DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Civil Engineering **Semester: III**

Subject Name: Engineering Geology **Subject Code: BTCVC306**

Max Marks:60 **Date: 12/12/2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Illustrate your answers with neat sketches, diagrams etc. where ever necessary.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**All questions are compulsory.**		**12**
A)	Write a note on interior of the earth with neat labeled diagram.	**(CO 1)**	
B)	Explain types of volcanoes and its products.	**(CO 4)**	
C)	Write note on type of transportation by wind.	**(CO 1)**	
E)	Define various varieties of quartz group of mineral.	**(CO 2)**	
F)	Using diagram explain the term Meandering.	**(CO 1)**	
G)	Applications of geology in civil engineering.	**(CO 4)**	
Q.2	**Solve any Four of the following.**		**12**
A)	What are the clastic and non-clastic sedimentary rocks and their structures?	**(CO 2)**	
C)	Write in detail on the following properties of minerals with examples. (i) Specific gravity (ii) Hardness (iii) Luster (iv) Cleavage.	**(CO 2)**	
D)	Describe in brief about importance of clay minerals and their use in modern industries.	**(CO 2)**	
E)	Bring out the differences between dykes and sill with diagram.	**(CO 2)**	
F)	Give short notes on types of mountains with suitable examples.	**(CO 1)**	
Q. 3	**Solve any Three of the following.**		**12**
A)	Define fold and describe classification of folds with neat labeled diagrams.	**(CO 3)**	
B)	Describe various parts of fault and its following types with labeled diagram (i) Gravity fault (ii) Reverse fault (iii) Strike slip fault	**(CO 3)**	
C)	Explain in detail different type of unconformities with labeled diagram.	**(CO 3)**	
D)	Define and describe joints and classification with its role in civil engineering.	**(CO 3)**	

Q.4 Solve any Three of the following. **12**

A) What are the factors generally considered by an engineer while deciding use of stone in construction jobs? **(CO 2)**

B) What are the types of Aquifer with neat labeled diagram? **(CO 1)**

C) Explain various dressing methods of building stones. **(CO 2)**

D) What is ground water? Describe the various zones of ground water. **(CO 4)**

Q. 5 Solve any Two of the following. **12**

A) Explain electric resistivity method with following configurations: **(CO 4)**
(i) Wenner configurations (ii) Schlumberger configurations.

B) Give details of importance of geological structures for reservoir site. **(CO 4)**

C) Illustrate important geological requirements considered in the selection of a dam site. **(CO 4)**

Q. 6 Solve any Two of the following. **12**

A) Describe procedure of measurement and calculation of Rock Quality Designation (RQD) and its uses in construction. **(CO 3)**

B) Describe various types of drilling techniques in detail. **(CO 4)**

C) Write a note on objectives of preliminary geological survey in civil engineering structures. **(CO 4)**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Civil Engineering | **Sem: III**

Subject Name: Building Construction | **Subject Code: BTCVC305**

Max Marks: 60 | **Date: 10/12/2018** | **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve ANY FIVE questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*
5. *All sketches should be labeled, neat and proportionate*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	State the comparative merits and demerits of stone masonry and brick masonry?	**(CO 1)**	**6**
B)	Draw neat sketches, showing plan of two consecutive courses of 1½ brick thick corner of wall in English bond?	**(CO 1)**	**6**
C)	What are the general principles observed in brick masonry?	**(CO 1)**	**6**
Q.2	**Solve Any Two of the following.**		
A)	What are the chief ingredients of plain cement concrete? Describe in detail the properties of each?	**(CO 2)**	**6**
B)	Describe the properties of fresh and hardened concrete?	**(CO 2)**	**6**
C)	Explain the role of admixtures in concrete?	**(CO 2)**	**6**
Q. 3	**Solve Any One of the following.**		
A)	Sketch a semicircular arch showing all technical terms used in arch? Sketch the entire arrangement showing the details of centering work?	**(CO 3)**	**12**
B)	Explain Brick lintel, reinforced concrete lintel and steel lintel with sketches?	**(CO 3)**	**12**
Q.4	**Solve Any Two of the following.**		
A)	Draw a neat sketch of Frame and Panelled door? (plan , section & elevation)	**(CO 3)**	**6**
B)	Draw a neat sketch of Louvered window?	**(CO 3)**	**6**
C)	Draw a neat sketch of wooden stair showing all components?	**(CO 3)**	**6**
Q. 5	**Solve Any One of the following.**		
A)	Explain king post truss and its joints with neat sketches?	**(CO 3)**	**12**
B)	Explain Queen post truss and its joints with neat sketches?	**(CO 3)**	**12**
Q. 6	**Solve Any two of the following.**		
A)	Explain merits and demerits of prefabrication?	**(CO 4)**	**6**
B)	Describe various types of prefabrication? Explain the term 'Tolerance '?	**(CO 4)**	**6**
C)	Describe various guidelines for transportation and erection in prefabrication?	**(CO 4)**	**6**

***** End *****

4452706A15C42C8064EA682DAFB8D16A

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Civil Engineering **Sem: III**

Subject Name: Surveying-I **Subject Code: BTCVC304**

Max Marks: 60 **Date: 07/12/2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Give the conventional symbols for the following: 1) North line, Chain line 2) Main station, Traverse station 3) River, Canal 4) Road Bridge, Boundary line 5) Jungle, Wire fencing 6) Railway line (double), Open well	**CO2**	**06**
B)	What is Well-Conditioned triangle? Explain clearly why it is preferred instead of an Ill-conditioned triangle.	**CO1**	**06**
C)	What is Cross Staff? List down the types of Cross staff. Describe the construction and use of an Open Cross staff with a sketch.	**CO1**	**06**
Q.2	**Solve Any Two of the following.**		**12**
A)	i) The fore bearings of the lines AB, BC, CD, DE are $45^{0}30'$, $120^{0}15'$, $200^{0}30'$, $280^{0}45'$ respectively. Find angles $<B$, $<C$, $<D$. ii) A traverse is done by three stations A, B and C in clockwise order in the form of equilateral triangle. If the bearing of AB is $80^{0}30'$, find the bearings of the other sides.	**CO1**	**06**
B)	The following are the observed bearings of the lines of a traverse ABCDEA with a compass in a place where local attraction was suspected. Find correct bearings of the lines by calculating interior angles.	**CO1**	**06**

Line	FB	BB
AB	$191^{0}00'$	$13^{0}00'$
BC	$39^{0}30'$	$222^{0}30'$
CD	$22^{0}15'$	$200^{0}30'$
DE	$242^{0}45'$	$62^{0}45'$
EA	$330^{0}15'$	$147^{0}00'$

C) Followings are the bearings observed while traversing with a compass, an area where local attraction was suspected. Find the correct bearings of the lines and also the true bearings, if the magnetic declination is 09^0 W. CO1 06

Line	FB	BB
AB	$60^0 00'$	$240^0 00'$
BC	$139^0 30'$	$317^0 00'$
CD	$215^0 15'$	$36^0 30'$
DE	$208^0 00'$	$29^0 00'$
EA	$318^0 30'$	$138^0 45'$

Q. 3 Solve Any One of the following. CO1 12

A) Write short note on: 12

i) Reconnaissance Survey
ii) Preliminary Survey
iii) Location Survey
iv) Layout
v) Difference between Summit curve & Valley curve
vi) Factors responsible for selection of good alignment for a road

B) Explain:

i) Curve ranging
ii) Definition of curve
iii) Objectives behind provision of curves
iv) Construction survey for Waterways

Q.4 Solve Any Two of the following. 12

A) What is the Principle of Plane Tabling? Explain all accessories of Plane table with neat figures. CO2 06

B) List down the methods of plane tabling. Explain procedure of any two methods with neat figures. CO2 06

C) Write down the advantages and disadvantages of plane tabling. CO2 06

Q. 5 Solve Any Two of the following. 12

A) i) Draw neat labeled diagram of Dumpy level. CO3 06

ii) Write down the object and uses of leveling.

iii) Write down definitions of:- 1) Line of Collimation 2) Change Point

B) i) An observer standing on the deck of a ship sees a light house. The top of light house is 35m above the sea level and the height of the observer is 6m above sea level. Find the distance between observer and light house. CO1, CO3 06

ii) In leveling between two points A and B on the opposite sides of a river, the level was set up near A and the staff readings on A and B were 2.645m and 3.230m respectively. The level was then moved and set up near B, the respective readings on A and B was 1.085m and 1.665m. Find the true difference of level between A and B

iii) A bench mark with reduced level 155.305m has been established at the floor of a room. It is required to find out the RL of the underside of the roof(R) of the room using spirit leveling. The back sight to the bench mark has been observed as 0.575m (staff held inverted). Calculate the RL(m) of R. CO3 06

C) Define the term contour line. Explain the characteristics of contour lines with neat figures. 12

Q.6 Solve Any One of the following. 12

A) i) Draw neat labeled diagram of Transit Theodolite.

ii) A flag post of height 2m was erected on top of a building. Find the RL of the top of the flag post, if the vertical angles to the bottom and top of it were measured using Theodolite as 7^0 and 10^0 respectively. A staff reading of 1.245m was taken over a bench mark of +150.000m with vertical angle of $0^0 0' 0''$.

iii) Explain Balancing of traverse and rules of distributing errors. 12

B) The length and bearing of lines of a closed traverse ABCDA are as under.

Line	Length	WCB
AB	250	130^0
BC	600	42^0
CD	100	317^0
DA	635.46	$235^0 40'$

Calculate latitude and departure. Apply correction to latitude and departure. Find out closing error. Use Bowditch rule.

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Civil Engineering **Sem: III**

Subject Name: Surveying-I **Subject Code: BTCVC304**

Max Marks: 60 **Date: 07/12/2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Give the conventional symbols for the following: 1) North line , Chain line 2) Main station, Traverse station 3) River, Canal 4) Road Bridge, Boundary line 5) Jungle, Wire fencing 6) Railway line (double), Open well	**CO2**	**06**
B)	What is Well-Conditioned triangle? Explain clearly why it is preferred instead of an Ill-conditioned triangle.	**CO1**	**06**
C)	What is Cross Staff? List down the types of Cross staff. Describe the construction and use of an Open Cross staff with a sketch.	**CO1**	**06**
Q.2	**Solve Any Two of the following.**		**12**
A)	i) The fore bearings of the lines AB, BC, CD, DE are $45^0 30'$. $120^0 15'$, $200^0 30'$, $280^0 45'$ respectively. Find angles <B, <C, <D. ii) A traverse is done by three stations A, B and C in clockwise order in the form of equilateral triangle. If the bearing of AB is $80^0 30'$, find the bearings of the other sides.	**CO1**	**06**
B)	The following are the observed bearings of the lines of a traverse ABCDEA with a compass in a place where local attraction was suspected. Find correct bearings of the lines by calculating interior angles.	**CO1**	**06**

Line	FB	BB
AB	$191^0 00'$	$13^0 00'$
BC	$39^0 30'$	$222^0 30'$
CD	$22^0 15'$	$200^0 30'$
DE	$242^0 45'$	$62^0 45'$
EA	$330^0 15'$	$147^0 00'$

C) Followings are the bearings observed while traversing with a compass, an area where local attraction was suspected. Find the correct bearings of the lines and also the true bearings, if the magnetic declination is 09^0 W. CO1 06

Line	FB	BB
AB	$60^0 00'$	$240^0 00'$
BC	$139^0 30'$	$317^0 00'$
CD	$215^0 15'$	$36^0 30'$
DE	$208^0 00'$	$29^0 00'$
EA	$318^0 30'$	$138^0 45'$

Q. 3 Solve Any One of the following. 12

A) Write short note on: CO1 12

i) Reconnaissance Survey
ii) Preliminary Survey
iii) Location Survey
iv) Layout
v) Difference between Summit curve & Valley curve
vi) Factors responsible for selection of good alignment for a road

B) Explain: CO1 12

i) Curve ranging
ii) Definition of curve
iii) Objectives behind provision of curves
iv) Construction survey for Waterways

Q.4 Solve Any Two of the following. 12

A) What is the Principle of Plane Tabling? Explain all accessories of Plane table with neat figures. CO2 06

B) List down the methods of plane tabling. Explain procedure of any two methods with neat figures. CO2 06

C) Write down the advantages and disadvantages of plane tabling. CO2 06

Q. 5 Solve Any Two of the following. 12

A) i) Draw neat labeled diagram of Dumpy level. CO3 06

ii) Write down the object and uses of leveling.

iii) Write down definitions of : 1) Line of Collimation 2) Change Point

B) i) An observer standing on the deck of a ship sees a light house. The top of light house is 35m above the sea level and the height of the observer is 6m above sea level. Find the distance between observer and light house. CO1, CO3 06

ii) In leveling between two points A and B on the opposite sides of a river, the level was set up near A and the staff readings on A and B were 2.645m and 3.230m respectively. The level was then moved and set up near B, the respective readings on A and B was 1.085m and 1.665m. Find the true difference of level between A and B

iii) A bench mark with reduced level 155.305m has been established at the floor of a room. It is required to find out the RL of the underside of the roof(R) of the room using spirit leveling. The back sight to the bench mark has been observed as 0.575m (staff held inverted). Calculate the RL(m) of R. CO3 06

C) Define the term contour line. Explain the characteristics of contour lines with neat figures. 12

Q.6 Solve Any One of the following. 12

A) i) Draw neat labeled diagram of Transit Theodolite.

ii) A flag post of height 2m was erected on top of a building. Find the RL of the top of the flag post, if the vertical angles to the bottom and top of it were measured using Theodolite as 7^0 and 10^0 respectively. A staff reading of 1.245m was taken over a bench mark of +150.000m with vertical angle of $0^0 0'$.

iii) Explain Balancing of traverse and rules of distributing errors. 12

B) The length and bearing of lines of a closed traverse ABCDA are as under. Calculate latitude and departure. Apply correction to latitude and departure. Find out closing error. Use Bowditch rule.

