FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I-Semester (Old) Examination, May / June 2017

Subject : Transportation Engineering

Time : 3 hours   **Max. Marks : 75**

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

PART – A (25 Marks)

1	Explain the objects of highway planning.	2
2	What is off tracking? Derive the equation required for widening of pavements.	3
3	Define i) volume ii) speed iii) density iv) head way	2
4	Estimate the basic capacity of traffic lane at a speed of 70 kmph. Assume that all the vehicles are of average length 6m.	3
5	Explain the functions of joints in cement concrete pavements.	2
6	Define Bitumen and tar and bring out the points of differences between bitumen and tar.	3
7	Draw the cross section of a B.G. Track in embankment with details.	2
8	Enumerate the type of sleepers used in permanent way. Explain the merits and demerits of any one type.	3
9	What is the role of ICAO in the development of airports?	2
10	Define i) Cross wind component ii) Wind rose diagram and iii) Head wind.	3

PART – B (50 Marks)

11 a) What are the uses of map study in Engineering surveys for highway location.   3

   b) The speed of overtaking and overtaken vehicles are 75 and 60 kmph respectively on a two way traffic road. If the acceleration of overtaking vehicle is 1.1 m/sec^2, calculate the safe overtaking sight distance, mention the minimum length of overtaking zone and draw a neat sketch of overtaking zone and show the positions of the sign posts.   7

12 a) Show the conflict points at the intersection of the following types.
   i) cross roads, both two way   ii) cross roads, one way
   iii) T intersection, both two way   6

   b) Indicate how the traffic volume data are presented and the results used in traffic engineering.   4

13 a) Explain the desirable properties of aggregates to used in different types of pavement construction.   5

   b) Calculate the stresses at interior, edge and corner of cement concrete pavement by using Westergaard's stress equations.
   Modulus of elasticity of concrete = 3 x 10^5 kg/cm^2, Poisson's ratio of concrete = 0.15, Thickness of concrete pavement = 18 cm, Modulus of sub-grade reaction = 8.5 kg/cm^3, wheel load = 5100 kg, Radius of loaded area = 15cm.   5

..2

14 a) Define Creep. Explain briefly the various theories of creep. 5
   b) Draw the neat sketches of the layout of left and right hand turnouts with all the details. 5

15 a) Explain the various factors to be considered in the geometric design of runways. 7
   b) The runway gradation map indicates that there is a rising gradient of 1.0% meeting a falling gradient of 0.70%. There is again an upgrade of 0.70%. Design the runway profile as per FAA specifications. 3

16 a) Explain the level of service concept as per HCM 2000. 5
   b) Explain the remedial measures to reduce the accidents on highways. 5

17 Write short notes on the following : 10
   a) Sight distance
   b) O and D studies
   c) Permanent way component parts
   d) Corrections to be applied for basic runway length

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FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I – Semester (New) (Suppl.) Examination, May / June 2017

Subject: Transportation Engineering

Time: 3 Hours   **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions

from Part B.

PART – A (25 Marks)

1 Write the Classification of road system as per Third Road Development Plan.   [3]

2 Enumerate the reasons for Widening of a Pavement on a Horizontal Curves.   [2]

3 Define 30th Highest Hourly Volume.   [3]

4 Define Speed, Flow and Density relationships.   [2]

5 Write the Various properties of Road aggregates used for road construction.   [2]

6 Calculate the radius of contact for a wheel load of 4100 Kgs with a tyre pressure of 5 Kg/cm^2.   [3]

7 Define Creep in Rails.   [2]

8 Write any three functions of Ballast and Rails.   [3]

9 Expand ICAO and IAAI. Where are Head quarters situated?   [2]

10 What are the different systems of classification of Airport?   [3]

PART – B (5X10=50 Marks)

11 a) Explain briefly the various Surveys carried out for Highway Alignment.   [5]
    b) Derive an Expression for determining the rate of Super elevation, if the design coefficient of lateral friction is 'f'.   [5]

12 a) Explain the Highway Capacity and Level of Service concept as per HCM 2000 design manual.   [5]
    b) What is rotary intersection? Explain design factors of Rotary Intersection.   [5]

13 a) Explain Flexible and Rigid pavements with neat sketches.   [5]
    b) Explain the CBR method of Flexible pavement design.   [5]

