**Code No. 1639**

# FACULTY OF TECHNOLOGY

**B.Tech. 4/4 (Chem. Engg.) I – Semester (Backlog) Examination, June 2018**

**Subject: Mass Transfer Operations – II**

**Time: 3 Hours** **Max. Marks: 70**

**Note: Answer all questions. All questions carry equal marks.**

1 a) i) Explain briefly the flash vaporization. [4]

ii) A mixture of benzene and toluene containing 40 mole % benzene is to be separated to give 65% of feed as vapour a product, in an equilibrium distillation. Using an average value of 2.4 for the volatility of $C_6H_6$ relative to toluene, calculate the quantities and qualities of vapour and liquid products for 100 k moles / hr of feed. [10]

**OR**

b) i) What is relative volatility? Explain its significance. [4]

ii) A simple distillation unit is used to distill 1200 kg of a mixture contains 60 wt % of ethyl alcohol and 40 wt % of $H_20$. After distillation, the residue composition is of 5 wt % alcohol. Determine the composition of the distillate its mass and mass of the residue. [10]

Equilibrium data for

Ethyl Weight fraction of ethyl alcohol:

| In liquid | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | -- |
|---|---|---|---|---|---|---|---|---|---|
| In vapour | 0.510 | 0.655 | 0.710 | 0.740 | 0.767 | 0.789 | 0.81 | 0.855 | -- |

2 a) i) Explain extractive distillation with a suitable example. [4]

ii) A distillation column is to be designed to separate A and B. The feed is 35% A at its dew point. The distillate and the residue compositions of A are 0.95 and 0.025. Find the number of equilibrium stages required in column if the reflux ratio is 2.5. Assume relative volatility is 2.25. [10]

**OR**

b) i) Write the important characteristics of entrainer in azeotropic distillation. [5]

ii) Write short notes on reboilers. [5]

iii) When are packed bed distillation columns are preferred? Explain. [4]

3 a) i) Discuss with an example for the system of 3 liquids where two pairs partially soluble. Also discuss the effect of temperature on the above system. [7]

ii) Explain the procedure for the location of difference point in counter current extraction unit. [7]

**OR**

b) A feed solution of $H_20$-acetic acid contains 13.4% acid by weight. It is desired to extract 95% of acid using diethyl ether as solvent. The solvent is pure and assumed to be immiscible to each other between $H_20$ and diethyl ether. Determine minimum amount of solvent required for 1000 kgs of feed and number of theoretical stages by counter current contactor if 1.5 times the minimum solvent is used. [14]

$X'$ and $Y'$ are weight ratios

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $X'$ | 0 | 0.0204 | 0.0417 | 0.0638 | 0.087 | 0.1111 | 0.1299 | 0.1628 |
| $Y'$ | 0 | 0.0334 | 0.1072 | 0.1481 | 0.1923 | 0.2277 | 0.2914 | |

4 a) i) With a neat sketch explain the construction and operation of Kennedy extractor. [7]

ii) Explain typical equilibrium diagrams used in leaching operation. [7]

**OR**

b) The oil is to be extracted from meal by using hexane as solvent in an counter current extractor. The unit is to treat the meal which contains 1200 kg / hr of exhausted solid. The untreated meal contains 16 kg of oil and 600 kg of hexane. The exhausted solids are to contain 55 kg of unextracted oil. [14]

| Kg oil / kg solution | 0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |
|---|---|---|---|---|---|---|---|---|
| Kg solution retained / kg solid | 0.5 | 0.505 | 0.515 | 0.530 | 0.550 | 0.571 | 0.595 | 0.620 |

5 a) i) Explain physical and chemical adsorption. Write briefly about an adsorption hysterisis. [7]

ii) What are hyper sorbers? Explain in detail. [4]

iii) Write a short note on nature of adsorbents. [3]

**OR**

b) An aqueous solution containing a valuable solute is coloured by small amounts of an impurity. The impurity is to be removed on a decolorizing carbon which adsorbs only significant amounts of principal solute. The colour intensity is measured in units. It is reduced to colour to 10% of its original value 12. Determine the quantity of fresh carbon required per 1000 kg of solution for 2 stage cross current process. [14]

| Kg carbon / Kg solution | 0 | 0.001 | 0.004 | 0.008 | 0.02 | 0.04 |
|---|---|---|---|---|---|---|
| $Y^*$ eqm colour, units/kg sol. | 12 | 10 | 8 | 4 | 2 | 1 |

