Code No. 5005 / N

FACULTY OF ENGINEERING & INFORMATICS

B.E. I – Year (New) (Suppl.) Examination, January 2016

Subject: Engineering Chemistry

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

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

PART – A (25 Marks)

1 Define single electrode potential. 2
2 What is a battery? Give one example each for primary and secondary batteries. 3
3 Explain sacrificial anodic method of protecting corrosion. 3
4 Define the term "Reverse osmosis" and what is its use. 2
5 Write the structure of Bakelite. 2
6 What is conducting polymer? Give one example. 3
7 Define the terms:
i) HCV and
ii) LCV of a fuel. 2
8 Explain various sources of Bio Diesel. 3
9 What is Pattinson's process? Explain. 3
10 Define:
i) Saponification number and
ii) Acid value. 2

PART – B (5x10 = 50 Marks)

11 a) Construct a cell for the reaction

$$Fe_{(s)} + Ni^{2+}_{(0.1m)} \rightarrow Fe^{2+}_{(0.01m)} + Ni_{(s)}$$

Calculate the e.m.f. of the cell at 25^{o}C from the following S.R.P. values data

$E^{o}_{Fe^{2+}/Fe}$ = -0.440 V and $E^{o}_{Ni^{+2}/Ni}$ = -0.250 V

Is the cell reaction spontaneous or not? 5

b) Discuss the construction, working and applications of Nickel-Cadmium battery. 5

12 a) Explain:
i) Galvanic corrosion
ii) Electroplating. 5

b) Describe ion-exchange method of softening of water. 5

13 a) Write the preparation and properties of
i) Poly urethane and
ii) Buna – S rubber. 6

b) Discuss the applications of conducting polymers. 4

14 a) What is meant by cracking of petroleum? Describe moving bed catalytic cracking method used for cracking of petroleum. 6

b) Write the characteristics of a good propellant. 4

…2

15 a) Classify liquid crystals and give suitable example for each. 5

b) Define the terms:

i) Phase

ii) Component 5

16 a) Explain the principle and applications of potentiometric titrations. 5

b) Write the electrode representation and electrodic reaction for the reduction process of

i) Calomel electrode and

ii) Quinhydrone electrode 5

17 a) What is phenolpthalien and methyl orange alkalinity of water? Explain. 5

b) Give one example each for 5

i) Addition polymer

ii) Condensation polymer

iii) Co-polymer

and give their structure

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Code No. 5013 / O

FACULTY OF ENGINEERING & INFORMATICS

B.E. I - Year (Old) Examination, January 2016

Subject : Engineering Chemistry

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

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

PART – A (25 Marks)

1		Electrode potential and standard electrode potential of copper electrode are 0.45V and 0.34V. Calculate the concentration of Cu^{2+} ion in the solution.	3
2		What are Lithium ion batteries?	3
3		In a carnot cycle 480 Joules of heat is absorbed and 120 joules of work is done. Calculate the sink temperature if source temperature is 300^0C.	3
4		Explain phase rule with definition of degrees of freedom.	3
5		How does zinc protect the iron from corrosion?	2
6		Give the reasons why hydroxide and bicarbonate alkalinity don't exist together.	2
7		Distinguish thermoset and thermoplastic resins.	2
8		Define extrinsic and intrinsic conducting polymers with examples.	3
9		What is the principle in fractional distillation?	2
10		Give disadvantages of knocking in Internal combustion engine.	2

PART – B (50 Marks)