14 a) With a neat sketch explain the structure of Permanent way and show the Components. What are the requirements of Permanent way in Railways?   [5]
    b) Define the terms: Cant and Cant deficiency. A 6 degree curve branches off from a 3 degree main curve in an opposite direction in the layout of B.G Yard. If the Speed on the branch line is restricted to 35 Kmph. Determine the speed restriction on the main line. Assume permissible deficiency in cant as 75 mm.   [5]

15 a) What are Points and Crossings? Explain the necessity of Points and Crossings.   [5]
    b) Define Turnouts. Draw the layout of a left hand Turnout and explain in detail.   [5]

16 a) Explain the various corrections required for elevation, temperature and gradient suggested by ICAO and FAA. [5]

b) The proposed runway length under standard condition is 2120 m. The Airport site has an elevation of 365 m. The monthly mean of average daily temperature is 40° C and monthly mean of maximum daily temperature is 45^oC at the Airport site. Find out the corrected runway length of effective gradient is 0.12 %. [5]

17 Write a note on any **FOUR** of the following: [10]
   a) Accident Studies
   b) Coning of Wheels
   c) Types of Rails
   d) Aircraft types and characteristics
   e) Traffic signals

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FACULTY OF ENGINEERING

B.E. 3/4 (EEE/Inst.) I-Semester (Old) Examination, May / June 2017

Subject : Linear Integrated Circuits

Time : 3 hours   Max. Marks : 75

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

PART – A (25 Marks)

1	Mention any three characteristics of an ideal Op-Amp.	3
2	Draw the circuit diagram of a Non-Inverting Op-Amp.	2
3	Draw pin diagram of IC741.	3
4	Mention the four DC offsets for an Op-Amp.	2
5	Draw a voltage to current converter with floating load.	3
6	Define "Locked" and "Capture in Range" for a VCO.	2
7	What is the output voltage for a three terminal fixed voltage regulator 7820.	3
8	Define the quality factor (Q) for a filter and find Q. If F_h = 20KHz, F_1 = 8KHz.	2
9	Draw the circuit diagram of dual voltage regulator of $\pm$ 5V.	2
10	Draw the circuit diagram of a Narrow band reject filter.	3

PART – B (50 Marks)

11 a) Derive the equation for output voltage Vo, for the differential amplifier.   5
    b) Discuss the frequency response of Op-Amp.   5

12 a) Explain the working of a practical differentiator Op-Amp with relevant
        circuit diagrams.   5
    b) Write short notes on Schmitt trigger.   5

13 a) Explain quadrature oscillators with neat circuit diagram.   5
    b) Explain the operation of a triangular waveform generator with neat
diagram.   5

14 a) Explain the operation any A/D converter type with relevant diagrams.   5
    b) Write short notes on 555 timer.   5

15 a) Explain the working principle of series regulator with Op-Amp.   5
    b) Explain the operation of dual tracking regulator with neat circuit diagram.   5

16 a) Design a second order butter worth high pass active filter with a voltage
        gain of 2.5 and cutoff frequency of 5Hz.   5
    b) If a band pass filter has a resonant frequency of 1200 Hz and a bandwidth
        of 3000 Hz. Find the lower and upper cutoff frequencies.   5

17 Derive the equation for H_{HP}, H_{LP}, H_{BP} and H_N from a universal filter.   10

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FACULTY OF ENGINEERING

B.E. 3/4 (EEE/Inst.) I-Semester (New) (Suppl.) Examination, May/June 2017

Subject : Linear Integrated Circuits

Time : 3 hours   **Max. Marks : 75**

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

PART – A (25 Marks)

1	Define slew rate and what are the causes of slew rate.	2
2	The output impedance of Op-Amp is 50Ω its Ad = 10^5. What is the output impedance of voltage follower.	3
3	How the precision diode is different from conventional diode rectifier?	3
4	Mention the applications of instrumentation amplifier.	2
5	How to avoid false triggering of 555 timer?	2
6	How the R-2R ladder DAC is superior to weighted resistor DAC?	3
7	What is the function of voltage regulator?	2
8	Write the comparison's of linear voltage regulator and switching regulator.	3
9	Write the important parameters of a filter.	2
10	What is the use of twin T-notch filter?	3

PART – B (50 Marks)

11 Explain the DC characteristics of ideal Op-Amp.   10

12 Design a Schmitt trigger using an Op-Amp to set UTP = 4V and LTP = -2V. Supply voltage = ± 15V. Sketch the hysteresis loop.   10

13 Explain the types of D/A converters.   10

14 Explain series regulators using Op-Amp.   10

15 Explain balanced modulator and its applications.   10

16 Write short notes on
   a) PLL   5
   b) Parallel ADC   5

17 a) Explain the working of astable multivibrator   5
   b) Explain voltage follower   5

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FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I - Semester (Old) Examination, May / June 2017

Subject : Automatic Control Systems

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. Classify various types of Control Systems. [2]
2. Construct the Signal flow graph for the following set of simultaneous equations making y_4 as Output node.