****

Code No. 20/CBCS

**FACULTY OF ENGINEERING**

**B.E. II Semester (EE/Inst.) (CBCS) (Main & Backlog) Examination,**
**May / June 2018**

**Subject: Elements of Mechanical Engineering**

**Time: 3 Hours** **Max. Marks: 70**

**Note:** Answer All Questions From Part - A & Any Five Questions From Part-B.

**PART-A (10 X 2 = 20 MARKS)**

1. What is Clauses inequality
2. Explain the concept of entropy
3. During a cycle consisting of four processes, the heat transfers are 60KJ,-8KJ, -34KJ and 6KJ. Determine the net work of the cycle
4. Draw the valve timing diagram for 4-stroke S.I engine
5. State Stefan-Boltzmann law of radiation
6. State Wein's displacement law
7. Define the term LMTD in heat exchange
8. Define pitch circle, module and gear ratio of gear drive
9. Compare five spur gears and helical gears applications
10. List different parts of Lathe machine

**PART-B (5 X 10 = 50 MARKS)**

11. a) Explain second law of thermodynamics (4)
    b) Air is heated from 420 K to 600 k. Find the change in entropy if the process is:
    (i) Constant pressure process (ii) Constant volume process (iii) Reversible adiabatic process (6)

12. a) Explain with neat sketches working of 4-stroke diesel engine (5)
    b) Compare ten points S.I engines and C.I engines (5)

13. Derive the expression for heat loss KJ/$m^2$ through a composite wall of layers:
    (i) Without considering convective heat transfer coefficient
    (ii) Considering convective heat transfer coefficient (5+5)

14. a) Derive an expression for the LMTD for parallel flow heat exchanger (5)
    b) Hot oil with a capacity rate of 2500 W/K flows through a double pipe heat exchanger. It enters at $360^0$c and leaves at $200^0$c. If the overall heat transfer coefficient is 800 W/$m^2$k, determine the heat exchanger area required for:
    (a) Counter flow (5)

15. a) Sketch and explain epicyclic gear train and list out it's applications (5)
    b) Derive an expression for the length of belt in cross belt drive (5)

…2

16. a) Explain with a neat sketches is the sand casting process (5)
    b) Compare cold working and hot working process with respect to strength of heat with neat sketch with neat sketch (5)

17. Write short notes on the following:
    a) Absortivity, reflectivity and transmissivity (3)
    b) Working of single stage compressor (4)
    c) Wire drawing operation (3)

*******

Code No. 22 / CBCS

# FACULTY OF ENGINEERING

**B.E. II – Semester (ECE) (CBCS) (Main & Backlog) Examination, May / June 2018**

**Subject: Basic Circuit Analysis**

**Time: 3 Hours** **Max.Marks: 70**

**Note: Answer all questions from Part – A & any five questions from Part – B.**

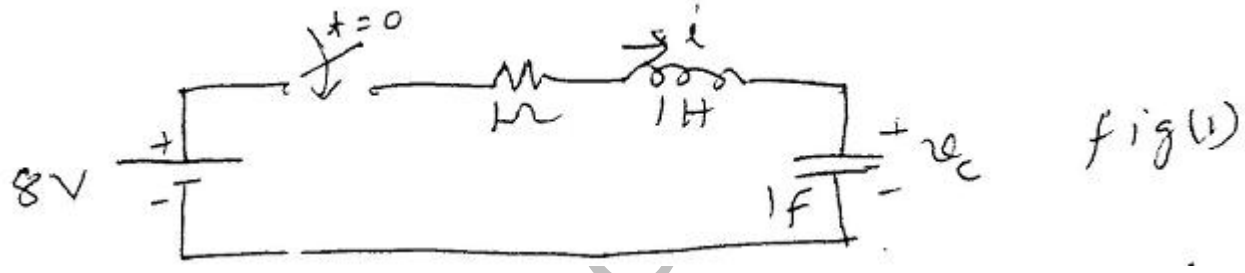
**PART – A (10 x 2 = 20 Marks)**

1 State Thevenin's theorem. Explain briefly.

2 Define – Tree, Chord, Graph and tie-set.

3 Define: Transient and steady state response.

4 Find $\frac{di}{dt}$ and $\frac{di^2}{dt^2}$ in the circuit shown at t = $0^+$ if $i(\bar{0})$ = 2A and $v_2(\bar{0})$ = 3v-1.




fig(1)

5 State maximum power transfer theorem for ac circuits containing reactive elements.

6 What is dot convention in magnetically coupled circuits?

7 Draw g-parameter equivalence circuit of a two port network.

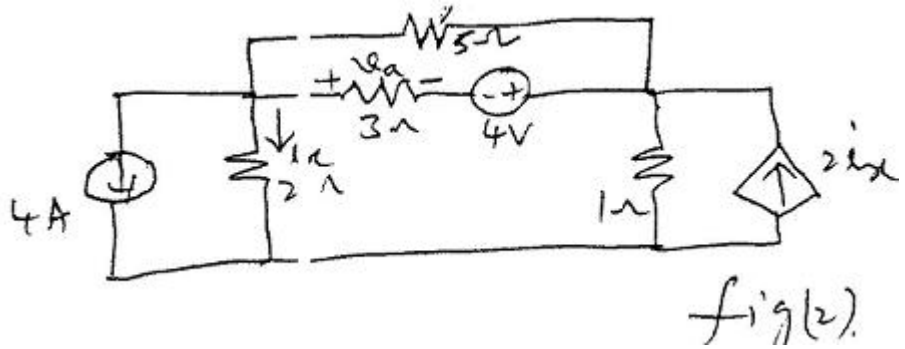
8 Find Z-parameters of a T-network.