Line	Length	WCB
AB	250	130^0
BC	600	42^0
CD	100	317^0
DA	635.46	$235^0 40'$

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Civil Engineering **Sem: III**

Subject Name: Hydraulics I **Subject Code: BTCVC303**

Max Marks: 60 **Date: 05-12-2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve **all** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Three of the following.**		
A)	Explain the different applications of Fluid Mechanics in Civil Engineering.	**CO2**	**04**
B)	Define: Surface Tension and Bulk modulus. Give proper unit of each.	**CO2**	**04**
C)	Calculate the dynamic viscosity of oil, which is used for lubrication between a square plate of size 0.8 x 0.8 m^2 and plane with angle of inclination 30°. The weight of square plate is 294.5 N and it slides down the inclined plane with uniform velocity of 0.3m/s. The thickness of an oil film is 1.5mm.	**CO2**	**04**
D)	When a pressure of 20.7MN/m^2 is applied to 100 liters of a liquid, it's volume decreases by 1 liter. Find the bulk modulus of the liquid and compressibility of liquid.	**CO2**	**04**
Q.2	**Solve Any Two of the following.**		
A)	Explain in detail with neat sketch – i) Differential U-Tube Manometer ii) Bourdon Tube Pressure Gauge	**CO2**	**06**
B)	Prove that the center of pressure of a vertical plane surface is always below the center of gravity.	**CO3**	**06**
C)	A wooden block of relative density 0.7 has width 15cm, depth 30cm and length 150cm. it floats horizontally on the surface of water. Calculate the volume of water displaced, depth of immersion and position of center of buoyancy. Also find the metacentric height.	**CO3**	**06**
Q.3	**Solve the following.**		
A)	Derive a three dimensional general continuity equitation in Cartesian co-ordinates.	**CO3**	**06**
B)	The velocity of component in a two dimensional flow are $u = 2xy \qquad v = b^2+x^2-y^2$ i) Is the flow possible? ii) Determine potential function. iii) Determine corresponding stream function.	**CO3**	**06**

Q.4 Solve Any Two of the following

A)	Derive an expression for point velocity distribution for laminar flow between two fixed parallel plates.	CO3	06
B)	Explain with neat sketches the difference between hydro dynamically smooth & rough boundaries.	CO2	06
C)	Explain Prandtl's Mixing Length Theory and Nikuradse's experiment.	CO2	06

Q. 5 Solve Any Two of the following.

A)	Write short note on Non-dimensional numbers – i) Froude number ii) Weber Number iii) Reynold's Number.	CO3	06
B)	Explain concept of equivalent pipe & Derive Dupit's equation in form $\frac{L}{D^5} = \frac{L_1}{D_1^5} + \frac{L_2}{D_2^5} + \frac{L_3}{D_3^5} + \cdots$	CO3	06
C)	What is Siphon? Explain its working with neat sketch.	CO2	06

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech. in Civil Engineering | **Sem:** III
Subject Name: Mechanics of Solids | **Subject Code:** BTCVC302
Date: 03/12/2018 | **Max Marks:** 60 | **Duration:** 3 Hrs.

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		COs	Marks
Q. 1	**Solve Any Two of the following:**		
A)	Define the following properties of materials: Elasticity, Ductility, and Brittleness.	CO1	(6)
B)	A metal wire of diameter 3 mm is subjected to an axial tensile force of 2 kN. The extension measured was 4 mm over a length of 1500 mm. Find the modulus of elasticity of the metal. Using the calculated value of modulus of elasticity; find the maximum axial tensile force that can be applied on the wire if the strain is limited to 0.001.	CO1	(6)
C)	A thin tyre made up of mild steel is to be shrunk on to a rigid wheel of 1200 mm diameter. Calculate (i) internal diameter of tyre if the hoop stress is limited to 50 N/mm^2, and (ii) the least temperature to which the tyre must be heated above that of the wheel before it could be slipped on. For the tyre the coefficient of thermal expansion (α) is 12×10^{-6} per °C and $E = 2 \times 10^5$ N/mm^2.	CO1	(6)
Q.2	**Solve the following.**		
A)	Write the assumptions made in the theory of pure bending.	CO2	(4)
	OR		
A)	Find the diameter of a solid shaft which will transmit 150 kW power at 200 r.p.m. if the permissible shear stress is 60 N/mm^2. Find also the length of shaft, if the permissible angle of twist is 1° over the entire length. Take, shear modulus = 80×10^3 N/mm^2	CO2, CO4	(4)
B)	A simply supported beam AB is 10 m long. It carries a uniformly distributed load of 20 kN/m over a distance of 5m from the left end A, a clockwise moment of 50 kN-m at 5m and a point load of 40 kN at a distance of 8 m from the left end A. Find shear force & bending moment at important locations and draw S.F.D. and B.M.D for the beam.	CO2	(8)

Q. 3 Solve the following.

A) A masonry pillar square in section 600 mm x 600 mm is subjected to point load of 1800 kN at an eccentricity of 200 mm along one of the centroidal axis of cross section. Find the stresses at four corners. Also determine the maximum eccentricity, if the permissible tensile stress in masonry is limited to 2 N/mm^2. CO1, CO4 (6)

B) Find analytically Principal stresses and Principal planes for an element. The element is subjected to two mutually perpendicular stresses 100 N/mm^2 and 50 N/mm^2 both tensile in X and Y direction, respectively along with a shear stress of 30 N/mm^2 (upwards on a plane of 100 N/mm^2 stress). Find also the maximum shear stress. CO1, CO4 (6)

Q.4 Solve the following.

A) Obtain an expression for maximum slope and deflection for a simply supported beam subjected to a central point load. CO3 (4)

B) A simply supported beam AB of span 6 m is loaded with three point loads 50 kN, 100 kN, and 50 kN each at 1 m, 3 m, and 5 m respectively from left support. Calculate the deflection under each load. Take, $E = 2 \times 10^5$ N/mm^2 and $I = 20 \times 10^8$ mm^4. CO3 (8)

Q. 5 Answer the following.

A) Obtain an expression for Euler's critical load for a column hinged at both the ends. CO4 (6)

B) Using Euler's equation for long columns, determine the critical stresses for a compression member of slenderness ratio 80, 120, 160, and 200. The compression member has following end conditions (i) both ends hinged, and (ii) one end hinged and other end fixed. $E = 2 \times 10^5$ N/mm^2. CO4 (6)

Q. 6 Answer the following.

A) Explain: The Rankine's failure theory. CO1, CO4 (6)

B) A circular bar is subjected to a tensile force of 20 kN along with a transverse shear force of 10 kN. Determine the diameter of bar using Maximum Principal Stress, Maximum Principal Strain, and Maximum Shear Stress failure theory. Take: Yield strength = 250 MPa, factor of safety = 2, and Poisson's ratio = 0.3 CO1, CO4 (6)

********** **End of Paper**********

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: S.Y.B. Tech (All Branches) **Semester:** III

Subject Name: Engineering Mathematics-III **Subject Code:** BTBSC301

Max Marks:60 **Date:**30/11/2018 **Duration:** 03 Hrs

Instructions to the Students:

1. *Attempt **Any Five** questions of the following .All questions carry equal marks.*
2. *Use of non-programmable scientific calculators is allowed.*
3. *Figures to the right indicate full **Marks**.*

Q. 1. a) Show that,

$$\int_0^\infty \frac{\sin at}{t}\,dt = \frac{\pi}{2}.$$ [4]

b) Find the Laplace transform of

$$\int_0^t \frac{e^{-3u}\sin 2u}{u}\,du.$$ [4]

c) Find the Laplace transform of the function

$$f(t) = \begin{cases} 2 & ,0 < t < \pi \\ 0 & ,\pi < t < 2\pi \\ \sin t & ,t > 2\pi \end{cases}$$ [4]

Q.2 . a) Find the inverse Laplace transform of $\cot^{-1}\left(\frac{s+3}{2}\right)$. [4]

b) By convolution theorem, find inverse Laplace transform of

$$\frac{s}{(s^2+1)(s^2+4)}.$$ [4]

c) By Laplace transform method, solve the following simultaneous equations [4]

$$\frac{dx}{dt} - y = e^t\,;\ \frac{dy}{dt} + x = \sin t\,;\ \ given\ that\ x(0) = 1, y(0) = 0.$$

Q. 3. a) Find the Fourier transform of

$$f(x) = \begin{cases} 1-x^2, & |x| \le 1 \\ 0, & |x| > 1. \end{cases}$$ [4]

b) Find the Fourier sine transform of $e^{-|x|}$, and hence show that

$$\int_0^\infty \frac{x\sin mx}{1+x^2}\,dx = \frac{\pi e^{-m}}{2},\quad m > 0.$$ [4]

c) Using Parseval's Identity , prove that

$$\int_0^\infty \frac{t^2}{(t^2+1)^2}\,dt = \frac{\pi}{4}\,.$$ [4]

Q.4. a) Solve the partial differential equation

$$(x^2 - yz)p + (y^2 - zx)q = z^2 - xy.$$ [4]

b) Use method of separation of variables to solve the equation

$$\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u\,;\; given\ that\ u(x,0) = 6e^{-3x}.$$ [4]

c) Find the temperature in bar of length $2\ units$ whose ends are kept at zero temperature and lateral surface insulated if initial temperature is

$$\sin\left(\frac{\pi x}{2}\right) + 3\sin\left(\frac{5\pi x}{2}\right).$$ [4]

Q. 5. a) If $f(z)$ is analytic function with constant modulus, show that $f(z)$ is constant . [4]

b) If the stream function of an electrostatic field is $\psi = 3xy^2 - x^3$, find the potential function ϕ, where $f(z) = \phi + i\psi$. [4]

c) Prove that the inversion transformation maps a circle in the z-plane into a circle in w-plane or to a straight line if the circle in the z-plane passes through the origin . [4]

Q.6. a) Evaluate $\oint_c \frac{e^z}{(z-2)}dz$, where c is the circle $|z| = 3$. [4]

b) Evaluate $\oint_c \tan z\,dz$, where c is the circle $|z| = 2$. [4]

c) Evaluate , using Cauchy's integral formula : [4]

1) $\oint_c \frac{\cos(\pi z)}{(z^2-1)}dz$ around a rectangle with vertices $2 \pm i\,, -2 \pm i$.

2) $\oint_c \frac{\sin^2 z}{(z-\frac{\pi}{6})^3}dz$, where C is the circle $|z| = 1$.

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech **Sem: III**

Subject Name: Renewable Energy Sources **Subject Code: BTCHE306B**

Max Marks:60 **Date: 12/12/2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve ANY FIVE Questions out of the following.*
2. *Figures to the right indicate full marks.*
3. *Draw neat diagrams wherever necessary.*

Q.1 Each of the following questions comprises four alternate answers. Choose the correct answer for each. **[12M]**

1. The following is (are) the visible sign(s) of large amount of heat lying in the earth's interior.
   - **a)** Volcanoes
   - **b)** Geysers
   - **c)** Hot springs
   - **d)** All of the above

2. What do fuel cells emit?
   - **a)** Oxygen
   - **b)** Hydrogen
   - **c)** Nothing
   - **d)** Water

3. The Ocean thermal energy conversion (OTEC) is uses _____
   - a) Energy difference
   - b) Potential difference
   - c) Temperature difference
   - d) Kinetic difference

4. The collection efficiency of flat plat collector can be improved by,
   - a) Putting a selective coating on the plate.
   - b) Evacuating the space above the absorber plate.
   - c) Both (A) & (B)
   - d) None of these.

5. Wind energy is harnessed as _____ energy with the help of windmill or turbine.
   - a) Mechanical
   - b) Solar
   - c) Electrical
   - d) Heat

6. The process that converts solid coal into liquid hydrocarbon fuel is called,
   - a) Liquification
   - b) Carbonation
   - c) Catalytic conversion
   - d) Cracking

Q. 2 Explain the following. (Attempt any Three) **[12M]**

A. Non-conventional Energy sources

B. Solar pond electric power plant

C. Fluidized bed gasifier

D. Float wave power machine

Q. 3 A. Derived the expression for maximum power obtained by turbine in extraction of wind energy. **[12M]**

B. Explain briefly with neat diagram floating drum-type biogas plant.

Q.4 A. Explain briefly with neat diagrams types of tidal power plant. **[12M]**

B. Explain briefly the construction and working of a 'solar distillation' with neat diagram.

Q.5 A. Derive the expression for power and energy in single basin-single effect/cycle scheme. **[12M]**

B. A tidal power plant of a single-basin type has a basin area of 24 km^2. The tide has a range of 10 m. The turbine stops operation when the head on it falls below 3m. Calculate the average power generated during one filling/emptying process in MW if the turbine generator efficiency is 75%. Density of sea water=1025 kg/m^3; g=9.8m/s^2.

OR

Describe hydrogen- oxygen fuel cell in detail with neat sketch.

Q.6 **A.** Write down the properties, advantages and application of hydrogen as fuel. **[12M]**

B. List out the resources of geothermal energy. Explain any one in detail.

*******END*******

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – DEC 2018

Branch: B. Tech **Semester:** III

Subject Name: Electronic devices and Circuits **Subject Code:** BTEXC303

Max Marks: 60 **Date:-** 05/12/2018 **Duration:-** 3 Hrs.

Instructions to the Students:

1. Each Question Carries 12 Marks
2. Attempt any five questions of the following
3. Illustrate your answers with neat sketches, diagram etc.,wherever necessary
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

Q. 1 Attempt Any Two questions of the following

a) Briefly Explain construction and working principle of JFET 06

b) Describe FET as an Amplifier and its Analysis(CS) 06

c) Explain about FET as High Impedance Circuits 06

Q.2 a) Briefly Explain the Characteristics of N-Channel E-MOSFET 06

b) Write short Notes on Non-Ideal Voltage current characteristics 06

Q.3 a) Explain the Classification of amplifier in details 06

b) Discuss in details about various feedback topologies 06

Q.4 Attempt Any Two questions of the following

a) Explain about Barkhausen criterion for oscillator 06

b) Draw and explain the RC Phase shift Oscillators 06

c) Describe the Hartley and colpitts oscillators 06

Q.5 a) Briefly Explain about the IC 555 Block Diagram 06

b) Write down the applications of IC 555 in Engineering 06

Q.6 Attempt Any Two questions of the following

a) Explain about adjustable three terminal positive (LM 317) regulators with neat diagram 06

b)Briefly Explain SMPS with Neat diagram 06

c) Write Down the Comparison of Linear power supply and SMPS 06

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Chemical/Petrochemical Engineering **Sem: III**

Subject Name: Fluid Flow Operations **Subject Code: BTCHC 303**

Max Marks: 60 **Date: 5-12-2018** **Duration: 3 Hrs.**

Instructions to the Students:

1. *Solve ANY FIVE questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve <u>Any Two</u> of the following.**		**2x6=12**
A)	Calculate the pressure in kN/m^2 at the bottom of a spherical tank filled with oil having a diameter of 2.4 m. The top of the tank is vented to the atmosphere having a pressure of 101.325 kN/m^2. The density of the oil is 922 kg/m^3.	Apply	
B)	A U-tube manometer is being used to measure the pressure drop across a flow meter. The heavier fluid is mercury, with a density of 13,600 kg/m^3, and the top fluid is water , with a density of 1000 kg/m^3. The reading on the manometer is R_m = 32.7 cm. Calculate the pressure difference in N/m^2.	Apply	
C)	Given the pressure of 1 standard atmosphere as 101325 N/m^2, do as follows: (i) Convert this pressure to water head in meters (take density of water as 1000 kg/m^3) (ii) Convert this pressure to carbon tetrachloride head in meters (take density of carbon tetrachloride as 1,600 kg/m^3)	Apply	
Q.2	**Solve <u>Any Two</u> of the following.**		**2x6=12**
A)	Differentiate between Newtonian and non-Newtonian fluids and explain the rheological behavior of Newtonian and non-Newtonia fluids (time-independent) with examples for each type of fluid.	Analyze	
B)	Whole milk at 293 K having a density of 1030 kg/m^3 and viscosity 2.12 cP is flowing at the rate of 0.605 kg/s in a glass pipe having a diameter of 63.5 mm. (a) Calculate the Reynolds number . Is this turbulent flow? (b) Calculate the flow rate needed in m^3/s for a Reynolds number of 2100 and velocity in m/s.	Apply	
C)	A pump draws oil (specific gravity 0.8) from a storage tank and discharges it to an overhead tank. The mechanical energy delivered by the pump to the fluid is 50 J/kg. The velocities at the suction and the discharge points of the pump are 1 m/s and 7 m/s, respectively. Neglecting friction losses and assuming kinetic energy correction factor to be unity, what is the pressure developed by the pump?	Apply	

1x12=12

Q. 3 Solve Any One of the following.

A) (i) Derive velocity profile for a Newtonian fluid flowing under laminar flow conditions in a circular pipe. Also derive equation for average velocity in the pipe. At what radial position is the fluid velocity equal the mean velocity in the pipe? Where does this occur for a pipe diameter of 25 mm? — Apply

B) (i) Derive f = 16/Re for flow of Newtonian fluid in laminar flow through a circular pipe. — Apply

(ii) A lubricating oil at a rate of 0.5 kg/s flows through a 25 mm diameter circular pipe. Pressure drop over a length of 2 m is measured with the help of an U-tube manometer. If the manometer reads 225 mm find the friction factor and compare it with the theoretical value. Take density = 900 kg/m^3, viscosity = 0.250 Pa.s, density of manometer fluid = 13600 kg/m^3. — Apply

2x6=12

Q.4 Solve Any Two of the following.