   $y_2 = t_{21}y_1 + t_{23}y_3$
   $y_3 = t_{31}y_1 + t_{32}y_2 + t_{33}y_3$
   $y_4 = t_{42}y_2 + t_{43}y_3$ [3]
3. Sketch the response of 2nd order under damped system. $(0 < \xi < 1)$. [2]
4. What are the different types of error constants? [3]
5. Define Gain and Phase margins with respect to Bode plots. [2]
6. Justify why Lag and Lead networks are called Compensating networks. [3]
7. What is the transfer function of a zero order hold circuit ? [2]
8. Write the advantages and disadvantages of Digital control systems. [3]
9. Compare Modern control theory vs. Conventional control theory. [2]
10. Define State, State vector and State space. [3]

PART – B (50 Marks)

11. Using block diagram reduction techniques obtain C/R by reducing the block diagram shown below.
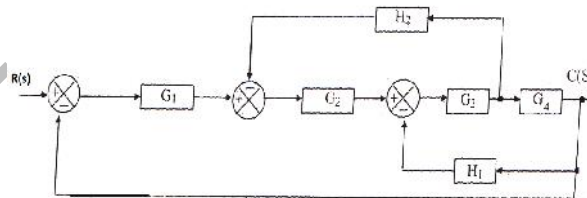
Also verify the same using Mason's gain formula by drawing signal flow graph. [10]

12. (a) The characteristic equation of the feedback control system is
    $s^4 + 20ks^3 + 5s^2 + (10+k)s + 15 = 0$.
    Determine the range of k for system to be stable. [5]

    (b) Obtain the response of unity feedback system whose open loop transfer function is $G(s) = \dfrac{4}{s(s+5)}$ and when the input is unit step. [5]

13. (a) Sketch the Nyquist plot for $G(s) = \dfrac{1}{(s+p_1)(s+p_2)}, p_1, p_2 > 0$ and find stability. [7]

    (b) Draw the block diagram of PID controller and obtain its transfer function. [3]

..2

14. (a) Explain the architecture of a Digital Control System giving a suitable physical example. [6]
   (b) Obtain the expression for C(z) in terms of R(z) of a basic closed loop discrete control system. [4]

15. (a) Obtain the solution of State space equation. [6]
   (b) What are the drawbacks of transfer function method over state variable approach ? [4]

16. Derive the transfer function of a Lag network and Lead network and sketch the root locus of a Lag and Lead transfer function. [10]

17. Write Short notes on : [10]
   (a) Synchros
   (b) Static error coefficients
   (c) State transition matrix

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FACULTY OF ENGINEERING
B.E. 3/4 (ECE) I - Semester (New) (Suppl.n) Examination, May / June 2017

Subject : Automatic Control Systems

Time : 3 Hours   Max. Marks: 75

Note: Answer all questions from Part-A and answer any five questions from Part-B. Missing data, if any, may suitably be assumed.

PART – A (25 Marks)

1   List the advantages of Closed loop system.   [2]

2   Demonstrate the basic elements used for modeling a mechanical rotational
    system.   [3]

3   Describe BIBO stability Criterion.   [2]

4   Illustrate how a Control system is classified depending on the value of damping
    ratio ?   [3]

5   Explain Compensators and list types of compensators.   [2]

6   Why Derivative controller is not used in Control systems.   [3]

7   When a control system can be called as sampled data control system?   [2]

8   Write the advantages and disadvantages of Digital control systems.   [3]

9   What are the properties of State Transition Matrix ?.   [2]

10 What is Controllability ? How is the Controllability of a system determined ?   [3]

PART – B (50 Marks)