9 If R = 2Ω, L = 1 mH and C = 10μf in a parallel resonant circuit, find $w_o$, Q and bandwidth.

10 Define poles and zeros of a network function.

**PART – B (5x10 = 50 Marks)**

11 Use nodal analytic to find $i_x$ and $v_a$ in the circuit shown.




fig(2)

12 Find $\neg_c(t)$ for $t \geq 0$ in the circuit shown.

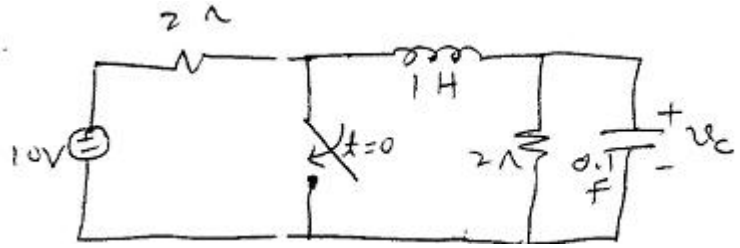



fig (3)

13 Find Thevenin's equivalent for the circuit shown.

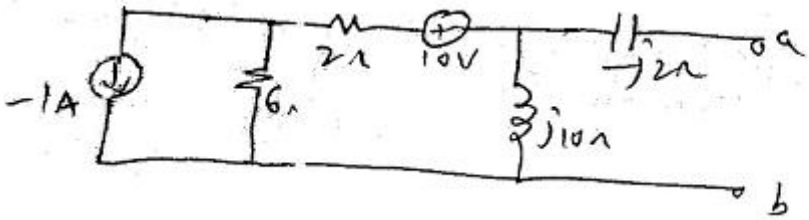



fig (4)

14 Find ABCB parameters of the circuit shown.

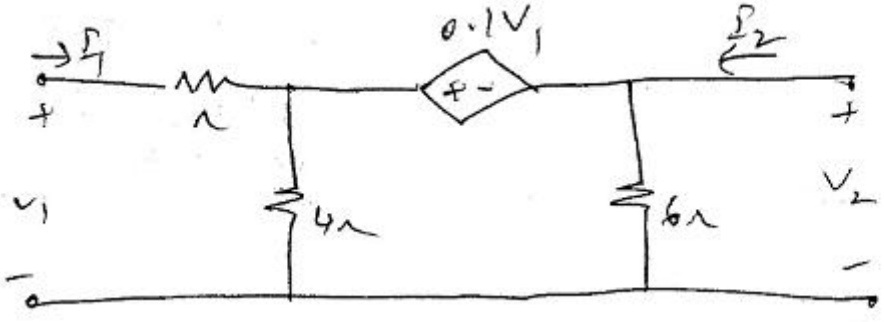



fig (5)

15 a) Derive an expression for quality factor of a series resonant circuit. 6

b) Find the impedance Z(s) and make pole – zero plot. 4

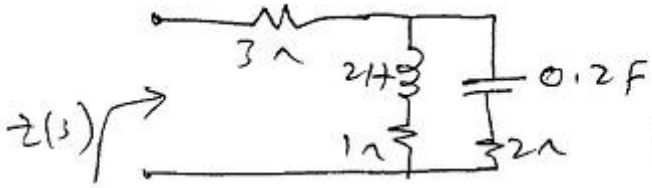



fig (6)

16 a) Draw the dual network for the network shown.

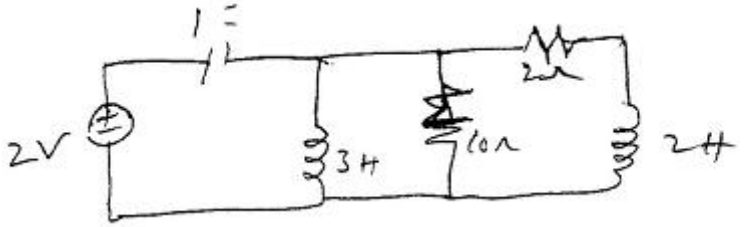



fig (7)

b) Formulate integro differential equations for a parallel RLC circuit for ZIR and ZSR.

17 Write short notes on:

a) Powers in a.c circuit
b) Reciprocity theorem
c) Impedance and admittance function.

