

Bachelor of Engineering
Second Semester Main Examination, June-2021
Chemistry [CY110T]
Branch: CSE/EC/EX/IT

Time: 3:00 Hrs

Max Marks 70

Note : Attempt any five questions out of eight.

All questions carry equal marks.

- Q.1 (a) What is the molecular orbital theory? With the help of MO diagram calculate the bond order of the following: CO, NO, O₂, O₂⁻, O₂²⁻.
(b) Discuss the differences between order of the reaction and molecularity of a reaction.
- Q.2 (a) Define the Order of reaction. Explain the Methods of determining order of reaction (1st & 2nd Order).
(b) Define the following terms:
(a) Component (b) Phase (c) Degree of freedom (d) Corrosion
- Q.3 (a) What are polymers? Classify them on the basis of structure and heat stability with suitable examples.
(b) Write short note on:
(a) Nylon 66 (b) Poly Vinyl Chloride (c) Teflon
(d) Phenol formaldehyde resin (e) Nylon 6 (f) Urea-formaldehyde resin
- Q.4 (a) What is vulcanization? Explain with proper reaction. Mention the advantages of vulcanized rubber
(b) What do you understand by **valence-shell electron-pair repulsion (VSEPR)** model? Give the hybridization of CO₂, SO₂, CH₄, SF₄, and SF₆ molecules.
- Q.5 (a) What do you know by Electrochemistry? Explain Arrhenius theory of electrolytic dissociation.
(b) Write a short note on following:
(i) Transport Number
(ii) Kohlrausch's Law
(iii) Solubility Product
(iv) Redox Reaction
(v) Electrochemical Cells

- Q.6 (a) 0.5g of CaCO_3 was dissolved in dilute HCL and diluted to 500 ml with distilled water ,50 ml of this solution required 48 ml of EDTA solution for titration.50ml of hard water sample required 15 ml of EDTA solution for titration.50 ml of same water sample on boiling and filtering requires 10 ml of EDTA solution . Calculate temporary, permanent and total hardness in ppm.
(b) 100ml of water sample on titration with N/20 HCl required 10 ml of the acid to phenolphthalein end point and 12 ml of acid to methyl orange end point. Calculate the type and extent of alkalinity present in water sample.
- Q.7 (a) Explain the detailed procedure for determining the flash & fire point of lubricating oil.
(b) Explain followings:
(i) First law of thermodynamics & Second law of thermodynamics
(ii) Gibb's free energy
(iii) Enthalpy and Entropy
(iv) Relation between C_v & C_p
- Q.8 (a) Write short note on:
(a) Cloud & Pour point (b) Aniline Point (c) Saponification number
(d) Neutralization number (e) viscosity
(b) Explain the Poly Vinyl Chloride (PVC) on the basis of Its Properties, Preparation and Uses.

Bachelor of Engineering
Second Semester Main Examination, June-2021
Fundamentals of Electronics Engineering [EC110T]
Branch: CE/EE/ME

Time: 3:00 Hrs

Max Marks 70

- Note:**
1. Attempt any five questions.
 2. Answer should be precise & to be point only.
 3. Assume suitable data if necessary & state them clearly.

- Q.1 (a) Describe with suitable sketch the frequency modulation process.
(b) Explain guided and unguided transmission channel used in communication system.
- Q.2 (a) Explain Basic and universal logic gates with symbol and truth table?
(b) Define real and complex exponential signal.
- Q.3 (a) Define energy and power signal.
(b) Explain Extrinsic and intrinsic types of semiconductor?
- Q.4 (a) Describe forward and reverse biased V-I characteristics of Zener diode.
(b) Describe full wave rectifier with suitable circuit diagram.
- Q.5 (a) Explain all types of the Clipper circuit with digram.
(b) Explain Gray code with example.
- Q.6 (a) What are complements? Define 9s, 10s, 15s and 16s complement.
(b) Explain XOR and XNOR logic gates with symbol and truth table?
- Q.7 (a) Describe Boolean algebra and its related all types of Law.
(b) Explain signum and sinc function with suitable example.
- Q.8 (a) What do you mean by signals? Explain its classification?
(b) What is communication system? Explain with block diagram?