A) Ammonia at atmospheric pressure and 300 K with a bulk stream velocity of 10 m/s flows through a pipe of diameter 25 cm. Calculate the pressure drop per 100 m length of the pipe and the power consumed. Friction factor $f = 0.079\ Re^{-0.25}$ in the turbulent regime. Viscosity of ammonia may be taken as 10.2×10^{-6} kg/(m.s). — Apply

B) A bacterium is moving in water at a velocity of 1 mm/s. The size of the bacterium may be taken as 1 micron meter. If the the kinematic viscosity of water is 10^{-6} m^2/s what will be the drag coefficient? — Understand

C) Evaluate the sphericity of the following: — Apply
(i) a solid particle of cubical shape
(ii) s solid particle of cylindrical shape with length equal to diameter.

1x12=12

Q. 5 Solve Any One of the following.

A) (i) A bed of spherical particles (specific gravity 2.5) of uniform size 1500 micron meter is 0.5 m diameter and 0.5 m high. In the packed bed state, the porosity may be taken as 0.4. Ergun's equation for the above particle -fluid system (in SI units) is given below — Apply
$\Delta P/L = 375 \times 10^3\ V_{OM} + 10.94 \times 10^6\ V^2_{OM}$ (in SI units)
If water is to be used as the fluidizing medium, what is the minimum fluidizing velocity, V_{OM}? In actual fluidization operation, the above bed has a height = 1m. What is the porosity of the fluidized bed?

(ii) Two spherical particles have the same outer diameter but are made of different materials. The first one (with material density ρ_1) is solid, whereas the second (with material density ρ_2) is a hollow sphere with the inner shell diameter equal to half the outer diameter. If both the spheres have the same terminal velocity in any fluid, then what will be the ratio of their material densities, ρ_2/ρ_1. — Apply

B) (i) Explain the concept of NPSH and suction lift for a centrifugal pump. — Understand

(ii) A storage vessel exposed to atmosphere (absolute pressure = 10.3 m of water) has a diameter of 3 m and is initially filled with water to a height of 2m. The pump draws water from the vessel and is located at an elevation of 5m above the bottom of the vessel. The frictional head loss in the suction pipe is 2 m of water. If the vapor pressure of the liquid at the temperature of operation is 3 m of water, then what will be the available NPSH? — Apply

1x12=12

Q6 Answer **any one** of the following:

A) (i) Explain, with neat sketches, the working principles of venturi meter and orifice meter. Give the merits and demerits of venturi and orifice meters. — Understand

(ii) Water flowing at 1.5 L/s in a 0.05 m diameter tube is metered by means of a simple orifice of diameter 0.025 m. If coefficient of discharge is 0.62, what will be the reading on a mercury-under-water manometer connected to the meter? Density of water = 1000 kg/m^3; viscosity of water = 0.001 Pa.s; density of mercury = 13,600 kg/m^3. — Apply

B (i) List out the purposes of agitation and explain, with example, how an agitator serves multiple purposes in a reaction vessel. — Remember

(ii) What are the causes of swirling and vertex formation in an agitated vessel? Suggest suitable measures for reducing the swirling and vertex formation in an agitated vessel. — Understand

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Chemical /Petrochemical Engineering **Sem:** III
Subject Name: Chemical Process Calculation **Subject Code:** BTCHC 302
Max Marks: 60 **Date:** 03/12/2018 **Duration:** 3 Hr.

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve the following.**		
A)	A mixture is 10 mole% ethyl alcohol, 75 mole% ethyl acetate ($C_4H_8O_2$) and 15 mole% acetic acid. Calculate the weight fraction of each of the compound. What is the average molecular mass of the mixture. What would be the weight (Kg) of a sample containing 25 km ol of ethyl acetate.	**Apply**	**04**
B)	A label has come off a cylinder of a gas in your laboratory. You know only that one species of gas is contained in the cylinder, but you don't know whether it is hydrogen, oxygen or nitrogen. To find out , you evacuate a 5 liter flask ,seal it and weigh it, and then let the gas from he cylinder flow into it until gauge pressure equals 1.0 atm. The flask is reweighed and the mass of added gas is found to be 13 gm. Room temperature is 27^0 C and barometric pressure is 1 atm. What is that gas?	**Analyze**	**04**
C)	A sample of caustic soda flakes contains74.6% Na_2O (by mass). Find the purity of the flakes.	**Understand**	**04**
Q.2	**Solve Any Two of the following.**		
A)	The waste acid from nitrating plant contains 30% H_2SO_4,35% $HNO_3$and 35% water. The acid is to be concentrated to 39% H_2SO_4, 42% HNO_3 by addition of concentrated H_2SO_4 containing 98% H_2SO_4 and concentrated HNO_3 containing 72% HNO_3 (by weight).Calculate the quantities of three acid to be mixed to get 1000 kg of desired mixed acid.	**Apply**	**06**
B)	Straw berries contain 15% solids and 85% water. To make strawberry jam, crushed strawberries and sugar are mixed in a 45 : 55 ratio and the mixture is heated to evaporate water until residue contain one tired water by mass. Calculate how many kg of strawberries are needed to make one kg of jam. (All percentage and ratio are by weight.)	**Apply**	**06**
C)	An evaporator is to produce 1300 kg/hr of dry common salt from a feed solution containing 20% NaCl .The salt removed carries 20% of its weight as saturated brine(The saturated brine contains 27% NaCl) Calculate the feed rate to the evaporator in kg/hr.	**Apply**	**06**
Q. 3	**Solve the following.**		
A)	The oxidation of ethylene to produce ethylene oxide proceeds according to the equation $2C_2H_4 + O_2 \longrightarrow 2\,C_2H_4O$	**Understand**	**06**

The feed to the reactor contains 100 kmol C_2H_4 and 100 kmol O_2. i)Which is the limiting reactant ? ii) What is the percentage excessof other reactant? iii) If the reaction proceeds to completion , howmuch of the excess reactant will be left, howmuch C_2H_4O will be formed and what is the extent of reaction?

B) In a Deacon process for manufacturing chlorine , hydrochloric acid gas is oxidized with air .The reaction taking place is : **Apply** **06**

$$4HCL + O_2 \rightarrow 2 CL_2 + H_2O$$

If the air is used in excess of 30 % of that theoretically required, and if the oxidation is 80% complete, calculate the composition by volume of dry gases leaving the reaction chamber.

Q.4 Solve Any Two of the following.

A) The dry bulb temperature and the dew point of an ambient air were found to be 29^0C and 18^0C respectively .The barometer reads 750 mm Hg pressure . **Understand** **06**
Compute
i) Absolute humidity ii) % Relative humidity iii) % Humidity
Data V.P. of water at $18^0C = 20$ mmHg
V.P. of water at $29^0C = 42$ mm Hg

B) Fresh orange juice contain 12 mass % solid and balance water and concentrated orange juice contain 42% solids. Initially a single stage evaporation process was used for concentration, but volatile constituent of juice escaped with water, resulting in flat taste .The present process overcomes this problem by bypassing the evaporator with a fraction of fresh juice that enters the evaporator is concentrated to 58% solids and the product is mixed with bypass fresh juice to achieve the desired final concentration of solids. Calculate the amount of concentrated juice produced per 100 kg of fresh juice fed to the process and fraction of feed that bypasses the evaporator. **Apply** **06**

C) With neat flow diagram, explain recycle ,bypass and purging operations in process industries and their importance. **Remember** **06**

Q. 5 Solve the following

A) Tin is melted in an open pan using jacket. The jacket is fed with eutectic mixture of diphenyl-diphenyl oxide at 1.73 kgf/cm^2a. Tin is fed to the pan at 30^0C.Calculate the quantity of eutectic mixture condensed per 100 kg of tin melted at its melting point temperature. Assume no subcooling of vapors. **Apply** **06**
Data for tin: Molecular Weight –118.7
Melting point --- 231.8^0C ,Latent heat of fusion –1720 kcal/kmol
Specific heat of solid tin
$C = 5.05 + 0.0048\ T$ (kcal/kmol.K)
Where T is in degree Kelvin.
Data for Diphenyl- Diphenyloxide mixture at1.73 kgf/cm^2 a

Saturation	Enthalpy(kcal/kg)		
Temp. ^0C	Sensible	Latent	Total
280	120.5	66.5	187.00

B) Calculate the quantity of heat to be added to raise the temperature of 5 kmol of CO_2 from 25 to 500 ^0C. Heat capacity is given by the following equation. **Understand** **06**

$$Cp = 19.774 + 73.375 \times 10^{-3} T - 56.02 \times 10^{-6} T^2 + 17.155 \times 10^{-9} T^3$$

where C_p is in kJ/ kmol. K

Q.6 Solve the following :

A) Sulfur dioxide is oxidized to sulfur trioxide in a small pilot plant reactor. SO_2 and 100% excess air are fed to the reactor at 450 ^0C.The reaction proceeds to 65% conversion of SO_2 and the product emerge from the reactor at 550 ^0C.The production rate of SO_3 is 100 kg /hr. The reactor is surrounded by water jacket into which water is fed at 25 ^0C.Calculate the minimum flowrate of water if temperature rise of water is to be kept below 15 ^0C. **Analyze** **08**
$\Delta H^0_R = -23.636$ kcal/ kmol

Mean molal heat capacity data is as follows. (C^0_{pm} =kcal/ kmol. K)

Component	C^0_{pm} (450^0C -25^0C)	C^0_{pm} (550^0C - 25^0C)
SO_2	7.261	11.33
SO_3	-----	16.110
O_2	-----	7.567
N_2	-------	7.19
Air	11.035	----

B) A square tank 4 m on a side and 10 m high is filled to the brim with water. Find the time required for it to empty through a hole in the bottom 5 cm^2 in area. **Apply** **04**

End

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End-semester Examination - Winter 2018

Course: B. Tech in Chemical/ Petrochemical Engineering — Semester: III

Subject Name: Mechanical Operations — Subject Code: BTCHC304

Max Marks: 60 — Date: 7/12/2018 — Time: 03:00 Hrs

Instructions:

1. *Solve ANY FIVE questions out of the following*
2. *The level question/expected answers per OBE or the course outcomes (CO) on which the question is based is mentioned in column in front of the questions.*
3. *Use of non-programmable scientific calculator is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		CO	Marks
Q.1a)	Write a brief note on the importance of unit operation in chemical process industries	CO1	4
Q.1b)	Give brief account of mechanical operations with any two appropriate industrial examples.	CO1	4
Q.1c)	For a sample of sand, the sphericity, density and diameter are 0.7, 2000 kg/m^3 and 700 μm respectively. Calculate the surface area of 5 kg sample.	CO3	4

Q.2a) A crusher was used to crush a material whose compressive strength was 22.5 MN/m^2 the size of the feed was minus 50mm, plus 40mm and the energy required was 13.0KJ/kg the screen analysis of the product was as follows. — CO3 — 4

Size of aperture [mm]	Through 6.00	On 4.00	On 2.00	On 0.75	On 0.50	On 0.25	On 0.125	Through 0.125
Mass fraction of particles	-	0.26	0.18	0.23	0.08	0.17	0.03	0.05

Calculate sauter mean diameter for above analysis. What would be the power required to crash 1kg/s of a material of compressive strength 45MN/m^2 from a feed minus 45mm, plus 40mm to a product of average size 0.50mm?

Q.2b) Discuss in brief about properties of particulate matter in bulk. — CO2 — 4

Q.2c) The following table given with the size distribution of dust as follows: — CO3 — 4

Size rang in μm	0-2	2-4	4-8	8-12	12-16	16-20	20-24
No of particles in range	2000	600	140	40	15	5	2

i) Calculate Sauter mean diameter

ii) Convert these figures to obtain size distribution on mass basis and calculate specific surface assuming specific gravity of particle 2.65.

Q.3a) Screen analysis of a sample of galena (specific gravity= 7.43) is given below — CO3 — 4

Tyler screen	3/4	4/6	6/8	8/10	10/14	14/20	20/28	-28
x (%)	3.5	15.0	27.5	23.5	16.0	9.1	3.4	2.0

Plot cumulative mass fraction and fractional mass distribution graphs.

Tyler screen	3	4	6	8	10	14	20	28
Screen size in mm	6.68	4.699	3.327	2.362	1.651	1.168	0.833	0.589

Q.3b) A quartz mixture having the screen analysis shown in table below through a std 10mesh screen. The cumulative analysis of overflow and underflow are given. Calculate the mass ratio of the overflow and underflow to feed and the overall effectiveness of screen. — CO4 — 4

Cumulative fraction smaller than D_p

Mesh	D_p, mm	feed	overflow	underflow
4	4.699	0	0	
6	3.327	0.025	0.071	
8	2.362	0.15	0.43	0
10	1.651	0.47	0.85	0.195
14	1.168	0.73	0.97	0.58
20	0.833	0.885	0.99	0.83
28	0.589	0.94	1.00	0.91
35	0.417	0.96		0.94
65	0.208	0.98		0.975
Pan		1.00		1.00

Q.3c) Draw sketch and discuss the grizzlies considering following points CO2 4

a) Working principles and working
b) Advantages, disadvantages and industrial application.

Q.4a) Give brief account of following with the neat sketch , construction, working and advantages, disadvantages and industrial application.*(ANY ONE)* CO3 4

a)Leaf filter
b)vacuum filter

Q.4b) In the filtration of sludge, the initial period is affected at a constant rate with feed pump at full capacity, until the pressure difference reaches 400kN/m^2. The pressure is then maintained at this value for the remainder of filtration. CO4 4

The constant rate operation requires 900 sec and one third of the total filtrate is obtained in this period. Neglecting the resistance of the filter medium, determine total filtration as well as cycle time. The time for removing cake and resembling the press is 1200 sec, the cake is not washed.