****

Code No. 24 / CBCS

# FACULTY OF ENGINEERING

## B.E. II - Semester (Main & Backlog) Examination, May/June 2018

**Subject : Object Oriented Programming Using C++**

**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 | List the programming paradigms. | (2) |
| 2 | What are the advantages of OOP? | (2) |
| 3 | What is the difference between call by value and call by reference? | (2) |
| 4 | Define a abstract data types. | (2) |
| 5 | Define dynamic arrays. | (2) |
| 6 | What is copy constructors? | (2) |
| 7 | Discuss templates with syntax. | (2) |
| 8 | Explain linked lists. | (2) |
| 9 | Define virtual functions. | (2) |
| 10 | Define queues. | (2) |

### PART – B (50 Marks)

| | | |
|---|---|---|
| 11 | (a) Write a C++ program for employee information [Emp-number, name, salary, address]. | (5) |
| | (b) What are the control structures list with an syntaxes? | (5) |
| 12 | (a) Write a program for matrix multiplication using C++. | (5) |
| | (b) Define classes with an example. | (5) |
| 13 | Define derived classes and overriding with examples. | (10) |
| 14 | (a) What are arrays? Discuss Arrays in functions with an example. | (5) |
| | (b) Discuss classes and objects. | (5) |
| 15 | (a) Discuss exception handling with example. | (6) |
| | (b) Explain class templates. | (4) |
| 16 | (a) What is node? Implementation of stack using arrays. | (5) |
| | (b) What is queues? Implementation of queue using linked lists. | (5) |
| 17 | (a) What are the linked list operations list and explain the inserting a node, deleting a node? | (6) |
| | (b) Define Friend Function with an example. | (4) |

*****

**Code No. 116 / S**

# FACULTY OF ENGINEERING

## B.E. 3/4 (ECE) I-Semester (Supplementary) Examination, May / June 2018

## Subject: Automatic Control Systems

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

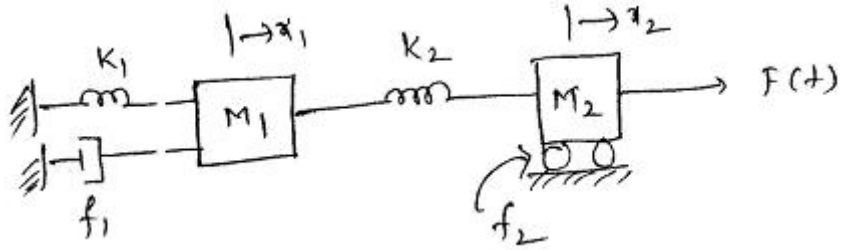
***Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.***

### PART – A (25 Marks)

1 Write the merits and demerits of block diagram reduction technique. 2
2 State Mason's gain formula. 2
3 Closed loop transfer function of a unity feedback system is given by $\frac{16}{S^2+4S+16}$ then determine static error constants. 3
4 The characteristic equation of a system is given by $S^4+8S^3+21S^2+20S+K=0$. Determine maximum value of K for the system to be stable. 3
5 Determine the resonant frequency and resonant peak of the system with closed loop transfer function $\frac{16}{S^2+4S+16}$. 3
6 What are the drawbacks of phase lead compensator? 2
7 Derive transfer function for zero order hold circuit. 3
8 How do you identify the stability of a sample data system? 2
9 Define controllability and observability. 3
10 Write the properties of state transition matrix. 2

### PART – B (50 Marks)

11 a) Determine transfer functions for a given mechanical system. 6




b) Briefly explain about torque-voltage and torque-current analogy. 4

12 A unity feedback control system has an open loop transfer function $G(S)=\frac{K(S+1)}{S^2(S+9)}$

i) Sketch the root locus and comment on closed loop system stability 7
ii) Find the value of 'K' for which all the roots are equal and also find the value of those roots. 3

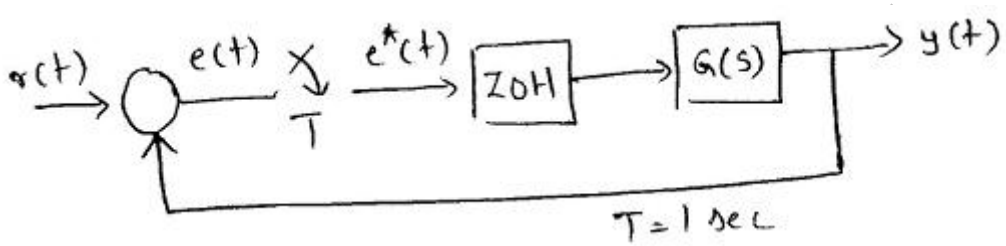
13 a) The characteristic equation of a system is $S^3+7S^2+25S+39=0$. Check the roots of characteristic equation has more negative than -1. 5
b) The unit step response of a closed loop system is $C(t) = 1 + 0.2e^{-60t} – 1.2\ e^{-10t}$ than determine undamped natural frequency and damping ratio of the system. 5

..2

14 The transfer function of a system is $\frac{20}{S(1+0.05S)(1+0.25S)}$. Draw the bode plot and obtain gain margin and phase margin from the plot. 10

15 a) Distinguish between analog and digital control system. 3

b) Obtain the unit step response of the system shown in figure if $G(S)=\frac{1}{S(S+1)}$. 7