11 (a) Write F-V analogy for the elements of mechanical rotational system.   [4]
   (b) Determine the overall transfer function for the following block diagram.   [6]
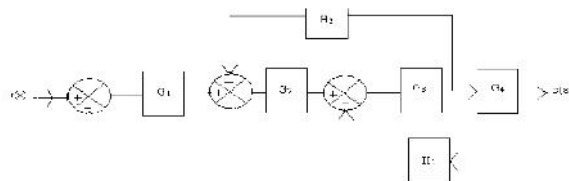
12 (a) Using Routh Criterion, design the stability of the system represented by the
        characteristic equation $s^4+8s^3+18s^2+16s+5=0$.   [5]
   (b) Construct the Root Locus for the following loop transfer function.   [5]

$$G(s)H(s) = \frac{K}{s(s+4)(s^2+4s+20)}.$$

13 (a) What is Principle of argument ?   [3]
   (b) Demonstrate the Nyquist plot for a system, whose open loop transfer function
        is given by $G(S) H(S) = K(1+S)^2 / S^3$. Find the range of K for stability.   [7]

14 (a) What is the transfer function of Zero order hold? [4]
   (b) For a system having system $G(s) = 1/(s+2)$ and $H(s) = 1$, find the output value at sampling instants for unit step input $r(t)$. Take sampling interval $T = 0.5$ sec. [6]

15 (a) Explain in detail the State space representation for continuous time systems. [5]
   (b) Determine the Controllability of a system with $X = AX + BU$ and [5]

$$A = \begin{bmatrix} -0.5 & 0 \\ 0 & -2 \end{bmatrix}, \quad B = \begin{bmatrix} 0 \\ 1 \end{bmatrix}.$$

16 (a) State the rule for obtaining Breakaway points in the Root locus. [4]
   (b) Discuss in detail about Lead, Lag and Lag-lead compensating networks. [6]

17 Write Short notes on : [10]
   (a) Synchro transmitter and receiver
   (b) Static error coefficients
   (c) State models of LTI systems

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FACULTY OF ENGINEERING
B.E. 3/4 (Mech.) I - Semester (New) (Suppl.) Examination, May / June 2017

Subject : Manufacturing Processes

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 Enlist various types of pattern materials used in casting process.
2 Give applications and limitations of centrifugal casting process.
3 Differentiate between soldering and brazing.
4 Briefly explain the principle of ultrasonic welding process.
5 What is the electrode material used in resistance welding and why?
6 Distinguish between spot welding and seam welding.
7 Differentiate between forward and backward extrusion.
8 Explain briefly about spinning and deep drawing.
9 What are the types and advantages of ceramic materials?
10 Why oxidizing flame is used for welding of brass?Justify.

PART – B (50 Marks)

11 (a) What are the advantages of solid state welding processes over fusion welding processes? Explain ultrasonic welding process with a neat sketch.
   (b) Explain PAW process with a neat sketch. Describe how it is different from TIG.

12 (a) What is the principle of resistance welding? Explain the percussion welding process along with its applications.
   (b) State and explain various welding defects, their causes and remedies.

13 (a) Explain various properties of moulding sand and its ingredients.
   (b) Discuss with sketches the types of pattern allowances.

14 (a) Explain shell moulding process with neat sketch with its applications and limitations.
   (b) Explain friction stir welding process with neat sketch.

15 (a) Sketch and explain electro-magnetic forming with neat sketch.
   (b) Distinguish between impact extrusion and hydrostatic extrusion.

16 (a) Explain the procedure for the design of gating system.
   (b) Explain hot chamber die casting with neat sketch with limitations and advantages.

17 Write short notes on the following:
   (a) Casting defects with causes and remedies
   (b) Resistance butt welding
   (c) Sheet metal operations

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FACULTY OF ENGINEERING

B.E. 3/4 (Mech.) I-Semester (Old) Examination, May / June 2017

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 (25 Marks)

1 State and advantages of top gate over the bottom gate.
2 Find the diameter of the side riser for a casting of dimensions 100mm x 50mm x 10mm using modulus method.
3 What is the binder used in CO_2 moulding process? State the process of hardening of the mould.
4 Explain stretch forming.
5 Compare the SAW and SMAW based on merits and demerits.
6 "Joint gap is highly critical in soldering and brazing processes". Justify the statement.
7 What is difference between spot welding and resistance seam welding? Why does the melting in spot welding take place at the interface between two sheets?
8 State the differences between cold working and hot working.
9 What is the difference between blanking and piercing? How is the clearance provided in blanking and piercing operations?
10 What is bend allowance? And how is it calculated?

PART – B (50 Marks)

11 a) State and explain about various allowances that should be given to pattern.
   b) Explain the procedure for gating system design.

12 a) What are various inspection techniques available to inspect surface and subsurface defects of the casting and explain about them in brief.
   b) Explain the process of producing plastic components by injection moulding.