Q.4c) A cyclone separator 1 m in diameter and 3.0 m in depth has been used to handle 144,000kg/day of dust laden gas. The gas inlet is 0.3m square and gas outlet is 0.4m in diameter. If size distribution of particle (specific gravity = 1.2)in feed gas is as given below, estimate what % of particle will be separated from the gas stream: CO4 4

Particle size in μm	-11.7+8.3	-8.3 +5.9	-5.9 +4.2	-4.2 +2.9	-2.9 +2.1	-2.1
Mass fraction	0.098	0.234	0.277	0.149	0.101	0.141

Q.5a) Explain briefly the concepts of cross flow filtration. Give the classification of cross flow filtration processes according to their driving forces and separation size range. CO2 4

Q.5b) Explain the following terms in brief (any two) CO2 4

a)molecular weight cut off
b)observed retention and real retention
c)osmotic pressure

Q.5c) Discuss briefly about concentration polarization in cross flow filtration. CO2 4

Q.6a) Activated sludge from secondary waste water treatment facility is to be concentrated from 2500 mg/ht to 10000 mg/lit in a continuous thickner the flow rate to the unit is 2*10^6 lit/day. Determine thickner area required from batch test data given below. CO2 6

Time, min	0	1	2	3	5	8	12	16	20	25
Height of interface, cm	51	43.5	37.0	30.8	23.0	17.9	14.3	12.2	11.2	10.7

OR

Q.6a) What are the types of Flow pattern arises in agitated vessel, how the swirling can be avoided. Discuss in brief about impellers. CO2 6

Q.6b) Give comparative study of tubular bowl and disc bowl centrifuge. CO3 6

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,LONERE

End Semester Examination – Winter 2018

Course: B. Tech **Sem: III**

Subject: Advanced Engineering Chemistry **Subject code: BTBSC305/BTBSE3404A**

Date: 10/1202018 **Duration: 3 Hr.** **Marks: 60**

Instructions to the Students:

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it.

		(COs)	Marks
Q.1	**Solve Any Two of the following.**		
	a) Write a note on Pitting corrosion.	01	06
	b) What is Cathodic protection? Explain methods to minimize corrosion.	01	06
	c) Explain in details various factors affecting the rate of corrosion	01	06
Q.2	**Solve Any Two of the following**		
	a) What are Thermal reactions? Give mechanism of Cope reaction..	02	06
	b) What is Quantum Yield? Explain the Photosynthetic reaction of HBr.	02	06
	c) Explain the term Fluorescence and Phosphorescence with the help of Jablonski diagram	02	06
Q.3	Solve **Any One** of the following		12
	a)Describe Condensation polymerization and Co-polymerization.	03	
	b) What are the Constituents of plastic and Explain Moulding of plastic by Injection method	03	
Q.4	Solve **Any Two** of the following		
	a) Give the Mechanism of Isomerization reaction and Benzidine Rearrangement reaction.	04	06
	b) Explain Homolytic and Heterolytic bond fission with suitable examples.	04	06
	c) Write a note on: Electromeric effect and Hyper conjugative Effect.	04	06
Q.5	**Solve Any Two** of the following		
	a) Explain the laws of Absorption. [i] Lamberts law [ii] Beers law [iii] Beer-Lamberts law	05	06
	b) Explain the instrumentation and working of Atomic Absorption Spectrophotometer.	05	06
	c) Count the number of ^{1}H-NMR signals and multiplicity of the respective signals in the following compounds [i] Dichloro Ethane [ii] 2-Chloro Prop-1-ene [iii] 2-Chloro Butane.	05	06
Q.6	Solve **Any Two** of the following		
	a) Explain the types of Chromatography. Give the applications of Thin Layer Chromatography (TLC).	06	06
	b) Describe Instrumentation and Applications of Thermo gravimetric analysis.	06	06
	c) Explain the Principle and working of Gas Chromatography.	06	06

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Chemical /Petrochemical Engineering | **Sem:** III
Subject Name: Chemical Process Calculation | **Subject Code:** BTCHC 302
Max Marks: 60 | **Date:** 03/12/2018 | **Duration:** 3 Hr.

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve the following.**		
A)	A mixture is 10 mole% ethyl alcohol, 75 mole% ethyl acetate ($C_4H_8O_2$) and 15 mole% acetic acid. Calculate the weight fraction of each of the compound. What is the average molecular mass of the mixture. What would be the weight (Kg) of a sample containing 25 km ol of ethyl acetate.	**Apply**	**04**
B)	A label has come off a cylinder of a gas in your laboratory. You know only that one species of gas is contained in the cylinder, but you don't know whether it is hydrogen, oxygen or nitrogen. To find out , you evacuate a 5 liter flask ,seal it and weigh it, and then let the gas from he cylinder flow into it until gauge pressure equals 1.0 atm. The flask is reweighed and the mass of added gas is found to be 13 gm. Room temperature is 27^0 C and barometric pressure is 1 atm. What is that gas?	**Analyze**	**04**
C)	A sample of caustic soda flakes contains74.6% Na_2O (by mass). Find the purity of the flakes.	**Understand**	**04**
Q.2	**Solve Any Two of the following.**		
A)	The waste acid from nitrating plant contains 30% H_2SO_4,35% $HNO_3$and 35% water. The acid is to be concentrated to 39% H_2SO_4, 42% HNO_3 by addition of concentrated H_2SO_4 containing 98% H_2SO_4 and concentrated HNO_3 containing 72% HNO_3 (by weight).Calculate the quantities of three acid to be mixed to get 1000 kg of desired mixed acid.	**Apply**	**06**
B)	Straw berries contain 15% solids and 85% water. To make strawberry jam, crushed strawberries and sugar are mixed in a 45 : 55 ratio and the mixture is heated to evaporate water until residue contain one tired water by mass. Calculate how many kg of strawberries are needed to make one kg of jam. (All percentage and ratio are by weight.)	**Apply**	**06**
C)	An evaporator is to produce 1300 kg/hr of dry common salt from a feed solution containing 20% NaCl .The salt removed carries 20% of its weight as saturated brine(The saturated brine contains 27% NaCl) Calculate the feed rate to the evaporator in kg/hr.	**Apply**	**06**
Q. 3	**Solve the following.**		
A)	The oxidation of ethylene to produce ethylene oxide proceeds according to the equation $2C_2H_4 + O_2 \longrightarrow 2\ C_2H_4O$	**Understand**	**06**

The feed to the reactor contains 100 kmol C_2H_4 and 100 kmol O_2. i)Which is the limiting reactant ? ii) What is the percentage excessof other reactant? iii) If the reaction proceeds to completion , howmuch of the excess reactant will be left; howmuch C_2H_4O will be formed and what is the extent of reaction?

B) In a Deacon process for manufacturing chlorine , hydrochloric acid gas is oxidized with air .The reaction taking place is : **Apply** **06**

$$4HCL + O_2 \rightarrow 2\ CL_2 + H_2O$$

If the air is used in excess of 30 % of that theoretically required, and if the oxidation is 80% complete, calculate the composition by volume of dry gases leaving the reaction chamber.

Q.4 Solve Any Two of the following.

A) The dry bulb temperature and the dew point of an ambient air were found to be 29^0C and 18^0C respectively .The barometer reads 750 mm Hg pressure . Compute **Understand** **06**

i) Absolute humidity ii) % Relative humidity iii) % Humidity

Data V.P. of water at 18^0C = 20 mmHg

V.P. of water at 29^0C = 42 mm Hg

B) Fresh orange juice contain 12 mass % solid and balance water and concentrated orange juice contain 42% solids. Initially a single stage evaporation process was used for concentration, but volatile constituent of juice escaped with water, resulting in flat taste .The present process overcomes this problem by bypassing the evaporator with a fraction of fresh juice that enters the evaporator is concentrated to 58% solids and the product is mixed with bypass fresh juice to achieve the desired final concentration of solids. Calculate the amount of concentrated juice produced per 100 kg of fresh juice fed to the process and fraction of feed that bypasses the evaporator **Apply** **06**

C) With neat flow diagram, explain recycle ,bypass and purging operations in process industries and their importance. **Remember** **06**

Q. 5 Solve the following

A) Tin is melted in an open pan using jacket. The jacket is fed with eutectic mixture of diphenyl-diphenyl oxide at 1.73 kgf/cm^2a. Tin is fed to the pan at 30^0C.Calculate the quantity of eutectic mixture condensed per 100 kg of tin melted at its melting point temperature. Assume no subcooling of vapors. **Apply** **06**

Data for tin: Molecular Weight –118.7

Melting point --- 231.8^0C ,Latent heat of fusion –1720 kcal/kmol

Specific heat of solid tin

$C = 5.05 + 0.0048\ T$ (kcal/kmol.K)

Where T is in degree Kelvin.

Data for Diphenyl- Diphenyloxide mixture at1.73 kgf/cm^2 a

Saturation Temp. ^0C	Enthalpy(kcal/kg) Sensible	Latent	Total
280	120.5	66.5	187.00

B) Calculate the quantity of heat to be added to raise the temperature of 5 kmol of CO_2 from 25 to 500 ^0C. Heat capacity is given by the following equation. **Understand** **06**

$$Cp = 19.774 + 73.375 \times 10^{-3}\ T - 56.02 \times 10^{-6}\ T^2 + 17.155 \times 10^{-9}\ T^3$$

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE
Winter Semester Examination – December - 2018

Branch: B. Tech in Computer Science **Sem.:- III**
Subject with Subject Code: - Digital Electronics & Microprocessor (BTCOC305)
Date: 10/12/2018 **Marks: 60** **Duration: - 3 Hr.**

Instructions to the Students

1. *Each question carries 12 marks.*
2. *Attempt **any five** questions of the following.*
3. *Illustrate your answers with neat sketches, diagram etc., wherever necessary.*
4. *Assume suitable data wherever necessary and mention it clearly.*
5. *Use of non-programmable scientific calculators is allowed.*

		(Marks)
Q.1	**Solve Any Two of the following.**	**12**
A)	Design basic gates with the help of universal gates.	**06**
B)	Explain different types of Boolean algebra theorems.	**06**
C)	Explain different types of K-Map representation.	**06**
Q.2	**Solve Any Two of the following.**	**12**
A)	Calculate $F(A, B,C,D) = \sum m(0,1,2,3,7,8,9,10,11,12,13)$.	**06**
B)	Calculate $F(A,B,C,D) = \pi M(4,5,6,7,8,12) \cdot d(1,2,3,11,14)$.	**06**
C)	Compare Multiplexer and Demultiplexer with neat diagram.	**06**
Q.3	**Solve Any Two of the following.**	**12**
A)	Explain with neat diagram working of S-R Flip-Flop.	**06**
B)	Write a short note on shift registers and list down its applications.	**06**
C)	Write a short note on D Flip Flop and T Flip- Flop	**06**
Q.4	**Solve Any Two of the following.**	**12**
A)	Differentiate between 8085 and 8086 Microprocessors.	**06**
B)	Explain with neat diagram architecture of 8086.	**06**
C)	Explain the structure of 8086 PSW.	**06**
Q.5	**Solve Any Two of the following.**	**12**
A)	Differentiate between I/O mapped I/O and memory mapped I/O of 8086.	**06**
B)	Explain with neat diagram working of DMA controller.	**06**
C)	Explain different types of interrupts in 8086.	**06**
Q.6	**Solve Any Two of the following.**	**12**
A)	Explain with example different types of instruction set of 8086.	**06**
B)	Explain the various addressing modes of 8086.	**06**
C)	Write a short note on Procedure and Subroutine.	**06**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Computer Engineering **Sem: III**

Subject Name: Data Structures **Subject Code:** BTCOC303

Max Marks: 60 **Date: 5/12/2018** **Duration: 3 Hrs.**

Instructions to the Students:

1. *Solve ALL questions.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Three of the following.**		
A)	What is data structure? Why to study data structure? Enlist the five areas of computer science in which data structure is used.	Understand	**4**
B)	What is garbage collection? Who will run garbage collection program? When it will be run?	Understand	**4**
C)	Suppose multidimensional arrays A and B are declared using A (0:5, -2:7) and B (0:5, -1:4). Find the length of each dimension and the number of elements in array A and B.	Apply	**4**
D)	What is primitive data structure? Enlist the differences between primitive and non-primitive data structures.	Understand	**4**
Q.2	**Solve Any Two of the following.**		
A)	What is circular queue? Let the following circular queue can accommodate maximum six elements with the following data, front = 2, rear = 4 and initial queue content is queue = ---, L, M, N, ----, --- Show the queue content with front and rear value after the following operations. i) Insert A ii) Delete iii) Insert B iv) Delete	Apply	**6**
B)	What is singly linked list? Write algorithm to find the number of times a given ITEM occurs in the singly linked list.	Creating	**6**
C)	Let the keys: 46, 34, 42, 23, 52, 33 are inserted into an empty hash tableusing function h (key) = key mod 10. Give hash table content after every insertion, if open addressing with linear probing is used to deal with collision.	Creating	**6**
Q. 3	**Solve Any Two of the following.**		
A)	What is selection sort? Sort the number following numbers in ascending order and also show the worst case time complexity of selection sort is O (n^2).	Analyzing	**6**
B)	Consider the stack of size 6 memory cells. Suppose initially stack contains **a, b, c, d, e** (Top of stack). Then the following operations are executed	Evaluating	**6**

in order. Show the stack top and any other situation raised while doing each of the operation.
i) Push(f) ii) Pop(top) iii) Push(g) iv) Push(h) v) Pop(top) vi) Push(i)

Apply

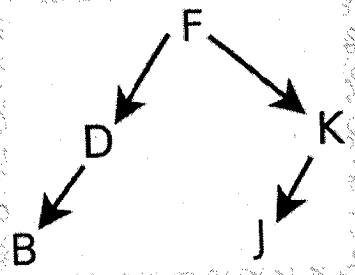
C) Explain how to implement two stacks in one array A[1 . . N] in such a way that neither stack overflow unless the total number of elements in both the stacks together is N. Note that, Push() and Pop() operations should be run in O (1) time. — 6

Q.4 Solve Any Two of the following.

A) What are the different types of the linked list? Give advantages and disadvantages each of the linked list over another. — Remember — 6

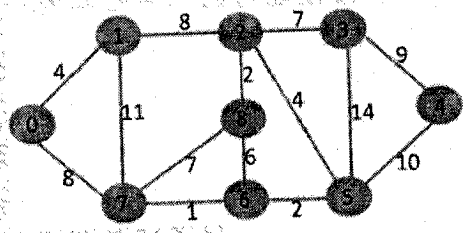
B) Assume, the following letters are inserted into an empty binary search tree in given order. J, B, D, F, N, K, O. Construct binary search tree and also give height of the tree. — Apply — 6

C) What is threaded binary trees? Give the threaded binary tree of the following binary tree. — Apply — 6



Q. 5 Solve the following.

A) What is graph? Find the shortest path using Dijkstra algorithm. Assume starting node is 0. — Evaluating — 6



B) Explain the in brief the following — Understand — 6
i) red black tree ii) m-way search tree iii) b tree iv) b+ tree
v) sparse matrix vi) AVL tree

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Computer Science and Engg **Sem:** III

Subject Name: Discrete Mathematics **Subject Code:** BTCOC302

Date: 03/12/2018 **Max Marks:** 60 **Duration:** 3 Hrs.