16 a) Verify whether the system described below is observable or not 5

$$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}-5 & 2\\ -4 & 5\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}1\\ 1\end{bmatrix}u;\quad y=\begin{bmatrix}-2 & 3\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}$$

b) The state equation of a system is $\dot{x}=Ax + By$ where system matrix $A=\begin{bmatrix}0 & 1\\ -3 & 4\end{bmatrix}$ find the characteristic equation and state transition matrix. 5

17 Write short notes on the following : 10

i) Principle of argument
ii) lag-lead compensator
iii) Sample data system

******

**CODE NO: 123 / S**

# FACULTY OF ENGINEERING

## BE 3/4 (Mech.) I-Semester (supply) Examination, May / June 2018

## Subject: Manufacturing Processes

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

Note: Answer All Questions From Part - A & Any Five Questions From Part – B.

### Part-A (25 Marks)

| | | | |
|---|---|---|---|
| 1. | | State the color code used on patterns in foundry | 2 |
| 2 | | Name the additives used in molding sand and state the corresponding property improvement | 3 |
| 3 | | When chaplets are used in foundry. Why they are considered as a source of defect | 2 |
| 4 | | Why casting yield is 100% in centrifugal castings | 2 |
| 5 | | What are hot tears. How to avoid hot tears in castings | 2 |
| 6 | | How a welding electrode is specified | 3 |
| 7 | | Sketch and label nozzles used for welding and cutting respectively | 3 |
| 8 | | What ate the advantages of solid state welding over thermal welding | 2 |
| 9 | | Differentiate cold and hot working | 3 |
| 10 | | What are the advantages and limitations of unconventional forming processes over conventional forming processes | 3 |

### Part-B (50 Marks)

| | | | |
|---|---|---|---|
| 11. | a) | Sketch and label green sand mould with gating and rise ring system. State the use of rise ring and gating systems | 6 |
| | b) | What do you understand by directional solidification. How chills are used in promoting directional solidification | 4 |
| 12 | a) | Give the cause and remedies of following casting defects<br>i) pin holes ii) hot tears iii) Mis run iv) porosity v) Rat tails | 6 |
| | b) | How blow molding is different from injection molding. Give its applications | 4 |
| 13 | a) | How polarity effects the weld beam shape. Give sketches for different weld beam shapes produced by different polarities and different welding current sources | 6 |
| | b) | How welding is different from brazing and soldering | 4 |
| 14 | a) | With a neat sketch explain the principle of explosive welding state its limitation and give its applications | 5 |
| | b) | State the principle of resistance welding. Draw a neat sketch of seam welding set-up. Give its applications | 5 |
| 15 | a) | How properties of material change in cold working and hot working. State the reasons | 5 |
| | b) | Calculate the blanking load to produce a blank of 40 diameter from a sheet of aluminum of thickness 2 mm Take shear strength of A1 as 200 $N.mm^2$ | 5 |
| 16 | a) | With a neat sketch explain about tube bulging by explosive forming | 5 |
| | b) | What are ceramics. Name few ceramics and give their applications along with their unique properties | 5 |
| 17 | a) | Write short notes on the following:<br>a) MEMS | 5 |
| | | b) electron beam welding | 5 |

*******

Code No. 126 / S

# FACULTY OF ENGINEERING

**B.E. 3/4 (Prod.) I - Semester (Supple.) Examination, May / June 2018**

**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 Explain the importance of true stress and true strain in metal forming. (3)
2 Give the advantages of cold working over hot working. (2)
3 Explain redrawing process. (3)
4 Match the following: (2)

| | |
|---|---|
| (a) Blanking | (i) Tension |
| (b) Stretch forming | (ii) Compression |
| (c) Coining | (iii) Shear |
| (d) Deep Drawing | (iv) Tension and compression |
| | (v) Tension and Shear |

5 Name some products which are produced by extrusion. (2)
6 Explain lubrication methods used in wire drawing. (3)
7 Write about Isothermal forging. (2)
8 Give the advantages of closed die forging over open die forging. (3)
9 Explain about roll bending. (3)
10 Give the advantages and limitations of using small diameter rolls in rolling. (2)

## PART – B (50 Marks)

11 (a) Explain the effect of temperature and strain rate mechanical properties of the material. (5)
(b) Explain the difference between Recovery and Recrystallization (5)

12 (a) Explain why and how various factors influence spring back in bending of sheet metals. (5)
(b) Differentiate between a progressive die and a compound die. (5)

13 (a) Explain the differences between Direct and Indirect Extrusion processes. (5)
(b) Write a brief notes on tube drawing with a neat sketch. (5)

14 (a) Derive an expression for drawing stress for homogeneous deformation. (5)
(b) Explain spinning process. (5)

15 (a) What is forgeability and how it can be measured. (5)
(b) Discuss briefly forging die design considerations. (5)

16 (a) Derive an expression for roll force and torque. (6)
(b) Explain cluster Rolling mill. (4)