13 a) State the types of flames in oxy-acetylene welding process. Explain how they are distinguished by appearance with neat sketches. What are their applications?
   b) Explain the atomic hydrogen welding process with its merits, demerits and applications.

14 a) State the welding process which is done in vacuum. Explain the equipment details and the process of welding that process.
   b) What are the applications of Thermit welding? How are the components welded by thermit welding process?

..2

15 a) What is the purpose of hydrostatic extrusion? Explain about it in detail.
   b) What are the merits and demerits of rubber pad forming with respect to conventional forming process? Explain any one of the rubber pad forming processes.

16 Explain the following briefly
   a) NRL method of riser design
   b) Blow moulding
   c) Friction welding

17 Explain the following briefly
   a) Resistant spot welding
   b) Tresca yield criteria
   c) Electro hydraulic forming

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FACULTY OF ENGINEERING

B.E. 3/4 (Prod.) I – Semester (Old) Examination, May / June 2017

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 (25 Marks)

1	What is strain rate and explain its effect on yield stress?	2
2	Differentiate between plane stress and plane strain with suitable examples in metal forming.	
3	Write the methods used for reducing cutting force in sheet metal working.	3
4	Differentiate between shear spinning and tube spinning.	2
5	Explain hydrostatic extrusion with its advantages.	3
6	What are the lubricants used in wire drawing?	2
7	Define absolute spread and coefficient of elongation.	2
8	What is the angle of bite and explain its significance in rolling.	3
9	Distinguish between fullering and edging with neat sketches.	2
10	Write advantages of closed-die forging over open die forging.	3

PART – B (5x10 = 50 Marks)

11 a) Explain yield criterion for predicting plastic deformation in metals.   5

   b) Discuss the phenomenon of work hardening and its role in metal forming.   5

12 a) Explain any 2 dies used in sheet metal working with neat sketches.   5

   b) Write about stretch forming operation.   5

13 a) Derive an expression for ideal force in extrusion and how it is affected by friction, die angle and speed of deformation.   6

   b) Explain multi-die wire drawing process with a neat sketch.   4

14 a) Explain different types of roll mills with their applications.   6

   b) Define the terms:
   i) Bloom
   ii) Billet
   iii) Slab
   iv) Plate   4

…2.

15 a) Explain forging defects. 5

 b) Write about machine forging. 5

16 Write short notes on any two: 10
   a) Bauschinger effect
   b) Edge bending
   c) Wire drawing die

17 Write short notes on any two: 10
   a) Tube extrusion
   b) Swaging
   c) Ring rolling.

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FACULTY OF ENGINEERING

B.E. 3/4 (Prod.) I-Semester (New) (Suppl.) Examination, May / June 2017

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 (25 Marks)

1   What is thermo-plasticity? Explain.   3
2   What do you understand by strain hardening? Explain briefly.   2
3   List out sheet metal operations. Mention their applications.   3
4   Name the factors that decide clearance for blanking operations.   3
5   Sketch and label the parts of compound die.   2
6   Explain the principle of press forging.   2
7   Enlist various types of forging hammers.   2
8   Describe the roll pass sequence for bar.   3
9   Explain various rolling defects. Suggest the remedy for the defects.   3
10 Why strength of a rolled part is usually greater than a cast part? Explain.   2

PART – B (5 x 10 = 50 Marks)

11 a) What is recrystallization temperature? Discuss its significance in Metal Forming operations.
   b) Explain the phenomenon of yielding of a ductile material under bi-axial state of stress.

12 a) Discuss the plane stress and plane strain conditions with suitable examples in metal forming.
   b) Differentiate clearly between deep drawing and spinning operation.

13 a) Explain the effect of friction and die angle in extrusion process.
   b) Discuss the selection of die materials for drawing process.

14 a) Sketch compound die set labeling all the parks and give its applications.
   b) Classify presses state how they are specified. How blanking loads are estimated?

15 a) Discuss in detail the process of Isothermal forming.
   b) Describe working of drop forging hammer with a neat sketch.

16 a) Describe with neat sketch the working of a Four-high rolling mill.
   b) Explain the effect of roll load, roll torque on the rolling process.

