypothesis.

PART – B (3x18=54 Marks)

11. Eliminate Unit production from following Grammar.
    $E \rightarrow T|E+T$ $T \rightarrow F/T*F$ $F \rightarrow I\backslash(E)$ $I \rightarrow a|bIaI|b|I0|I1$

12. Illustrate table filling Algorithm to minimize DFA given below.
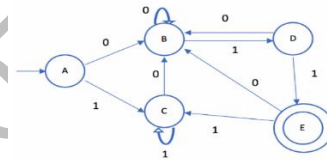
13. Explain with the help of pumping lemma weather the language.
    $L= \{a^n b^n| n >= 2 \}$ is regular or not

14. Obtain Turing Machine for $L= \{a^n b^n c^n\ n>1\}$ and Test weather string aabbcc is accepted or not using ID's.

15. Design PDA that accept by empty stack , process sequence of if's and else in c program , where" i" stands for if and " e" stands for else.

16. Write Algorithm to get CFG form PDA and solve given PDA
    $A=(\{q0,q1\},\{0,1\},\{S,A\},\hat{O} , q0, S, \Phi)$
    Where transitions $(\hat{O})$ are listed below
    $\hat{O}(q0,1,S) = \{(q0,AS)\}$
    $\hat{O}(q0,€,S) = \{(q0, €)\}$
    $\hat{O}(q0,1,A) = \{(q0,AA)\}$
    $\hat{O}(q0,0,A) = \{(q1,A)\}$
    $\hat{O}(q1,1,A) = \{(q1, €)\}$
    $\hat{O}(q1,0,S) = \{(q0, S)\}$

17. a) If L is recursive language then L' is also recursive language.
    b) Discuss types of Turing Machine.

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FACULTY OF ENGINEERING

B.E. ¾ (Mech.) I – Semester (Backlog) Examination, October 2020

Subject: Manufacturing Processes

Time : 2 Hours   **Max. Marks: 75**

Note: Answer any seven questions of Part - A & answer any three questions from Part - B.

PART – A (7x3=21 Marks)

1   Enlist various types of pattern materials used in casting process.
2   What do you know about "Directional solidification"?
3   What are the advantages of ceramic materials?
4   Give applications and limitations of centrifugal casting process.
5   Differentiate between soldering and brazing.
6   Briefly explain the principle of ultrasonic welding process.
7   What is the electrode material used in resistance welding and why?
8   Distinguish between spot welding and seam welding.
9   Differentiate between forward and backward extrusion.
10 Explain briefly about and deep drawing in sheet metal.

PART – B (3x18=54 Marks)

11 (a) Explain various properties of moulding sand and give its ingredients.
   (b) Discuss the types of pattern allowances provided on patterns.

12 (a) With neat sketches discuss the process of blow moulding of plastic
        components. How does this process differ from extrusion of plastics?
   (b) Explain with the help of neat sketches how ultrasonic welding takes place.
        What are the varies applications?

13 (a) Enumerate the advantages and limitations of PAW process. Give advantages
                                                                                and applications.
   (b) With suitable diagram discuss the working principle, applications and
        limitations of laser beam welding.

14 (a) Explain the thermit welding principle, advantages and applications.
   (b) Differentiate between hot working and cold working. Give advantages and
        disadvantages.

15 (a)Differentiate between punching and blanking in sheet metal.
    (b)Explain rubber pad forming with neat sketch.

16 (a)Explain the importance of MEMS in manufacturing process.
   (b) Explain yield criteria in metal forming process.

17 Write short notes on any two of the following:
        (a) Welding defects – causes and remedies
        (b) Lost wax process (c) Resistance welding   (d) Tube drawing
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