17 Write short notes on any **two** of the following:
(a) Estimation of blanking loads (5)
(b) Impact Extrusion (5)
(c) Ring Rolling process (5)

*****

Code No: 129 / S

# FACULTY OF ENGINEERING

## B. E. 3/4 (A.E) I-Semester (Supple.) Examination, May / June 2018

### Subject: Production Technology

**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 draft allowance? How it is provided for pattern | [3M] |
| 2 | Explain about the defects in casting. | [3M] |
| 3 | Mention the applications of friction welding. | [2M] |
| 4 | Differentiate between welding, soldering and brazing. | [3M] |
| 5 | What is the difference between extrusion and drawing? | [2M] |
| 6 | List the advantages and limitations of forging. | [3M] |
| 7 | Differentiate hot working and cold working. | [2M] |
| 8 | Define the term mach inability. | [2M] |
| 9 | What is lapping and honing operation. | [2M] |
| 10 | What is Taylor's relationship between cutting speed and tool life? | [3M] |

### PART-B (50 Marks)

11 (a) Briefly explain the procedure to be followed for making a sand mould.

(b) Differentiate between investment casting and shell moulding.

12 (a) Explain oxy-acetylene gas welding technique with a neat sketch.

(b) Describe the advantages and limitations of explosive welding.

13 (a) Briefly explain the principle of rolling with a neat sketch.

(b) Distinguish between drop forging and press forging.

14 (a) Explain the cutting tool materials and their properties.

(b) Differentiate the types of machining operations that can be performed on a lathe.

15 (a) Differentiate the types of machining operations that can be performed on a lathe.

(b) Explain the working principle of milling with a neat sketch.

16 Write short notes on the following

(a) Pattern allowances
(b) Defects in welding
(c) Impact extrusion

17 Write short notes on the following

(a) Types of chips and chip breakers
(b) Injection moulding
(c) Principle of drawing

**********

Code No: 103/S

# FACULTY OF ENGINEERING

## B.E. III/IV (Civil) I – Semester (Supple.) Examination, May/June 2018

## Subject: Transportation Engineering

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

**Note: Answer all questions from Part A & Any FIVE questions from Part – B.**

### PART – A (25 Marks)

| | | |
|---|---|---|
| 1) | Differentiate between key map and index map? | 2M |
| 2) | What are the different traffic studies? | 2M |
| 3) | What are the characteristics of an aircraft? | 2M |
| 4) | List out the factors to be considered for design of pavement. | 2M |
| 5) | Why the corrections are needed for basic runway length? | 2M |
| 6) | Explain the concept of off tracking? | 3M |
| 7) | Enumerate AADT? | 3M |
| 8) | Define the term camber and draw different types of cambers with neat sketch? | 3M |
| 9) | What are the component parts of a permanent way? | 3M |
| 10) | Write a short note on negative super elevation? | 3M |

### PART – B (50 Marks)

| | | | |
|---|---|---|---|
| 11 | a) | What are the objectives of Nagpur road plan? | 5M |
| | b) | Explain the terms modulus of sub grade reaction and radius of relative stiffness | 5M |
| 12 | a) | Describe the westergaard equation for wheel load? | 6M |
| | b) | A gradient on a highway is 1 in 15. Radius of curve is 150m. After grade compensation, the grade to be provided should not be less 4%. What is the grade compensation? | 4M |
| 13 | a) | What are design requirement of cement concrete pavement as per IRC? | 5M |
| | b) | What are the factors on which PUC values depend? | 5M |
| 14 | a) | What are the different types of traffic signal systems? | 5M |
| | b) | Write a short note on street and off street parking? | 5M |
| 15 | a) | Define Intersection? What are the types of Intersections and explain the necessity of Intersections? | 5M |
| | b) | The length of runway under standard conditions in 1620m. The airport site has an elevation of 270 m. Its reference temperature is $32.90^{o}$ C. If the runway is to be constructed with an effective gradient of 0.20 percent, determine the corrected runway length? | 5M |
| 16 | a) | Write a short note on different types of airports? | 5M |
| | b) | Explain different types of sleepers? | 5M |
| 17 | a) | Write a short note on ICAO? | 5M |
| | b) | Explain the carriageway, shoulders, right of way and width of formations? | 5M |