17 Write short notes on any TWO of the following :
   a) Grain formation in hot rolling process
   b) Direct and indirect extrusion process
   c) Roll bending

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FACULTY OF ENGINEERING

B.E. 3/4 (AE) I-Semester (Old) Examination, May / June 2017

Subject : Production Technology

Time : 3 hours   Max. Marks : 75

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

PART – A (25 Marks)

1	What are the functions of a core?	2
2	Name the important factors in selecting sand for moulds.	3
3	Sketch the different types of flames in oxy-acetylene welding.	3
4	Differentiate between soldering and brazing.	3
5	Differentiate between cold working and hot working.	3
6	List the advantages of forging.	2
7	How plastics are processed?	2
8	Sketch the single point cutting tool.	3
9	What is lapping and honing?	2
10	List the different types of cutting fluids.	2

PART – B (50 Marks)

11 a) Discuss the desirable properties of a tool material.

    b) Enumerate the factors affecting the tool life? Briefly explain the effect of each factor.

12 a) Explain step by step procedure for die casting and investment casting process.

    b) What is the function of a blind riser?

13 a) Explain the TIG welding with neat sketch? Mention the type of electrodes that are in GMAW process.

    b) What is resistance welding process. Explain any one process with neat sketch.

14 a) What are different types of rolling mills? Illustrate with neat sketches.

    b) Explain the forward extrusion process with a line diagram.

15 a) Explain the merchant model for determining the shear plane angle in orthogonal cutting.

    b) A 25 mm dia steel bar was turned at 300 rpm using HSS tool. Tool failure occurred after 10min. when the speed was decreased to 250 rpm, the tool failed in 52.5min. assuming that Taylor's equation applies, find the expected tool life at a cutting speed of 275 rpm.

..2

16 Write short notes on the following :
   a) Investment casting
   b) Friction welding
   c) Press forging

17 Write short notes on the following :
   a) Capstan and turret lathes
   b) Cutting tool materials and its properties
   c) Centrifuging

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FACULTY OF ENGINEERING

B.E. 3/4 (AE) I – Semester (New) (Suppl.) Examination, May / June 2017

Subject: Production Technology

Time: 3 Hours   Max.Marks: 75

Note: Answer all questions from Part A. Answer any five questions

from Part B.

PART – A (25 Marks)

1   Define pattern. Name different types of pattern materials
2   Define pattern allowance. Name types of pattern allowances
3   Sketch the types of flames in gas welding. Indicate their temperatures and label the colors involved.
4   Write and explain the terms involved in specification of an Welding Electrode
5   Distinguish between Hot working and Cold working
6   Sketch two high, three high, Cluster and planetary Roll mills.
7   What are the advantages of using cutting fluids during machining?
8   Explain different types of chips and chip breakers.
9   How will you specify a lathe?
10 Name three tool holding and work holding devices in lathe.

PART – B (5x10 = 50 Marks)

11 a) With neat sketches, explain the steps involved in making a casting.   [5]
   b) Explain various defects and their remedies in casting.   [5]

12 a) Explain with neat sketch the various modes of metal transfer in GMAW.   [5]
   b) Distinguish between Brazing, Braze welding and Soldering.   [5]

13 a) Explain with neat sketch the process and principle of Impact Extrusion and
       state applications.   [5]
   b) With neat sketches explain Drop forging and press forging.   [5]

14 a) Distinguish between shaping, slotting and planning.   [5]
   b) Distinguish between Up and Down milling with sketches.   [5]

15 a) Sketch the nomenclature and geometry of a single point cutting tool.   [5]
   b) What are the factors effecting tool life and how it is calculated.   [5]

16 a) Explain with neat sketches blanking and piercing operations.   [5]
   b) Explain in detail with neat sketches Tube Extrusion.   [5]

17 Write short notes on: [10]
   a) Wire Drawing
   b) Explosive Welding
   c) Investment Casting.

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FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I-Semester (New) (Suppl.) Examination, May / June 2017

Subject : Data Communications

Time : 3 hours   **Max. Marks : 75**

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

PART – A (25 Marks)

1 Define Data Communication model and protocol architecture.	2
2 For the bit stream 11001010, sketch the wave form of any three digital signal encoding formats.	3
3 Define single bit errors and burst errors.	2
4 What are the 3 data transfer modes defined in HDLC?	3
5 Differentiate BPSK and QPSK.	2
6 What are the characteristics of VCC?	3
7 List some basic function performed at the MAC layer.	2
8 Write briefly about soft switch architecture.	3
9 What is the principle of frequency reuse technique in content of a cellular network?	3
10 Define scatternet.	2

PART – B (50 Marks)