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *Use of non-programmable scientific calculators is allowed.*
3. *Assume suitable data wherever necessary and mention it clearly.*

Marks

Q. 1 Solve Any Three of the following.

A) Let p and q be the propositions "Swimming at the New Jersey shore is allowed" and "Sharks have been spotted near the shore" respectively. Express each of these compound propositions as an English sentence. **4M**

a) $\neg q$ b) $p \rightarrow \neg q$ c) $p \leftrightarrow \neg q$ d) $\neg p \vee q$

B) Explain with example, notations used and mathematical expression to describe the following terms. **4 M**

i) Membership ii) Subset iii) Equality of two sets iv) Union

C) Use mathematical induction to show that $1+5+9+\ldots+(4n-3) = n(2n-1)$, $\forall n \geq 1, n \in Z$ **4M**

D) Explain Universal quantifiers and Existential quantifiers with example. What is De Morgan's law for quantifiers? **4M**

Q.2 Solve the following.

A) Check whether the relation R defined in the set {1, 2, 3, 4, 5, 6} is $R = \{ (a, b) : b = a+1 \}$ is reflexive, symmetric or transitive. Justify your answer. Find the relation Matrix. **6 M**

B) Explain surjective, injective, bijective and inverse function each with example. **6M**

Q. 3 Solve Any three of the following.

A) Explain the pigeonhole principle with example. **4M**

B) Find how many symbol codes can be formed if the first two symbols are letters and the next three are digits but no symbol is repeated? **4M**

C) What is the expansion of $(3x + y)^4$? **4M**

D) Determine the sequence $\{a_n\}$ where $a_n = 3n$ for every non-negative integer, n is a solution of the recurrence relation $a_n = 2a_{n-1} - a_{n-2}$ for $n = 2, 3, 4, \ldots$ **4M**

Q.4 Solve the following.

A) Define Euler graph and Hamiltonian Graph. **6M**

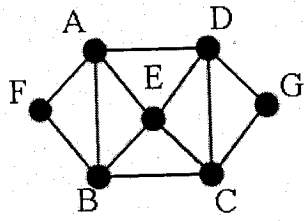
i)For a given graph G :

(a) Find a Hamiltonian path that begins at A and ends at E.

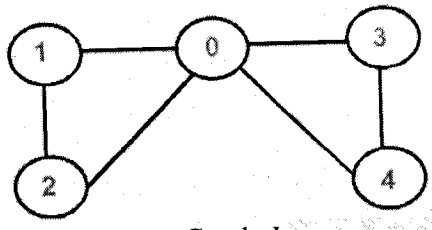
(b) Find a Hamiltonian circuit that starts at A and ends with the pair of vertices E, A.

(c) Find a Hamiltonian path that begins at F and ends at G.

ii) For a given graph I find Eulerian path and Eulerian cycle.

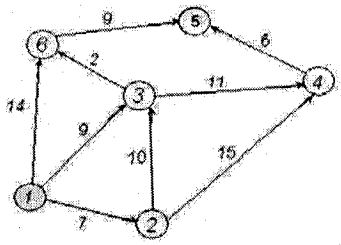


Graph: H



Graph: I

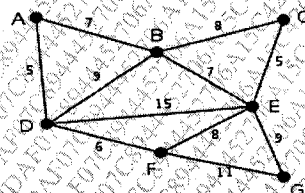
B) Find the shortest path in the given graph using Dijkstra shortest path algorithm. **6M**



Q. 5 Solve Any three of the following.

A) Show that a tree with n vertices has n-1 edges. **4M**

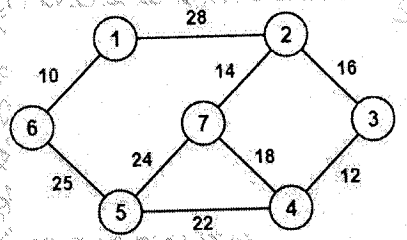
B) Find minimum spanning tree for the given graph using Prim's algorithm? **4M**



C) Define the following terms with reference to tree with example. **4M**

i)Level and Height of a tree ii)M-ary Tree iii) Eccentricity of a vertex

D) Construct the minimum spanning tree (MST) for the given graph using Kruskal's Algorithm. **4M**



Q. 6 Solve the following.

A) Define the following terms. **6M**

i)Algebraic Structures ii) Semi Groups iii) Monoids iv) Ring

v) Field vi) Group

B) For each of the following, determine whether the binary operation * is commutative or associative? **6M**

i) N is the set of natural numbers and $a * b = a + b + 2$ for $a, b \in N$

ii) On N where $a * b = \min(a, b+2)$

iii) On R where $a * b = a^b$

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Information Technology **Sem: III**
Subject Name: Object Oriented Paradigm with C++ **Subject Code: BTITC303**
Max Marks: 60 **Date:05/12/18** **Duration: 3 Hr.**

Instructions to the Students:

1. *All questions are compulsory.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level /CO)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	What is an algorithm? What is/are the need(s) of writing algorithm? What is class diagram? What are the components of class diagram? Explain with the help of diagram.	**CO1**	**6**
B)	What is reference variable? What is its major use? Write a function using reference variable as argument to swap the values of pair of integers.	**CO5**	**6**

C)	i. Enumerate the rules of naming variables in C++. How do they differ from ANSI C rules?
	ii. Describe the major parts of C++ program. How does a main function in C++ differ from main () in C?
	Identify error in the following program
	#include <iostream.h>
	void main()
	{
	short i=2500, j=3000,
	cout>>" i + j =" >>-(i + j);
	}
		CO5	**6**

Q.2	**Solve Any Two of the following.**		
A)	A friend function cannot be used to overload the assignment operator =. Explain why? When is a friend function compulsory? Give an example.	**CO5**	**6**

B)	What is constructor? Is it mandatory to use constructors in a class? How do we invoke constructor function? List some of the special properties of the constructor functions. Can we use more than one constructor in a class? If yes, explain the need of such a situation.	**CO3**	**6**
C)	What is type conversion? A class alpha has a constructor as follows: alpha (int a, double b);Can we use this constructor to convert types? We have two classes X and Y. If a is an object of X and b is an object of Y and we want to say a=b; What type of conversion routine should be used and where?	**CO3**	**6**

Q. 3 Solve Any two of the following.

A)	**i.** What is a virtual function? Why do we need virtual functions? When do we make a virtual function "pure"? What are the implications of making a function a pure virtual function? **ii.** What is an exception? How is an exception handled in C++? What are the advantages of using exception handling mechanism in a program? When should a program throws an exception?	**CO3** **CO4**	**6**
B)	What do you mean by function overloading? Explain with an example when do we use this concept. On what basis, the compiler distinguishes between a set of overloaded functions having the same name?	**CO4**	**6**
C)	Write a function to read a matrix of size m*n from the keyboard.	**CO2**	**6**

Q.4 Solve Any Two of the following.

A)	Distinguish between the following terms: i. Objects and classes ii. Data abstraction and data encapsulation iii. Inheritance and polymorphism iv. Dynamic binding and message passing	**CO2** **CO3** **CO4** **CO5**	**6**
B)	What does polymorphism means in C++ language? How polymorphism achieved at i. Compile time ii. Run time?	**CO4**	**6**
C)	Define a class String. Use overload == operator to compare two strings.	**CO2**	**6**

Q. 5 Solve Any One of the following.

A)	i. What does inheritance mean in C++? Class D is derived from class B. The class D does not contain any data members of its own. Does the class D require constructors? If yes, why? What is containership? How does it differ from inheritance? Describe how an object of a class that contains objects of other classes created? ii. What are the different forms of inheritance? Give an example for each. iii. We know that a private member of a base class is not inheritable. Is it anyway possible for the objects of a derived class to access the private members of the base class? If yes, how? Remember, the base class cannot be modified.	**CO3**	**12**
B)	Create two classes DM and DB which stores the value of distances. DM stores distances in meter and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add one object of DM with another object of DB. Use friend function to carry out the addition operation. The object that stores the results may be DM object or DB object, depending on the units in which the results are required. The result should be in the format of feet and inches or meters and centimeters depending on the object on display.	**CO2**	**12**

***** End *****

4452706A15C42C8064EA682DAF49E6B3

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Information Technology **Sem: III**

Subject Name: Programming in Java **Subject Code: BTITE305B**

Max Marks:60 **Date: 10-12-2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve ANY FIVE questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	Solve the following.		
A)	Write any two methods of array list class with their syntax.	**Application**	**04**
B)	Why java became platform independent language? Explain.	**Analysis**	**04**
C)	State & explain scope of variable with an example.	**Remember**	**04**
Q.2	Solve the following.		
A)	Explain inheritance and polymorphism features of Java.	Comprehension	04
B)	Explain how interface is used to achieve multiple Inheritance in Java.	Application	04
C)	Define a class and object. Write syntax to create class and object with an example.	Remember	04
Q. 3	Solve the following.		
A)	Define applet. Write a program to create an applet to display message "Welcome to java applet".	Remember Application	04
B)	Which are the ways to access package from another package? Explain with example.	Comprehension	04
C)	Explain applet life cycle with suitable diagram.	Comprehension	04
Q.4	Solve the following.		
A)	Write a program to create two thread one to print odd number only and other to print even numbers.	Application	04
B)	With proper syntax and example explain following thread methods: (1) wait( ) (2) sleep( ) (3) resume( ) (4) notify( )	**Remember** Comprehension	04
C)	With syntax and example explain try & catch statement.	Comprehension	04

Q. 5 Solve the following.

A)	Give the syntax of following methods of graphics class. Explain their use with suitable program: (i) drawRoundReel( ) (ii) drawPolygon( ) (iii) drawOval( ) (iv) drawstring( )	Comprehension	08
B)	Write a applet program to set background with red colour and fore ground with blue colour.	Application	04

Q.6 Solve the following.

A)	Write a java program to copy the content of the file "file1.txt" into new file "file2.txt".	Application	08
B)	Explain byte stream class in detail.	Comprehension	04

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Information Technology **Semester: III**
Subject Name: Switching Theory and Logic Design **Subject Code:** BTITC302
Date:03/12/2018 **Max Marks: 60** **Duration: 3 Hrs.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(COs)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	Convert: i. $(101111.0011111)_2 = (?)_{16}$ ii. $(3B.F)_{16} = (?)_{10}$ iii. $(756.603)_8 = (?)_{16}$ iv. $(10.625)_{10} = (?)_2$ v. $(367.52)_8 = (?)_2$ vi. $(247.6875)_{10} = (\ )_8$	CO1	06
B)	Perform the following subtractions in XS-3 code: (i) 267 – 175 (ii) 57.6 - 27.8	CO1	06
C)	A 12-bit Hamming code word containing 8 bits of data and 4 parity bits is read from memory. What was the original 8-bit data word that was written into memory, if the 12-bit word read out is (a) 010011111000 (b) 011101010010 (c) 010000000101?	CO1	06
Q.2	**Solve Any Two of the following.**		
A)	Using the Quine Mc-Clusky method minimize the following logic function: $F(A,B,C,D) = \sum m\ (0,1,2,3,5,7,8,9,11,14)$	CO1	06
B)	Draw and explain the state diagram, state table for a D flip-flop.	CO2	06
C)	What is logic family? Explain the characteristics of digital ICs.	CO1	06

Q. 3 Solve Any One of the following.

A)	(i) Evaluate the 7-bit composite code word for the data word 0110. (ii) Evaluate the three check bits C1, C2, and C3, assuming no error. (ii) Assume an error in bit D5 during storage into memory. Show how the error in the bit is detected and corrected.	CO1	12
B)	Solve the following expressions with the help of Boolean rules. (a) $X = ABC + \overline{A}B + AB\overline{C}$ (b) $X = \overline{A}B\overline{C} + A\overline{BC} + \overline{ABC}$ (c) $AB + \overline{A}C + BC = AB + \overline{A}C$	CO1	12

Q.4 Solve Any Two of the following.

A)	Design a 4-bit Gray to Binary code converter.	CO2	06
B)	Convert J-K flip flop into T flip flop. Draw truth table and logic symbol of T flip flop.	CO3	06
C)	With the help of appropriate diagrams, briefly explain the operation of Moore and Mealy finite state machines and highlight their differences.	CO2	06

Q. 5 Solve Any One of the following.

A)	Realize the following functions using a PAL with four inputs and 3-wide AND-OR structure. Also write the PAL programming table. $F_1(A,B,C,D) = \sum m\ (6,8,9,12,13,14,15)$ $F_2(A,B,C,D) = \sum m\ (1,4,5,6,7,10,11,12,13)$ $F_3(A,B,C,D) = \sum m\ (4,5,6,7,10,11)$ $F_4(A,B,C,D) = \sum m\ (4,5,6,7,9,10,11,12,13,14,15)$	CO2	12
B)	Implement the following logic functions using an 8 X 1 MUX: i) $F(X,Y,Z) = \sum m\ (0,2,3,5)$ ii) $F(A,B,C,D) = \sum m\ (1,3,4,11,12,13,14,15)$	CO2	12

Q.6 Solve Any Two of the following.