**********

**Code No: 108 / S**

# FACULTY OF ENGINEERING

## B.E. 3/4 (EEE/ INST.) I-Semester (Supple.) Examination, May / June 2018

**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. Mention any three characteristics of an ideal Op-Amp? [3]
2. Draw the circuit diagram of a Inverting Op-Amp [2]
3. Draw pin diagram of IC741. [3]
4. Mention how sine wave is generated using Op amp? [2]
5. Draw a Current to Voltage 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 Q? If $F_h$= 20 KHz, $F_l$=8 KHz.‘ [2]
9. Explain how current sensing is done using IC 723 [2]
10. Draw the circuit Diagram for 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 Opm-Amp. [5]
12. (a) Explain the working of a Practical Differentiator Op-Amp with relevant circuit diagrams? [5]
    (b) Write short notes on Schimitt trigger. [5]
13. (a) Explain quadrature oscillators with neat circuit diagram [5]
    (b) Explain the operation of triangular waveform generator with neat diagram. [5]
14. (a) Explain the operation Flash type A/D converter type with relevant diagram [5]
    (b) Write short notes on R-2R ladder type converter [5]
15. (a) Explain the working principle of Series Regulator with Op-AMP? [5]
    (b) Explain the operation of hybrid regulator with neat circuit diagram (5)
16. (a) Design a second order butterworth high pass active filter with a voltage gain of 3.5 and cutoff frequency of 10Hz. [5]
    (b) If a band passes filter has a resonant frequency of 1200 Hz and a bandwidth of 3000Hz Find the lower and upper cutoff frequencies. [5]
17. (a) Write short notes on PLL. [5]
    (b) Write short notes on Instrumentation Amplifier circuit with op-amp with suitable diagram. [5]

**********

**Code No. 136 / S**

# FACULTY OF ENGINEERING

**BE 3/4 (CSE) I – Semester (Suppl.) Examination, May / June 2018**

**Subject : Data Communication**

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

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

## PART – A (20 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 |

*****

**Code No. 140 / S**

# FACULTY OF INFORMATICS

**B.E. 3/4 (I.T.) I - Semester (Suppl.) Examination, May / June 2018**

**Subject : Theory of Computation**

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

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

## PART – A (25 Marks)

1 Define regular expression. Give an example.
2 Mention the different types of finite automata.
3 Mention the closure properties of regular languages.
4 Describe briefly ambiguity in grammars.
5 Define PDA and give an example
6 Discuss CFG and CFL
7 What is a turing machine? Discuss it.
8 Write short note on unrestricted grammar.
9 Define a recursively enumerable language,
10 Differentiate between P and NP classes.

## PART – B (50 Marks)

11 (a) Define NFA. Construct an NFA with three states that accepts the language {ab, abc}*. (6)
(b) Find a DFA that recognizes the set of all strings on $\Sigma$ = {a, b} starting with the prefix ab. (4)

12 (a) State and prove pumping lemma for regular languages. (4)
(b) Determine whether the language L = $\{a^n b^n : n \geq 0\}$ is regular. (6)

13 (a) Discuss the properties of CFL. (4)
(b) Explain the Normal forms for CFG. (6)

14 (a) Explain the problems that computer cannot solve. (5)
(b) What are the extensions to the turing machine? (5)

15 Explain the undecidable problems about turing machines. (10)

16 Find a regular expression for the language (10)
L = { $w \in \{a, b\}^*$ : $n_a(w)$ is even and $n_b(w)$ is odd }

17 Write short notes on the following:
(a) Applications of regular expressions (3)
(b) Parse tree (4)
(c) Closure properties of CFG (3)

*****

Code No. 140 / O

# FACULTY OF INFORMATICS

## B.E. 3/4 (IT) I– Semester (Old) Examination, May/June 2018

## 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. Define regular expression and regular languages. 2
2. Define-closure of a state and £ -closure for set of states. 3
3. What is an ambiguous grammar and give an example 3
4. What are the decision properties of regular languages? 2
5. Define Push-down automata and give an example. 3
6. Write any four closure properties of context-free languages 2
7. Define a Turning Machine. 2
8. Compare the Turning machine with computer? 3
9. Describe about post's correspondence problem. 2
10. Define the P. Np. NP-Complete and NP-Hard Problems. 3

### PART – B (5x10 = 50 Marks)

11. a) Construct finite automata equivalent to the regular expression: 10+(0+11)0*1 6
    b) Explain the process of converting NFA to DFA 4

12. a) State and prove pumping lemma for regular sets 6
    b) Examine whether the language L ={$0^n1^n$|n} is regular or not 4

13. a) Construct a push down automata equivalent to the following grammar:
    $S \to aA; A \to aABC|bB|\ a; B \to b : C \to c$ 5
    b) Prove that CFL's are closed under union and concentration. 5

14. Design a Turning machine that compute x+y where x and y are given two positive integers. 10

15. Distinguish between NP-complete and NP-Hand with suitable examples. 10

16. Describe the following: 10
    i) Context Free Grammar
    ii) Pumping Lemma for context free language
    iii) Greibach Normal Form.