11 a) List the service layers of OSI model and explain the functionalities.	6
b) Explain guided transmission media and its characteristics.	4
12 a) Explain CRC with an example.	6
b) Explain EIA – 232 in respect of four important characteristics.	4
13 a) Elaborate various method of multiplexing.	5
b) Differentiate circuit switching from packet switching with timing diagram.	5
14 a) Write about layer 2 and layer 3 switches.	5
b) Explain briefly about Gigabit Ethernet.	5
15 a) Write about IEEE 802.11 architecture.	5
b) How medium access control is done in wireless LAN?	5
16 a) Explain transmission impairments.	5
b) What is need of PCM? Explain the concept of sliding window protocol.	5
17 Write short notes on any two of the following :	
a) ATM cell header format	5
b) HDLC	5
c) DSSS	5

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FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I – Semester (Old) Examination, May / June 2017

Subject: Design and Analysis of Algorithms

Time: 3 Hours   **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions

from Part B.

PART – A (25 Marks)

1   Given $f(n)=10n^2+4n+3$, then prove that $f(n)=O(n^2)$ 3

2   List and define operations performed on sets?   2

3   Write control abstraction for divide and conquer approach?   2

4   What is the time required to compute a minimum weight spanning tree for any given weighted graph with E edges and V vertices?   3

5   When do you apply dynamic programming to solve a problem?   2

6   What do you mean by forward and backward approach of problem solving in dynamic programming?   3

7   Differentiate LCBB and FIFO Branch and bound?   3

8   What is chromatic number? Give an example.   2

9   List out the functions used to specify non deterministic algorithm?   2

10 Define NP-complete and NP-hard problems. Give an example for each.   3

PART – B (5x10 = 50 Marks)

11 a) Solve the following recurrence relation using master's theorem.

     a) $T(n) = 2T(n^{1/2})+\log n$

     b) $T(n) = 9T(n/3)+n^{2.5}$ 4

    b) Draw the worst case tree using weighting rule for UNION after implementing following set of operations

       UNION(1,2),UNION(3,4),UNION(5,6),UNION(7,8),UNION(1,3), UNION(5,7),UNION(1,5)   6

12 a) Analyze quick sort algorithm worst case time complexity.   5

    b) Cite optimal merge pattern algorithm and explain with an example.   5

13 a) For the following graph find articulation point and bi connected components using DFS.
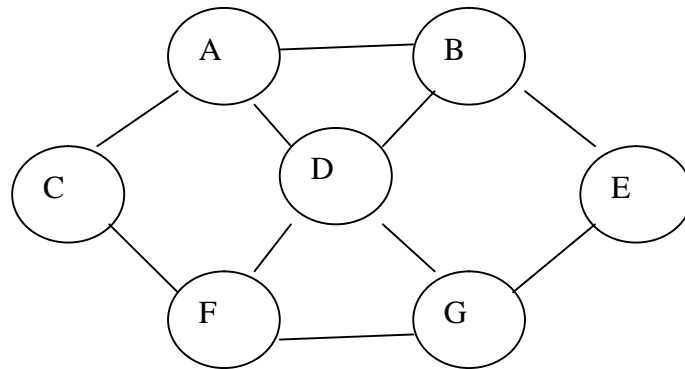
b) Cite and explain all pairs shortest path problem.   5

14 a) Find the solution to 0/1 knapsack problem using FIFO Branch and bound
m=12,n=4,(p1,p2,p3,p4)=(10,10,12,18) and (w1,w2,w3,w4)=(2,4,6,9)   5

b) Write an algorithm to find all m-coloring of a graph.   5

15 a) State Cooks theorem and prove it.   6

b) Write non deterministic algorithm for sorting.   4

16 a) Explain Dictionaries and heap data structure.   5

b) Explain Reliability design problem.   5

17 Write short notes on any two of the following: 10

a) Performance analysis of an algorithm

b) Lower bound theory

c) Merge sort.