Bachelor of Engineering
Second Semester Main Examination, June-2021
MATHEMATICS-II [MA111T]
CE/CSE/EC/EX/IT/ME

Time: 3:00 Hrs**Max Marks 70****Note: (i) Attempt any five questions.****(ii) All questions carry equal marks.**

- Q.1 (a) Solve $\cos x \, dy = y(\sin x - y) \, dx$.
 (b) Solve $\sqrt{1 - y^2} \, dx = (\sin^{-1} y - x) \, dx$.
- Q.2 (a) Find the particular integral of $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = 4 \cos^2 x$.
 (b) Solve $[(D - 1)^2(D - 3)^2]y = e^{3x}$.
- Q.3 (a) Solve- $\frac{dx}{dt} + 5x + y = e^t$, $\frac{dy}{dt} - x + 3y = e^{2t}$
 (b) Solve- $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} - y = x^2 e^x$.
- Q.4 (a) Solve by the method of variation of parameters - $x^2 \frac{d^2y}{dx^2} - 2x(1 + x) \frac{dy}{dx} + 2(1 + x)y = x^3$.
 (b) Solve $\frac{d^2y}{dx^2} - 2 \tan x \frac{dy}{dx} + 5y = \sec x e^x$.
- Q.5 (a) From the partial differential equation by eliminating the arbitrary function f from the relation $z = y^2 + 2f\left(\frac{1}{x} + \log y\right)$
 (b) Solve $x^2 p + y^2 q = (x + y)z$.
- Q.6 (a) Solve $-z(p - q) = z^2 + (x + y)^2$
 (b) Solve by Charpit's Method- $(p^2 + q^2)y = qz$.
- Q.7 (a) Solve $\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial x \partial y} = \sin x \cos 2y$
 (b) Solve by the method of separation of variables: $\frac{\partial^2 z}{\partial x^2} - 2 \frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 0$.
- Q.8 (a) Find the surface passing through the two lines $z = x = 0$ and $z - 1 = x - y = 0$ and satisfying the differential equation $r - 4s + 4t = 0$.
 (b) Solve- $(r + s - 6t) = y \cos x$. or $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} - 6 \frac{\partial^2 z}{\partial y^2} = y \cos x$.

Bachelor of Engineering
Second Semester Main Examination, June-2021
Concepts in Engineering Design [ME112T]
Branch-CE/EE/EC/CS/ME/IT

Time: 3:00 Hrs

Max Marks 70

Note: (i) Attempt any five questions. All question carry equal marks.
(ii) Answer should be precise & to be point only.
(iii) Assume suitable data if necessary & state them clearly

- Q.1 (a) Discuss Asimov's detailed design process.
(b) Explain concurrent engineering. Write a short note on extended product life cycle.
- Q.2 (a) Explain QFD with a suitable example.
(b) Explain general form of a contract.
- Q.3 (a) Describe optimization in detail. Also explain finite element modeling packages.
(b) Describe the design for environment.
- Q.4 (a) Explain the design rules for environment.
(b) Explain material selection methods in detail.
- Q.5 (a) Explain in detail Reliability centered maintenance.
(b) Discuss FMEA with a suitable example. Also list the benefits of design of experiments.
- Q.6 (a) What are the applications of CAE?
(b) What are the disadvantages of bench marking?
- Q.7 (a) What are the benefits of designing to codes and standards?
(b) What do you mean by product liability?
- Q.8 (a) Mention the steps to be followed to improve creative thinking.
(b) What are the types of models in engineering design?

Bachelor of Engineering
Second Semester Main Examination, June-2021
Fundamentals of Mechanical Engineering [ME114T]
Branch-EX

Time: 3:00 Hrs

Max Marks 70

Note: (i) Attempt any five questions.

(ii) All questions carry equal marks.

- Q.1 (a) What are the different types of CAM?
(b) What are gears? Classify it.
- Q.2 (a) Explain the various types of belt drives.
(b) What is thermodynamic equilibrium? Explain the phenomenon of thermal equilibrium.
- Q.3 (a) State & explain zeroth law of thermodynamics. Also explain equation of state.
(b) Explain basic modes of heat transfer with suitable examples.
- Q.4 (a) Explain Fourier law, Newton's law and Stefans-Boltzmaan's law Related with heat transfer.
(b) What is refrigeration? Explain the COP of a refrigerator.
- Q.5 (a) Enlist different properties of materials.
(b) Explain metallic and non-metallic materials.
- Q.6 (a) Explain brazing and soldering.
(b) What is welding? Classify it.
- Q.7 (a) Explain working and principle of lathe machine with neat sketch.
(b) List the various operations performed on lathe
- Q.8 (a) Differentiate between internal combustion engines and external combustion engines.
(b) What is Otto cycle? Obtain the formula for air standard efficiency of Otto cycle.