A)	Simplify the following logic functions and realize using NAND/NOR gates i) $F_1(A,B,C,D) = \sum m\ (1,3,5,8,9,11,15) + d(2,13)$ ii) $F_2(A,B,C,D) = \prod M\ (1,2,3,8,9,10,11,14)\ .\ d(7,15)$	CO1	06
B)	What is race around condition? How can it be avoided?	CO3	06
C)	Show how the PLA circuit would be programmed to implement the sum and carry outputs of a full adder.	CO2	06

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech. in Electronics and Telecommunication Engineering **Sem: III**

Subject Name: Digital Logic design **Subject Code: BTEXC305**

Max Marks: 60 **Date:10/12/2018** **Duration: 3 Hr.**

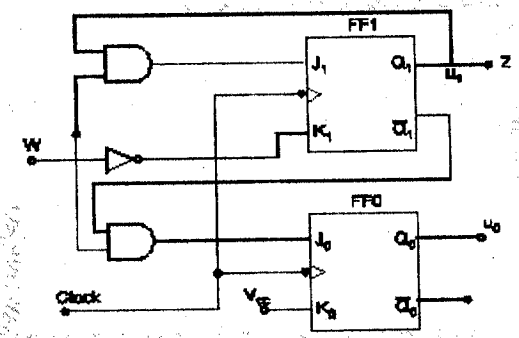
Instructions to the Students:

1. The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.

2. Use of non-programmable scientific calculators is allowed.

3. Assume suitable data wherever necessary and mention it clearly.

			(COs)	Marks
Q. 1	A)	Simplify following expression using K-Map $f(A,B,C,D) = \sum m(1,4,7,12,13,14,15) + d(0,5,8)$	(1,2)	06
	B)	Implement following using multiplexer (a) Half-adder (b) Half-subtractor	(1,2)	06
Q. 2	A)	Design 3-bit synchronous up counter using JK flip flop.	(2,3)	06
	B)	Draw and explain Universal shift Register.	(2,3)	06
Q. 3		Draw state diagram for given sequential circuit shown in figure 1.	(2,3)	12



Q.4	A)	Define and explain: i)Fan in and Fan out ii) Noise immunity iii) Propagation Delay	(2)	06
	B)	Explain in brief the operation of CMOS NAND Gate with schematic diagram.	(2)	06
Q5.	A)	Implement given Boolean functions using PLA, PAL and PROM F1 (A,B,C)= $\sum m(0,2,6,7)$ F2(A,B,C)= $\sum m(1,3,4,5,7)$	(2,3)	06
	B)	Write VHDL code for Mux 4:1 using dataflow and behavioural architecture style.	(4)	06
Q6.	A)	Draw combinational circuit for Binary Parallel Adder and Subtractor.	(3)	06
	B)	Draw Asynchronous 4 bit up counter with clock waveform.	(2,3)	06

**********The End**********

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Electronics and Telecommunication Engineering **Sem: III**

Subject Name: Network Analysis **Subject Code: BTEXC304**

Max Marks: 60 **Date: 07-12-2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. ***Draw figures wherever necessary.***
3. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
4. *Use of non-programmable scientific calculators is allowed.*
5. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve the following.**	**CO01**	
A)	In the circuit shown in Fig. 1, determine current through 5 ohm resistance using mesh analysis.		**[06]**

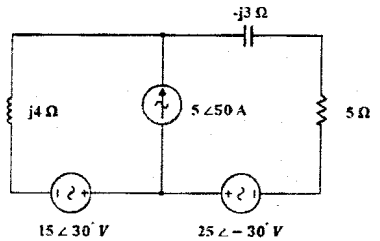


Fig. 1

B) In the circuit shown in Fig. 2, obtain the value of the load impedance between the terminals X and Y for maximum power transfer. Hence, determine the maximum power absorbed by this load. **[06]**

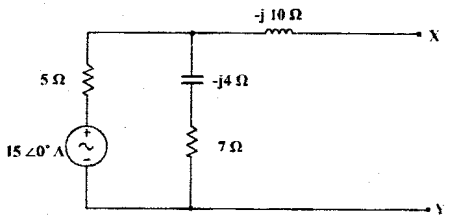


Fig. 2

Q.2 Solve Any Two of the following. **CO01, CO02**

A) Derive expression for frequencies at which voltage across L and C are maximum in a series resonant circuit. Also determine values of voltages across L and C at this frequency. **[06]**

B) A coil of 12H and resistance of 15Ω is shunt with 100pf capacitor. The combination is connected across a generator of 100V, having internal resistance of 70kΩ, Determine **[06]**
(a) voltage across parallel circuit at resonance and
(b) bandwidth.

C) Derive an expression for selectivity and bandwidth of anti-resonant circuit. If the circuit impedance of a parallel resonating frequency is (100 + j10) Ω at frequency 2.5 MHz. Find value of L and C if the Q of inductor is 6 and it is constant. **[06]**

Q. 3 Solve the following. **CO01, CO02**

A) For a symmetrical T network, explain briefly the terms, **[08]**
a) characteristic impedance
b) Propagation constant.
Also derive and expressions for these parameters in terms of circuit impedances.

B) Design a prototype low pass filter sections so as to have design impedance of 700Ω and f_c = 2kHz. Find circuit elements. Also find characteristic impedance Z_0 at frequency of 1kHZ, 2kHz and 5kHz. **[04]**

Q.4 Solve any two of the following. **CO01**

A) For a 2-port passive network, define- **[06]**
(a) driving point impedance
(b) driving point admittance
(c) current transfer ratio
(d) transfer admittance

B) For the network shown in Fig. 3 below, determine Z (open circuit impedance) parameter. Also verify condition for reciprocity and symmetry for the same. **[06]**

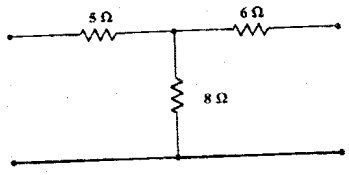


Fig. 3

C) Obtain equations for Y-parameters in terms of Z, h and ABCD parameters. **[06]**

Q. 5 Solve the following. **CO01,CO03**

A) In the R-C circuit shown in below Fig 4, the switch is closed at t = 0. Obtain expression for current $i(t)$. **[06]**

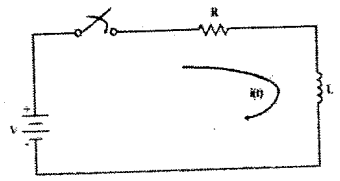


Fig 4

B) In the circuit shown in Fig.5, the switch K is moved from position 'a' to position 'b' at t = 0. A steady state having previously been established at when the switch was position 'a'. Using Laplace Transform method, find value of $i(t)$. **[06]**

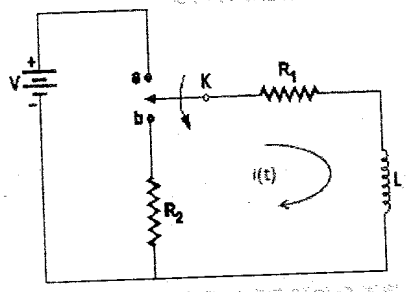


Fig. 5

Q. 6 Solve the following. **CO03, CO04**

A) For a transmission line of length l, starting from the differential equations, derive the expressions for the sending-end voltage and current in terms of receiving end voltage and currentsand the secondary line constants. **[06]**

B) A 50 Ω lossless transmission line of length 1.37 λ is terminated into load of (60 + j 40) Ω. Using Smith Chart, Find **[06]**
a) input impedance of the line
b) input and load admittances
c) Reflection coefficient in amplitude and phase
d) Standing wave ratio (S)
e) Minimum and maximum values of the impedances along the line
f) Distance of 1st voltage minima and maxima from the load

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Electronics and Telecommunication Engineering **Sem: III**

Subject Name: Network Analysis **Subject Code: BTEXC304**

Max Marks: 60 **Date: 07-12-2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve ANY FIVE questions out of the following.*
2. ***Draw figures wherever necessary.***
3. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
4. *Use of non-programmable scientific calculators is allowed.*
5. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve the following.**	**CO01**	
A)	In the circuit shown in Fig. 1, determine current through 5 ohm resistance using mesh analysis.		**[06]**

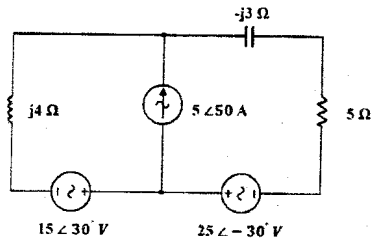


Fig. 1

B) In the circuit shown in Fig. 2, obtain the value of the load impedance between the terminals X and Y for maximum power transfer. Hence, determine the maximum power absorbed by this load. **[06]**

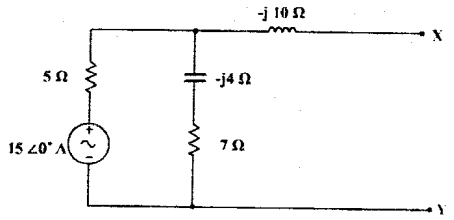


Fig. 2

Q.2 Solve Any Two of the following. **CO01, CO02**

A) Derive expression for frequencies at which voltage across L and C are maximum in a series resonant circuit. Also determine values of voltages across L and C at this frequency. **[06]**

B) A coil of 12H and resistance of 15Ω is shunt with 100pf capacitor. The combination is connected across a generator of 100V, having internal resistance of 70kΩ, Determine **[06]**
(a) voltage across parallel circuit at resonance and
(b) bandwidth.

C) Derive an expression for selectivity and bandwidth of anti-resonant circuit. If the circuit impedance of a parallel resonating frequency is (100 + j10) Ω at frequency 2.5 MHz. Find value of L and C if the Q of inductor is 6 and it is constant. **[06]**

Q. 3 Solve the following. **CO01, CO02**

A) For a symmetrical T network, explain briefly the terms, **[08]**
a) characteristic impedance
b) Propagation constant.
Also derive and expressions for these parameters in terms of circuit impedances. **[04]**

B) Design a prototype low pass filter sections so as to have design impedance of 700Ω and f_c = 2kHz. Find circuit elements. Also find characteristic impedance Z_o at frequency of 1kHZ, 2kHz and 5kHz. **CO01** **[06]**

Q.4 Solve any two of the following.

A) For a 2-port passive network, define- **[06]**
(a) driving point impedance
(b) driving point admittance
(c) current transfer ratio
(d) transfer admittance

B) For the network shown in Fig. 3 below, determine Z (open circuit impedance) parameter. Also verify condition for reciprocity and symmetry for the same.

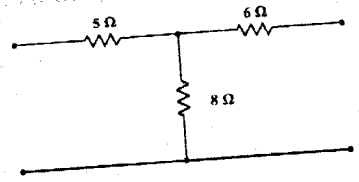


Fig. 3 **[06]**

C) Obtain equations for Y-parameters in terms of Z, h and ABCD parameters.

Q. 5 Solve the following. **CO01,CO03** **[06]**

A) In the R-C circuit shown in below Fig 4, the switch is closed at $t = 0$. Obtain expression for current $i(t)$.

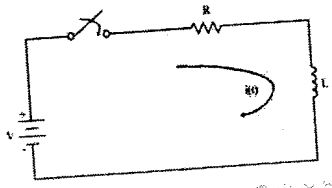


Fig 4 **[06]**

B) In the circuit shown in Fig.5, the switch K is moved from position 'a' to position 'b' at t = 0. A steady state having previously been established at when the switch was position 'a'. Using Laplace Transform method, find value of $i(t)$.

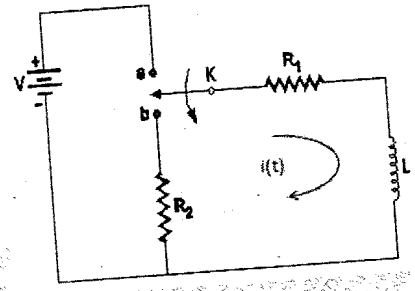


Fig. 5 **CO03, CO04**

Q. 6 Solve the following. **[06]**

A) For a transmission line of length l, starting from the differential equations, derive the expressions for the sending-end voltage and current in terms of receiving end voltage and currentsand the secondary line constants. **[06]**

B) A 50 Ω lossless transmission line of length 1.37 λ is terminated into load of (60 + j 40) Ω. Using Smith Chart, Find
a) input impedance of the line
b) input and load admittances
c) Reflection coefficient in amplitude and phase
d) Standing wave ratio (S)
e) Minimum and maximum values of the impedances along the line
f) Distance of 1st voltage minima and maxima from the load

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE
End Semester Examination – Winter 2018

Course: B. Tech in E&TC | **Sem:** III
Subject Name: Analog Circuits | **Subject Code:** BTEXC302
Date: 03/12/2018 | **Max Marks:**60 | **Duration:** 3 Hrs.

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	Solve the following.		
A)	Explain Block diagram of OPAMP	**Understand**	**06**
B)	Write Short note on Current Mirror Circuit	**Remember**	**06**
Q.2	Solve the following.		
A)	Design the OPAMP circuit which can give the output as $V_o = 2V_1 - 3V_2 + 4V_3 - 5V_4$	**Evaluate**	**06**
B)	Draw circuit diagram of Instrumentation Amplifier and Derive expression for output voltage	**Synthesize**	**06**
Q. 3	Solve the following.		
A)	Draw and Explain circuit diagram of Full Wave Precision Rectifier with its operation	**Understand**	**06**
B)	Compare Schmitt Trigger and Comparator	**Understand**	**06**
Q.4	Solve Any Two of the following.		
A)	Write short note on I to V Converter	**Remember**	**06**
B)	Draw and Explain R-2R Ladder DAC	**Understand**	**06**
C)	Draw and Explain Dual Slope ADC	**Understand**	**06**
Q. 5	Solve the following.		
A)	Compare RC Phase Shift Oscillator and Wien Bridge Oscillator	**Understand**	**06**
B)	Design Wien Bridge Oscillator circuit to have output frequency of 10KHz	**Evaluate**	**06**
Q. 6	Solve the following.		
A)	Draw and Explain Block Diagram of PLL	**Understand**	**06**
B)	Draw and Explain Band Pass Filter circuit and its Frequency response	**Understand**	**06**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

Semester Examination – December - 2017

Branch: B. Tech. Mechanical **Sem.:- III**

Subject with Subject Code:- Machine Drawing and CAD (BTMEC304) **Marks: 60**

Date: - 07/12/2018 **Time:- 4 Hr.**

Instructions to the Students

1. Question No.5 is compulsory. Attempt **any three** questions from the remaining.
2. If some part or data is noticed to be missing, you may appropriately assume it and should mention it clearly.