17. Write short notes on the following: 10
    a) Programming techniques for Turning machines
    b) Parse tree construction
    c) Decision properties of context-free languages

**********

**Code No. 19/CBCS**

# FACULTY OF TECHNOLOGY

**B.Tech. II – Semester (CBCS) (Main & Backlog) Examination, May/June 2018**

**Subject: Engineering Mechanics - II**

**Time : 3 Hours** **Max. Marks: 70**

***Note: Answer all questions from Part A & answer any five questions from Part B.***

## PART – A (20 Marks)

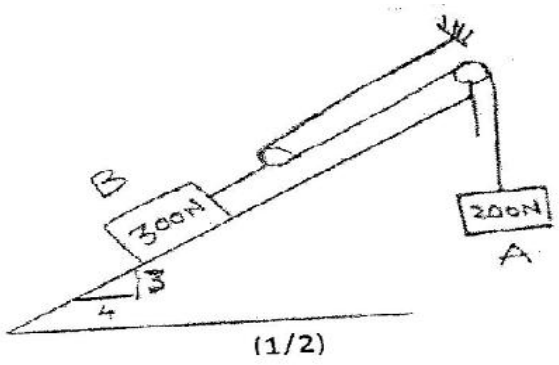
1. Explain the principle of Virtual work
2. Mass Moment of inertia of Solid Cone about its vertical axis is _____
3. What is fixed axis rotation?
4. A Projectile is fired horizontally from a point 300 m above the ground with initial velocity of 108 m/s find Range.
5. Explain the term inertia of a body.
6. State 'D' Alembert's Principle for a Particle.
7. What is Principle of Work and Energy?
8. A cube of weight 10 N rests on a rough inclined plane of slope 3 in t. The 'N' of mass 4kgs at rest. The coefficient is o.6. The minimum force necessary to start the cube moving up the plane is _____
9. State law of conservation of linear momentum.
10. Ball 'A' of mass 2kg moving with a velocity of 4m/s strikes directly on a ball 'B' of mass 4kg at rest. The ball A, after striking comes to rest. Find the velocity of ball 'B' after striking and coefficient of restitution.

## PART – B (5x10 = 50 Marks)

11. Obtain an expression for the mass moment of inertia of a homogeneous sphere of radius r with respect to diameter.

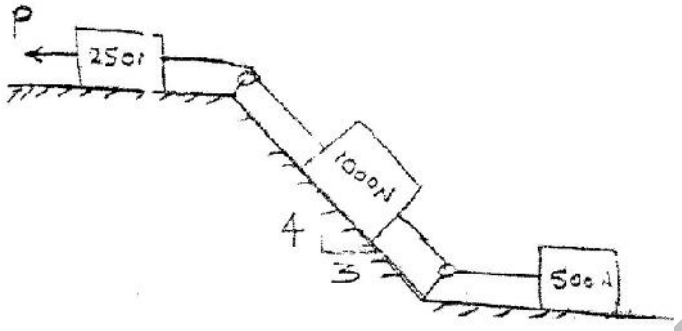
12. The rectilinear motion of a particle is governed by $a = -8s^2$ where a is in $m/s^2$ and S in m. When t=1 sec, S = 4m and V = 2 m/s. Determine acceleration when t = 28 sec.

13. Compute the acceleration of body B and the tension in the chord supporting body A as shown in fig. Take « =0.3

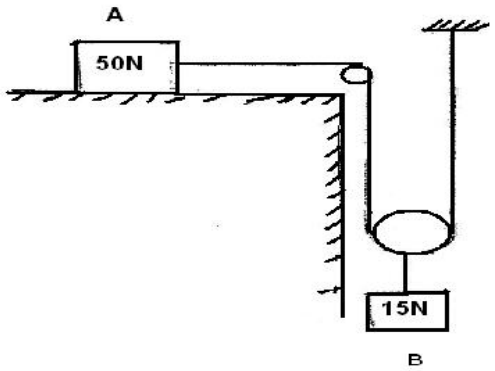



Contd…2…

14. Determine the constant force P that will give the system of bodies shown in fig. a velocity of 3m/sec after moving 5m from rest « = 0.2




15. The weight of blocks A and B of the system in fig is 50N and 15N respectively. If B is moving downward with a velocity of 1./s initially.. Find the velocity of A after 1 sec.

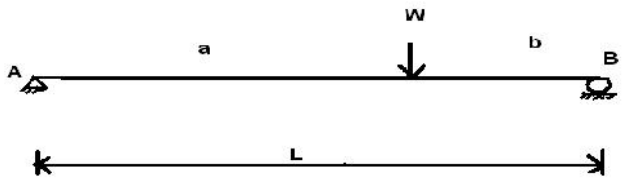



16. a) A weight W is suspended from a vertical spring. If the weight is pulled down x m from its equilibrium position and released. Determine the velocity. When the equilibrium position. 5

    b) Ball A of mass 2kg moving with a velocity of 4m/s strikes directly on a ball 'B' of mass 4kg at rest. The Ball A. after striking comes to rest. Find the velocity of ball 'B' after striking and coefficient of restitution. 5

17. a) Explain kinematic relation.

    b) Using principle of Virtual work determine reaction at support B. 10




    c) A stone is dropped into well and five seconds later the sound of splash is heard. If the velocity of sound is 341 m/s what is the depth of well?

**********