11	a)	Describe construction, half cell notation, and importance of calomel electrode.	6
	b)	Derive the Nernst equation and discuss the applications of it.	4
12	a)	Give limitations of I law and statements of II law of thermodynamics.	4
	b)	Derive and give applications of Gibbs-Helmholtz equation..	6
13	a)	Explain the cathodic protection of a metal against corrosion with examples.	4
	b)	Discuss the factors affecting the rate of corrosion.	6
14	a)	Give the preparation, properties and uses of Kevlar.	4
	b)	Define conducting polymers and give the mechanism of conduction in polyanilines. Give the applications of conducting polymers.	6
15	a)	Explain with diagram the principle and calculations involved in the determination of calorific value of fuels by Bomb calorimeter.	7
	b)	Calculate the lower calorific value of fuel if the percentage of hydrogen in the fuel is 12 and HCV is -1400 kJ.	3
16	a)	Differentiate primary battery from secondary battery with examples.	6
	b)	Describe the construction and working of lead acid battery.	4
17	a)	Explain principle and method of determination of hardness of water by EDTA method.	6
	b)	Discuss causes and effects of boiler troubles.	4

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Code No. 6677 / S

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. (Bridge Course) II - Semester (Suppl/) Examination, January 2016

Subject : Chemistry

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

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

PART – A (25 Marks)

1 How are electrode potentials assigned negative and positive signs? (2)
2 Give the losses due to corrosion. (2)
3 Give the mathematical relation between higher calorific value and lower calorific value. (2)
4 Define and give significance of cetane number. (3)
5 Give the condition of precipitation. (2)
6 Give requirements of a primary standard. (2)
7 Define enantiomer and what inter changes will convert one enantiomer into the other. (3)
8 Explain the direction of rotation of plane polarized light and configuration of enantiomer. (3)
9 How will you differentiate reducing sugars form non-reducing sugars? (3)
10 What is peptide linkage and explain how is it formed? (3)

PART – B (50 Marks)

11 (a) How are electrode potentials relative values are determined? (5)
(b) Explain two methods of cathodic protection against corrosion with diagram. (5)

12 (a) Explain determination of calorific value of fuel by Bomb calorimeter with calculations. (5)
(b) Explain flue gas analysis by orsat apparatus. (5)

13 (a) Differentiate equivalence point from end point and explain the basis of selection of indicators for acid – base and redox titrations. (5)
(b) What is standardization? How is hypo solution standardization using molarity in the calculation? (5)

14 (a) Write chair and boat conformations of cyclo hexane and discuss their stabilities. (5)
(b) Explain nomenclature of cyclo alkanes. (5)

15 (a) Give evidences for cyclic structure of glucose. (5)
(b) Explain formation of Osazone by fructose. (5)

16 (a) Give synthesis of any two amino acids. (5)
(b) Explain factors that form Anodic areas and cathodic areas on metal surfaces. (5)

17 (a) What are reducing and non reducing sugars? How will you differentiate reducing sugar from non reducing sugar? (4)
(b) Give steps for calculation of air quantities for combustion of fuel. (6)

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Code No. 5397 / S

FACULTIES OF ENGINEERING & TECHNOLOGY

B.E. / B.Tech. (Bridge Course) II – Semester (Suppl.) Examination, January 2016

Subject : Engineering Mechanics

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

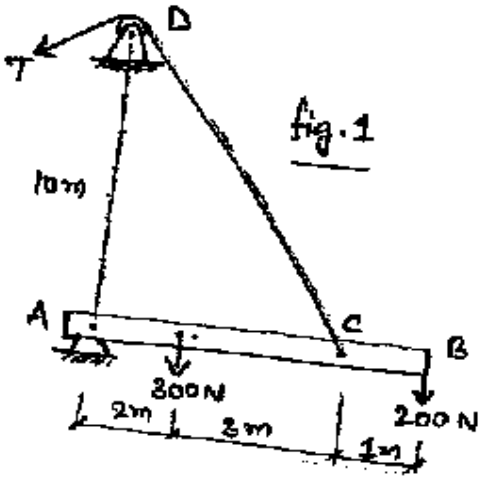
Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	What is 'Principle of Transmissibility'?	2
2	State "Parallelogram Law of Forces'.	2
3	What is 'Principle of Moments'?	3
4	What are the equations of equilibrium for planar and spacial force systems?	3
5	State the 'Laws of Friction'.	3
6	For a triangle of base 'B' and altitude 'H', find the Moment of Inertia about an axis passing through the apex and parallel to the base.	3
7	What is 'Dynamic Equilibrium'?	2
8	Derive the Work Energy equation for 'Fixed Axis Rotation'.	3
9	Define 'Coefficient of Restitution'.	2
10	Define the terms 'Amplitude' and 'Frequency'.	2