(Marks)

Q.1. Attempt **any two** of the following. **(12)**

a) Illustrate removed section with an example. **(6)**

b) Show flexible coupling with a neat diagram. **(6)**

c) Represent Bevel gears with convention. **(6)**

Q.2. Attempt **any two** of the following. **(12)**

a) Represent Double Riveted Double strap butt joint. **(6)**

b) Show convex double V butt weld with convention and symbol. **(6)**

c) Represent socket and spigot joint for pipes with a neat diagram. **(6)**

Q.3. Attempt **any two** of the following. **(12)**

a) A right circular cylinder with base diameter 60 mm axis length 60 mm stands vertically on its base in the H.P. A square prism with side of base 25 mm, axis length 80 mm penetrates horizontally such that its axis is parallel to V.P. and 10 mm away (in front) from the axis of vertical cylinder and is 30 mm above the base of the cylinder. The faces of square prism are equally inclined with H.P. draw the projections of solids with curve of intersection. **(6)**

b) A vertical cone of base diameter 100 mm and axis length 90 mm is penetrated by a horizontal cylinder of base diameter 50 mm axis length 120 mm. The axis of the cylinder is parallel to V.P. and is 30 mm above the base of cone. The axis of cylinder is 12 mm away from the axis of the cone. Draw the projections of the solids showing curves of intersection. **(6)**

c) A vertical square prism of side 50 mm and height 90 mm is resting on the ground on its base with one side of base inclined at 30° to the V.P and is completely penetrated by a horizontal square prism of 40 mm side and 100 mm axis length. the axis of the horizontal square prism is parallel to the V.P and bisects the axis of the vertical prism at right angle. All the rectangular faces of the horizontal prism are equally inclined to the V.P. draw the projections of the solids showing the lines of intersection. **(6)**

Q.4. Attempt **any two** of the following. **(12)**

a) Represent transition fit and interference fit. **(6)**

b) Show surface roughness value and roughness grade symbol for roughness grade number N3. **(6)**

c) Highlight the advantages of Computer Aided Design and Drafting (CADD). **(6)**

Q.5. Attempt **any one** of the following. **(24)**

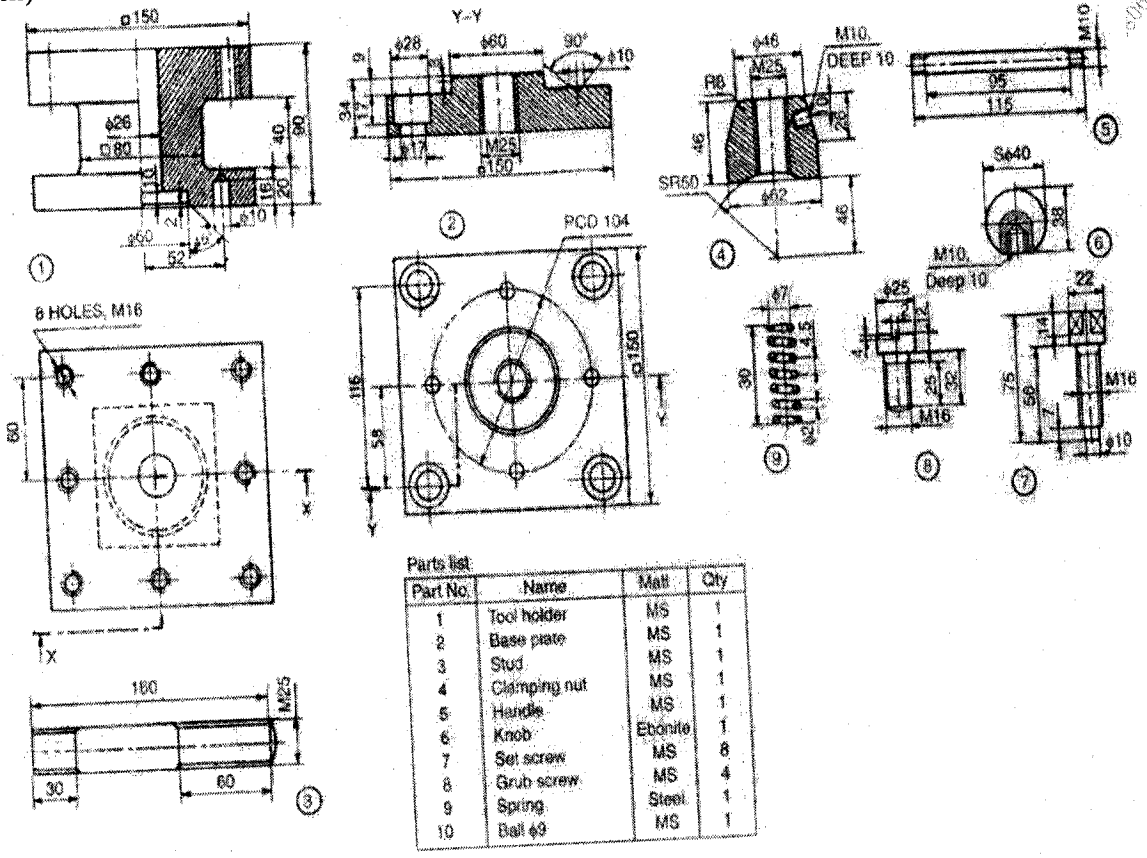
a) Fig. No.1 shows details of square tool post. Draw sectional front view and top view of the assembly and also prepare bill of material. **(24)**

b) Fig. No. 2 shows assembly of Non-Return valve. Draw detailed drawing of the following. **(10)**

i) Body – Sectional Front view and Top view. **(7)**

ii) Cover – Front view and Top view. **(7)**

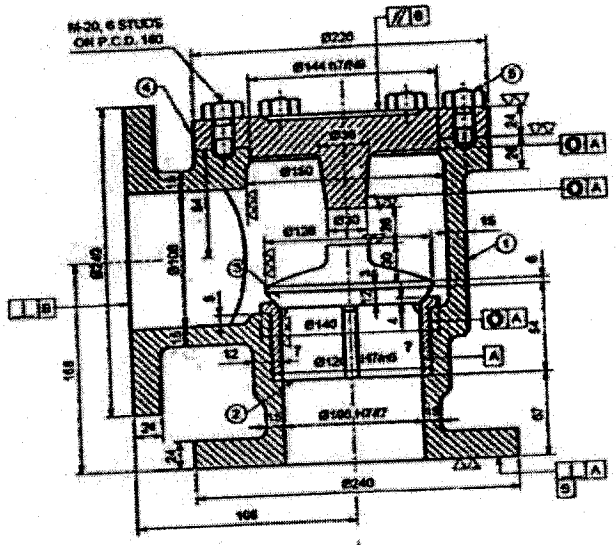
iii) Valve seat – Front view and Top view.

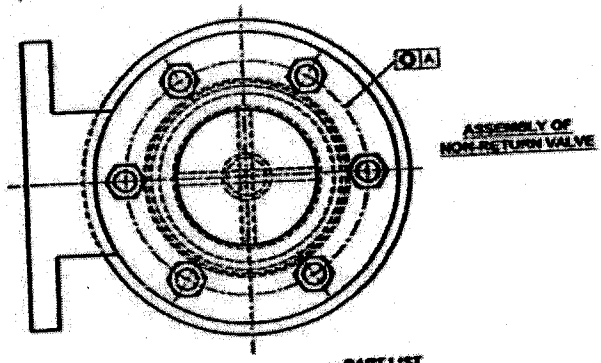


Parts list

Part No.	Name	Matl	Qty
1	Tool holder	MS	1
2	Base plate	MS	1
3	Stud	MS	1
4	Clamping nut	MS	1
5	Handle	MS	1
6	Knob	Ebonite	1
7	Set screw	MS	8
8	Grub screw	MS	4
9	Spring	Steel	1
10	Ball ø9	MS	1

Fig. No. 1 – Details of Square Tool Post





FIT CHART

106H7/d7 = CLEARANCE FIT
144H7/h6 = CLEARANCE FIT
126H7/k6 = TRANSITION FIT

PART LIST

PART NO.	PART NAME	MATERIAL	QTY.
1	BODY	C.I.	1
2	VALVE SEAT	G.M.	1
3	VALVE	G.M.	1
4	COVER	C.I.	1
5	STUD WITH NUT	M.S.	4

Fig. No. 2 – Assembly of Non-Return valve

****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Mechanical Engineering | **Sem:** III

Subject Name: Thermodynamics | **Subject Code:** BTMEC305

Max Marks: 60 | **Date:** 10 Dec 2018 | **Duration:** 3 Hr.

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following six questions.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculator is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/ CO)	Marks
Q. 1	**Solve the following:**		
A)	State Zeroth law of thermodynamics. Differentiate between point functions & path functions and write at least two examples of each.	(CO-1)	**6**
B)	With the help of simple diagram, explain working principle of thermocouple and state its advantages. A platinum resistance thermometer has a resistance of 2.8 ohm at 0°C and 3.8 ohm at 100°C. Calculate the temperature when the resistance indicated is 5.8 ohm.	(CO-1)	**6**
Q.2	**Solve the following:**		
A)	Show that energy is a property of a system. Differentiate between intensive and extensive properties. State any two intensive and extensive properties.	(CO-2)	**6**
B)	A steam at 18 bar and 400°C (h_1=3251.6, v_1 = 0.16849 m^3/kg) steadily enters a nozzle whose inlet area is 0.02 m^2. The mass flow rate of steam through nozzle is 5 kg/s. Steam leaves nozzle at 14 bar with a velocity of 275 m/s. The heat loss from nozzle is estimated to be 14 kJ/s. Determine (a) the inlet velocity of steam (b) specific enthalpy of steam at exit.	(CO-2)	**6**
Q. 3	**Solve the following:**		
A)	Draw schematic diagram of a simple steam power plant. Explain the Carnot heat engine cycle, with the help of T-s diagram with reference to saturation curve, for a simple steam power plant.	(CO-2)	**6**
B)	An inventor claims to have developed an engine that takes in 105 MJ at a temperature of 400 K, rejects 42 MJ at a temperature of 200 K, and delivers 15 kWh of work. Check the validity of the inventors claim. Represent this heat engine with the help of simple schematic diagram.	(CO-2)	**6**
Q.4	**Solve Any ONE of the following:**		
A)	Show that the adiabatic mixing on two fluids is irreversible process. Two kg of water at 80°C is mixed adiabatically with three kg of water at 30°C at atmospheric pressure. Find increase in entropy due to mixing process. State the assumptions made, if any.	(CO-2)	**12**
B)	Show that heat transfer process through a finite temperature difference is irreversible. Water is heated at a constant pressure of 7 bar. The boiling point of water is 165°C. The initial temperature of water is 0°C. The latent heat of evaporation is 2066.3 kJ/kg. Find the increase of entropy of water, if the final state is dry saturated steam.	(CO-2)	**12**

Q. 5 Solve the following:

Exhaust gases from a gas turbine are used to heat water in an adiabatic counter-flow heat exchanger. The gases are cooled from 260°C to 120°C, while water enters at 65°C. The flow-rates of gas and water are 0.38 kg/s and 0.5 kg/s respectively. (CO-4) **12**

Calculate gain in unavailable energy (exergy loss) due to heat transfer process (Take: Cp_g=1.09 kJ/kg K, Cp_w= 4.187 kJ/kg K, T_0 = 25°C)

Q. 6 Solve the following:

A) A closed system of 2 kg of air initially at pressure of 5 bar and 227°C expands polytropically to a pressure of 2 bar following the law of $PV^{1.25}$ = constant. (CO-3) **6**

(a) Determine work done & heat transfer.

(b) State assumptions made.

B) Explain, with the help of simple sketch, the principle of throttling calorimeter. (CO-5) **6**

Explain with the help of h-s diagram, why a throttling calorimeter cannot measure the quality of very wet steam. How is the quality of such a steam measured then?

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Mechanical Engineering | **Sem:** III

Subject Name: Thermodynamics | **Subject Code:** BTMEC305

Max Marks: 60 | **Date:** 10 Dec 2018 | **Duration:** 3 Hr.

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following six questions.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculator is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/ CO)	Marks
Q. 1	**Solve the following:**		
A)	State Zeroth law of thermodynamics. Differentiate between point functions & path functions and write at least two examples of each.	(CO-1)	**6**
B)	With the help of simple diagram, explain working principle of thermocouple and state its advantages. A platinum resistance thermometer has a resistance of 2.8 ohm at 0°C and 3.8 ohm at 100°C. Calculate the temperature when the resistance indicated is 5.8 ohm.	(CO-1)	**6**
Q.2	**Solve the following:**		
A)	Show that energy is a property of a system. Differentiate between intensive and extensive properties. State any two intensive and extensive properties.	(CO-2)	**6**
B)	A steam at 18 bar and 400°C (h_1=3251.6, v_1 = 0.16849 m^3/kg) steadily enters a nozzle whose inlet area is 0.02 m^2. The mass flow rate of steam through nozzle is 5 kg/s. Steam leaves nozzle at 14 bar with a velocity of 275 m/s. The heat loss from nozzle is estimated to be 14 kJ/s. Determine (a) the inlet velocity of steam (b) specific enthalpy of steam at exit.	(CO-2)	**6**
Q. 3	**Solve the following:**		
A)	Draw schematic diagram of a simple steam power plant. Explain the Carnot heat engine cycle, with the help of T-s diagram with reference to saturation curve, for a simple steam power plant.	(CO-2)	**6**
B)	An inventor claims to have developed an engine that takes in 105 MJ at a temperature of 400 K, rejects 42 MJ at a temperature of 200 K, and delivers 15 kWh of work. Check the validity of the inventors claim. Represent this heat engine with the help of simple schematic diagram.	(CO-2)	**6**
Q.4	**Solve Any ONE of the following:**		
A)	Show that the adiabatic mixing on two fluids is irreversible process. Two kg of water at 80°C is mixed adiabatically with three kg of water at 30°C at atmospheric pressure. Find increase in entropy due to mixing process. State the assumptions made, if any.	(CO-2)	**12**
B)	Show that heat transfer process through a finite temperature difference is irreversible. Water is heated at a constant pressure of 7 bar. The boiling point of water is 165°C. The initial temperature of water is 0°C. The latent heat of evaporation is 2066.3 kJ/kg. Find the increase of entropy of water, if the final state is dry saturated steam.	(CO-2)	**12**

Q. 5 Solve the following:

Exhaust gases from a gas turbine are used to heat water in an adiabatic counter-flow heat exchanger. The gases are cooled from 260°C to 120°C, while water enters at 65°C. The flow-rates of gas and water are 0.38 kg/s and 0.5 kg/s respectively. (CO-4) **12**

Calculate gain in unavailable energy (exergy loss) due to heat transfer process (Take: Cp_g=1.09 kJ/kg K, Cp_w= 4.187 kJ/kg K, T_0 = 25°C)

Q. 6 Solve the following:

A) A closed system of 2 kg of air initially at pressure of 5 bar and 227°C expands polytropically to a pressure of 2 bar following the law of $PV^{1.25}$ = constant. (CO-3) **6**

(a) Determine work done & heat transfer.

(b) State assumptions made.

B) Explain, with the help of simple sketch, the principle of throttling calorimeter. (CO-5) **6**

Explain with the help of h-s diagram, why a throttling calorimeter cannot measure the quality of very wet steam. How is the quality of such a steam measured then?