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FACULTY OF INFORMATICS

B.E. 3/4 (IT) I-Semester (New) (Suppl.) Examination, May / June 2017

Subject : Theory of Computation

Time : 3 hours   **Max. Marks : 75**

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

PART – A (25 Marks)

1 Give an example of a two-state system and present its state-transition diagram to illustrate it as a DFA.	3
2 What is ECLOSE of a state? Give an example.	2
3 State identiy, Annihilator, Idempotent and closure laws of regular expressions.	2
4 State pumping lemma for regular languages and explain briefly.	3
5 Distinguish between ambiguous and unambiguous CFGs.	2
6 Write properties of CFLs.	3
7 Formally define a Turing Machine and its Instantaneous Description (ID).	3
8 Will the Turing Machine halt on the following input (words) from : i) Recursively Enumerable Language ii) Recursive Language	2
9 List undecidable problems about Turing Machine specifications.	3
10 What is an Intractable problem? Give an example.	2

PART – B (50 Marks)

11 State and explain the steps involved in subset construction method used for conversion of a NFA to DFA to bring out their equivalence.   10

12 Convert the DFA given below to regular expression showing basis and recursive steps of structural induction using   10

$$R_{ij}^{k} = R_{ij}^{k-1} + R_{ik}^{k-1} (R_{kk}^{k-1})^{*} R_{kj}^{k-1}$$

δ	0	1
$\rightarrow q_0$	q_1	ϕ
q_1	ϕ	q_2
$* q_2$	q_2	q_1

13 a) Demonstrate the following with an example to illustrate :   5
     If L and M are regular, then so is L∩M.
   b) Explain how equivalent (indistinguishable) states help minimize a DFA.   5

14 a) Define and distinguish between 'Acceptance by Final State' and 'Acceptance by Empty Stack' for a PDA.   4

   b) Trace the sequence of IDs starting from Initial ID : $(q_0, 000011, Z)$ to illustrate 'Acceptance by Final State' for the PDA shown below :   6
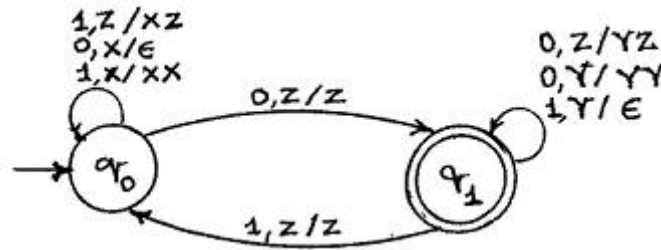
15 a) Explain 'Move' and 'Halting' of a Turing Machine in terms of state, head position and tape content.   5

   b) Describe one restricted Turing Machine in detail.   5

16 a) Discuss the following :
    A problem is decidable if it is a recursive language.   5

   b) Analyse TSP problem for intractability.   5

17 Write Comparative notes of the following :   5+5
   a) Properties of Regular languages and context Free Languages
   b) P and NP problems.

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FACULTY OF INFORMATICS
B.E. 3/4 (IT) I - Semester (Old) Examination, May / June 2017

Subject : Theory of Automata

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   Construct a DFA to accept the strings ending with 'bab' for   ={a,b}   (3)
2   Write the regular expression to accept strings of 0's and 1's having 3
    consecutive 0's.   (2)
3   What is an ambiguous grammar? How ambiguity can be removed?   (2)
4   What is Homomorphism? Give an example.   (3)
5   What is deterministic PDA? Give its formal definition.   (2)
6   Eliminate left recursion from the following grammar   (3)
       E   E+T/T
       T   T*F/F
       F   (E)/id
7   Briefly Explain Multiple track Turing Machine.   (2)
8   What is a Non-Deterministic Turing Machine?   (3)
9   What is a Universal Turing Machine?   (3)
10 What is a NP-Complete problem?   (2)

PART- B (50 Marks)

11 Convert the following NFA to DFA.   (10)
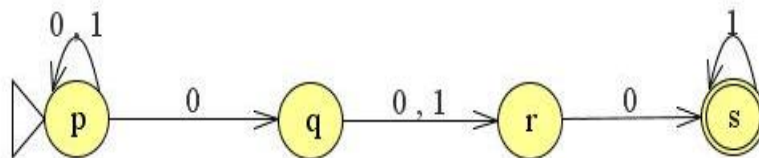
12 State and Prove Pumping Lemma for Regular Languages.   (10)
13 Construct a PDA to accept the language L(M)={ww^R/w (0+1)*} where w^R
    is the reverse of w.   (10)
14 Convert the given grammar into CNF.   (10)
       S   AB22
       A   S1/122/D0A
       B   1/1C/
       C   221/DD
       E   02
15 Construct a TM to accept the language L={a^{n}b^{n}c^n/n>=1}.   (10)
16 State and explain Rice Theorem.   (10)
17 (a) What are the applications of Finite Automata?   (4)
    (b) What is CFG. Give its formal notation?   (3)
    (c) What is an -Closure. Give an example.   (3)

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