PART – B (50 Marks)

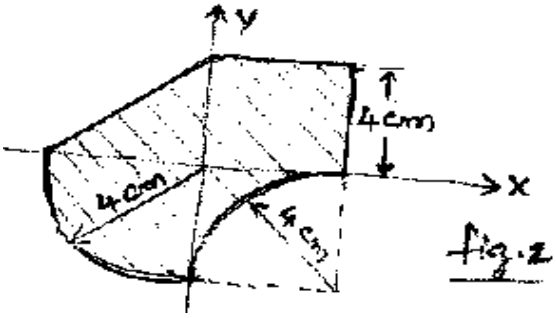
11 A boom 'AB' is supported in a horizontal position by a hinge 'A' and a cable which runs from 'C' over a small pulley at 'D' as shown in fig.1. Find the tension 'T' in the cable and the vertical and horizontal components of the reaction at 'A'. Weight of the boom and size of the pulley are negligible. 10



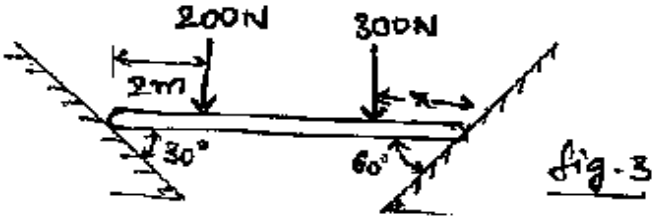
12 Determine the resultant and its inclination with respect to x, y and z axes for the system of concurrent forces having the following magnitudes and passing through the origin and the indicated points, P = 400N (+11, +5, -3) ; T = 300 N (-2, -5, +10) and F = 300 N (+4, -2, -4). 10

..2

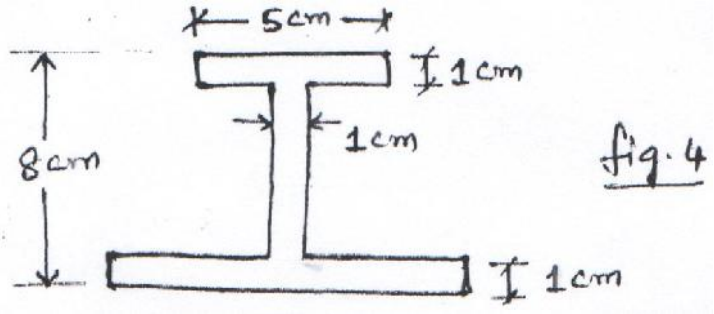
13 Locate the centroid of the shaded area shown in fig.2 with respect to the given axes. 10



14 A horizontal bar 10m long and of negligible weight rests on rough inclined planes as shown in fig.3 . If the angle of friction is 15^o, how close to 'B' may the 300N force be applied before motion impends? 10



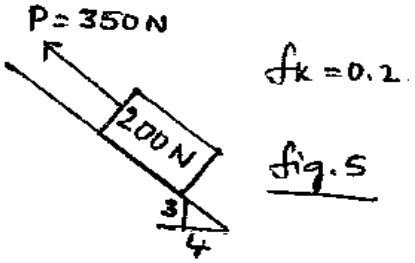
15 Determine the Moment of Inertia of the I-section shown in fig.4 with respect to its centroidal axes. 10



16 A particle has an initial velocity of 150 m/s up to the right at a slope of 0.75. The components of acceleration are constant at a_x = -10 m/s^2 and a_y = -25 m/s^2. Compute the radius of curvature at the start and at the top of the path. 10

17 a) The amplitude of a simple harmonic motion is 4m and the period is 1sec. Determine the maximum velocity and the maximum acceleration. 5

b) After the block in fig.5 has moved 15m from rest, the constant force 'P' is removed. Find the velocity of the block when it returns to its initial position. 5



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