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech. in Mechanical Engineering | **Semester:** III

Subject Name: Materials Science and Metallurgy | **Subject Code:** BTMEC 302

Date:03/12/2018 | **Marks: 60** | **Duration: 3 Hrs.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is permitted.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	*Marks*
Q. 1	**Solve the following.**		**12**
A)	Derive the expressions for planar atomic densities on (100), (110), and (111) planes of both BCC and FCC crystal structures.	*(Understand, CO1)*	
B)	Explain slip mechanism of plastic deformation w.r.t. conceptual meaning, its occurrence due to the movement of edge and screw dislocations, and comparison with twinning.	*(Understand)*	
Q.2	**Solve the following.**		**12**
A)	A tension test was conducted on steel specimen of diameter 12.5 mm and gauge length 50 mm. The loads at lower and upper yield points were recorded to be 45000 and 46000 N respectively. The maximum and fracture loads were 75000 and 50000N respectively. The gauge length after fracture was 62.5 mm. The diameter at fracture was found to be 8 mm. At a load of 20000 N, the total extension was 0.035 mm. Determine the following: (i) Lower yield stress (ii) Ultimate tensile stress (iii) True fracture stress (iv) Percentage elongation (v) Percentage reduction in area (vi) Modulus of resilience.	*(Apply, CO 2)*	
B)	Discuss Vickers Hardness Test w.r.t principle of working, indenter details, formula, advantages, and limitations.	*(Understand)*	
Q. 3	**Solve the following.**		**12**
A)	Describe the types of solid solutions. Explain Hume-Rothery's rules of solid solubility.	*(Remember)*	
B)	What is the importance of T-T-T diagrams? Explain the procedure to determine these diagrams with the help of schematic diagrams.	*(Understand)*	
Q.4	**Solve *Any Two* of the following.**		**12**

A) Define heat treatment and give its objectives. Give the names of two different heat treatment processes along with the major objective of each. *(Understand)*

B) Explain tempering process w.r.t. purposes, process details, types, and variation of properties with tempering temperature. *(Understand)*

C) Discuss induction hardening process w.r.t. principle of working, process details, advantages, and limitations. *(Understand)*

Q. 5 Solve *Any Two* of the following. **12**

A) Describe the procedure of specimen preparation for microscopy. *(Understand)*

B) Explain the principle of working of optical metallurgical microscope. Compare it with electron microscope. *(Remember)*

C) Discuss sulphur print test w.r.t. purpose, significance, procedure, and chemical reactions. *(Understand)*

Q. 6 Solve the following. **12**

A) Explain dispersion strengthening w.r.t. basic mechanism, critical factors, advantage, and commercial examples. *(Remember)*

B) Describe ultrasonic inspection technique w.r.t. principle of working, types, and applications. *(Understand)*

☆End of Paper ☆

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Mechanical Engineering **Sem: III**

Subject Name: Fluid Mechanics **Subject Code: BTMEC303**

Max Marks:60 **Date: 05-12-2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	State and derive Pascal's law.	**(Remember)**	**(6)**
B)	A cubical block weighing 4.5 N and having a 40 cm edge is allowed to slide down an inclined plane surface making an angle of 30^0 with the horizontal on which there is a uniform layer of oil 0.005 cm thick. If the expected steady state velocity of the block is 12.5 cm/s, determine viscosity of the oil. Also express the kinematic viscosity in stokes if the oil has mass density of 800 kg/m^3.	**(Apply)**	**(6)**
C)	List some occurrences which can be attributed to the physics of surface tension. Set-up a relationship between surface tension and pressure intensity (in excess of outside pressure) for a liquid droplet.	**(Analysis)**	**(6)**
Q.2	**Solve the following questions.**		
A)	A rectangular plate 3 m x 5m is immersed vertically in water such that the 3 m side is parallel to the water surface. Determine the hydrostatic force and centre of pressure if the top surface is i) flush with the water surface ii) 2 m below the water surface.	**(Apply)**	**(6)**
B)	A solid cylinder of diameter 4.0m has a height of 3m .Find the meta–centric height of the cylinder when it is floating in water with its axis vertical. The specific gravity of the cylinder = 0.6. Comment on the stability of cylinder	**(Understand)**	**(6)**
Q. 3	**Solve the following questions.**		
A)	Derive the differential form of continuity equation in Cartesian coordinate system.	**(Understand)**	**(6)**
B)	A stream function is given as $\psi = 2xy$. Determine i) whether the flow is possible ii) whether the flow is rotational or irrotational	**(Analysis)**	**(6)**

Q.4 Solve the following questions.

A) State Bernoulli's theorem. Derive Euler's equation of motion and from it derive Bernoulli's equation. **(Understand)** **(6)**

B) A horizontal venturimeter with inlet and throat diameters 30 cm and 15 cm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and the throat is 20 cm mercury. Determine the rate of flow .Take C_d=0.98 **(Apply)** **(6)**

Q. 5 Solve the following questions.

A) Derive an expression for the velocity distribution for viscous flow through a circular pipe. **(Understand)** **(6)**

B) Determine the difference in the elevations between the water surfaces in the two tanks which are connected by a horizontal pipe of diameter 300 mm and length 400 m. The rate of flow of water through the pipe is 300 litres/s. Consider all losses and take the value of f = 0.008 **(Analysis)** **(6)**

Q. 6 Solve Any <u>Two</u> of the following questions.

A) In a compressor, the frictional torque T in the impeller depends on diameter D, rotational speed N, fluid density ρ and viscosity μ. Using Buckingham's π theorem, obtain an expression for torque. **(Apply)** **(6)**

B) The velocity distribution in the boundary layer is given by $\frac{u}{U} = \left(\frac{y}{\delta}\right)^{\frac{1}{7}}$. Calculate the displacement thickness and momentum thickness. **(Apply)** **(6)**

C) What do you understand by the terms drag, lift and coefficient of drag? **(Recall)** **(6)**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Electrical Engineering **Sem: III**

Subject Name: Electrical Engineering Materials **Subject Code:** BTEEE305A

Max Marks: 60 **Date: 10/12/2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve following questions.**		**12**
A)	Define atomic packing factor of the cubic system. Show that the APF for BCC crystal structure is 0.68	**CO 1**	**4**
B)	With neat diagram explain and derive Bragg's law of X-ray diffraction in crystal.	**CO 1**	**5**
C)	If the interplanar distance for a plane having Miller indices (1 1 0) is 2.86 A°. Calculate the lattice constant 'a'	**CO 1**	**3**
	OR		
C)	A certain orthorhombic crystal has a ratio of a:b:c of 0.430:1:0.377. Find the Miller indices of faces whose intercepts are i) 0.215:1:0.188 ii) 0.860:1:0.754	**CO 1**	**3**
Q.2	**Solve following questions.**		**12**
A)	Give the classification with examples for magnetic materials based on relative permeability(μ_r)	**CO 2**	**5**
B)	Draw and explain the hysteresis loop for ferromagnetic materials. What is retentivity and coercivity	**CO2**	**7**
	OR		
B)	Define magnetic dipole moment &relativepermeability(μ_r). Show that$\mu_r = (1+\chi_m$),Where χ_m is magnetic susceptibility.	**CO 2**	**7**
Q. 3	**Solve following questions.**		
A)	Describe the formation of energy bands in solids and explain with proper diagrams, classification of materials into conductors and insulators.	**CO 3**	**5**
B)	With ref to superconductivity explain with neat diagrams i) Meissner effect ii) Cooper pair formation iii) High temp super conductivity	**CO 3**	**7**

Q.4	**Solve following questions.**		**12**
A)	Explain Hall effect and its significance. Give its applications	CO 2	6
B)	Explain the concept of Fermi-level in case of semiconductors and derive an expression for Fermi-energy in intrinsic semiconductor	CO 3	6
	OR		
C)	Obtain the expression for the i)Total conductivity of semiconductor ii) conductivity of N & P semiconductors	CO 3	6
Q. 5	**Solve following questions.**		**12**
A)	Define Electric dipole moment and explain dielectric polarization and indicate different types of polarizations	CO 4	6
B)	Derive Clausius-Mosotti relation from first principles as applied to dielectric materials, state the assumptions made	CO 4	6
Q. 6	**Solve following questions.**		**12**
A)	Explain the concept of Nano-technology as it applies to electrical / electronic engineering materials. Also state important properties and applications of Nano particles	CO 4	6
B)	With neat diagram explain the principle , construction and working of STM-Scanning Tunneling Microscope	CO 4	6
	OR		
C)	Write a short note on carbon nano-tubes and its applications	CO 4	6

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Semester Examination – winter 2018

Course: Electrical Engineering **Sem.:- III**

Subject with Subject Code: - Signals and Systems (BTEEE305C)

Date: - 10-12-2018 **Marks: 60M** **Time: - 3 Hr.**

Instructions to the Students

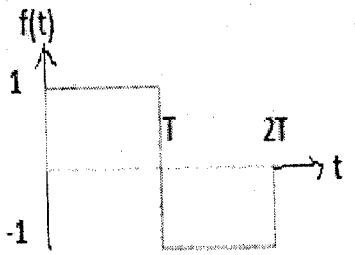
1. *Each question carries 12 marks.*
2. *Attempt **any five** questions of the following.*
3. *Illustrate your answers with neat sketches, diagram etc., wherever necessary.*
4. *If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly*

(Marks)

Q.1. a] Explain in detail continuous and discrete time domain signal. (06m)
b] Explain in detail Linear& Non-linear system (06m)

Q.2. a] Explain in detail properties of LTI system (06m)
b] Explain the following operations on signal (06m)
i.) Time advance ii) time delay iii) folding

Q.3. a] Find the Laplace Transform of the square wave shown in figure (06m)



b] Explain in detail properties of Fourier Transform (06m)

Q.4. a] Determine zero input response of system described by second order Difference equations (06m)

$$Y[n]-5/6\ Y[n-1]+1/6\ Y[n-2]=0$$

b] Explain in detail state variable equations and matrix representations of the System (06m)

Q.5. a) Explain in detail properties of z-transform (06m)
b) Explain in detail sampling of the signal (06m)

Q.6. a) Explain in detail convolution sum (06m)
b) Calculate the DFT of the sequence x (n) = {1, 1, 0, 0} (06m)

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Semester Examination – Nov/Dec - 2018

Branch: Electrical Engg. **Sem.:-III**
Subject with Subject Code:- Measurement & Instrumentation (BTEEC304) **Marks:60**
Date:- 07-12-2018 **Time:- 3Hr.**

Instructions to the Students

1. Each question carries 12 marks.
*2. Attempt **any five** questions of the following.*
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

Q1. a)Describe Direct & Indirect methods of Measurement 6M

b) Define the Terms: 1. Repeatability 2. Reproducibility 3. Accuracy 6M

Q2. a)Describe the construction, working of PMMC instrument 6M

b) Explain Instrument Transformer - CT & PT 6M

Q3. a) Explain working & application Q-Meter 6M

b) Classify & explain different methods of measuring Low, Medium & High resistances 6M

Q4. a) Coil of 300 MI Voltmeter has resistance 500 ohm & inductance 0.8 Henry. The Instrument read correctly at 50 Hz ac supply and takes 100mA at Full Scale deflection. Analyze the percentage error in the instrument reading when it is connected to 200v DC Supply. 6M

b) Draw & Explain the Block diagram of Digital Voltmeter 6M

Q5. a) With the help of neat diagram explain the operation of LVDT 6M

b) Explain Thermocouple & RTD with its applications 6M

Q6. a) Explain different types of Recorders 6M

b) Two wattmeter connected to measure the input to a balanced three phase circuit indicates 2000W & 500W respectively. Find the Power Factor of the circuit. 6M

i) When the both readings are positive

ii) When the latter readings is obtained after reversing the connections to the current coil of the first instrument.

OR

c) Draw & Explain the block diagram of Digital Storage Oscilloscope (DSO) 6M

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE –
Semester Examination – December - 2018

Branch: Electrical Engineering **Sem.:- III**
Subject with Subject Code: Fluid Mechanics & Thermal Engineering **(BTEEC303)** **Max. Marks: 60**
Date: - 05-12-2018 **Time:- 3Hr.**

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

(Marks)

Q.1. a) A circular opening, 4m diameter in a vertical side of a tank is closed by a disc of 4m diameter, which can rotate about horizontal diameter. Calculate 1. The force on disc and 2. The torque required to maintain the disc in equilibrium in vertical position, when the head of water above the horizontal diameter is 5m. (6)

b) Explain methods of describing fluid motions used in fluid kinematics (6)

Q.2. a) Water flows through a pipe AB 1.2m diameter at 3 m/s and then passes through a pipe BC 1.5 m diameter. At C, the pipe branches. Branch CD is 0.8 m in diameter and carries one third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE (6)

b) Explain working of centrifugal pump and define manometric, mechanical and overall efficiencies (6)

Q.3. a) Explain working of four stroke petrol engine with neat sketches (6)

b) Explain fuel supply system of diesel engine with neat sketch (6)

Q.4. a) Explain construction and working principle of reciprocating air compressor (6)

b) Elaborate applications of compressed air (6)

Q.5. a) Explain working of vapour absorption refrigeration system in detail (6)

b) Explain desirable and undesirable properties of refrigerant (6)

Q.6. a) Explain centralized air conditioning plant with its applications (6)

b) Explain significance of various lines and curves on Psychrometric chart (6)

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE
End Semester Examination – Winter 2018

Course: B. Tech in Electrical Engineering | **Semester:** III
Subject Name: Network Analysis and Synthesis | **Subject Code:** BTEEC302
Date:03/12/2018 | **Max Marks:60** | **Duration:** 3 Hrs.

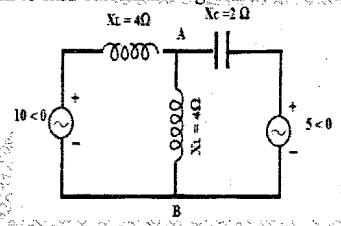
Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. *Students should note, no supplement will be provided.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

Marks

Q. 1 Solve Any Two sub questions

A) Use superposition theorem to find current through branch A-B in the Circuit of figure **06**

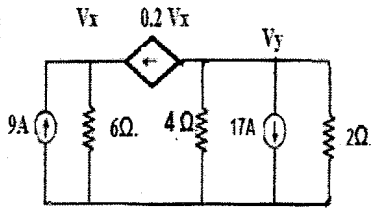


B) Explain the following terms: **06**
i) Independent and Dependent sources.
ii) Lumped and distributed systems.

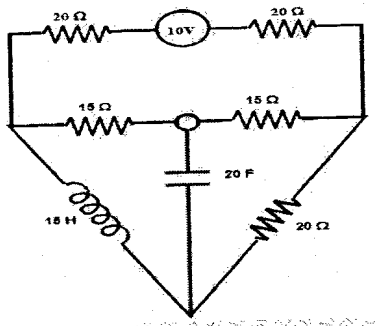
C) State and Explain maximum Power transfer theorem in case A.C circuits **06**

Q.2 Solve Any Two sub questions

A) Using Nodal Analysis find Voltage 'Vy' for given N/W **06**



B) Obtain dual network for the circuit given below **06**



C) Define the following **06**

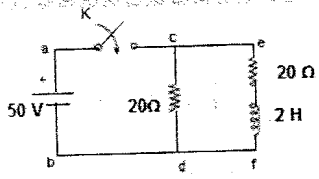
i. Planner graph ii. NonPlanner graph

iii. Subgraph. iv.Tree and Co-Tree

Q. 3 Solve All Sub-Questions

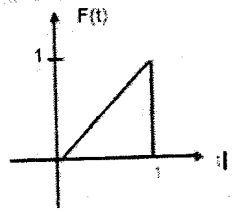
A) Explain response of RL series circuit to D.C excitation **06**

B) Find the expression of current when 50V dc source is applied as switch K is opened At t=0, **06**



Q.4 Solve All Sub-Questions

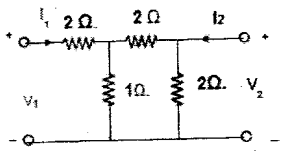
A) Find the Laplace transform of the waveform **06**



B) Explain Concept of Complex Frequency in detail **06**

Q. 5 Solve All Sub-Questions

A) Determine the Open circuit parameters for the circuit shown below **06**



B) What is the physical significance of Pole and Zero in a transfer function? **06**

Q. 6 Solve All Sub-Questions

A) What is Meant by Resonance in RLC Series Circuit and Derive equation for resonant Frequency **06**

B) Explain the High pass filter and band pass filter. **04**

C) A Coil of inductance 31.8mH and resistance of 10Ω is connected in parallel across 250V,50Hz.Determine value of Capacitance so that total current is in phase supply voltage **02**

***** End *****

4452706A15C42C8064EA682DAF08390E