1E2401

Roll No. _____ Total No of Pages: 3

1E2401

B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019

1FY2-01 Engineering Mathematics-I

Time: 3 Hours **Maximum Marks: 160**

Min. Passing Marks: 56

Instructions to Candidates:

Attempt all ten questions from Part A, fiver questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×3=30]**

All questions are compulsory

Q.1 Evaluate $\int_0^{\infty} e^{-x^2} dx$

Q.2 Find the volume generated by revolving the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about the x – axis.

Q.3 Write the condition for p series $\sum_{n=1}^{\infty} \frac{1}{n^p}$ to be convergent and divergent.

Q.4 Determine the radii of convergence of the power series $\sum_{n=0}^{\infty} \frac{(2n)!}{(n!)^2} .z^n$

Q.5 State the Parseval's theorem.

Q.6 Evaluate $\lim_{(x,y)\to(0,0)} \frac{2x^3-y^3}{x^2+y^2}$.

Q.7 If $f(x, y, z) = 2x^2y - y^3 z^2$, then find the grad f at the point (1, -2, -1).

Q.8 Evaluate $\int_0^1 \int_0^2 dx\, dy$

Q.9 Write the coordinate of center of gravity of a solid.

Q.10 Write the statement of Gauss's divergence theorem.

PART – B

(Analytical/Problem solving questions) **[5×10=50]**

Attempt any four questions

Q.1 Prove that $\int_0^\infty \frac{dx}{1+x^4} = \frac{\pi}{2\sqrt{2}}$

Q.2 Use Taylor's theorem to show that –

$$\sin(x + h) = \sin x + h\cos x - \frac{h^2}{2!}\sin x - \frac{h^3}{3!}\cos x + \cdots$$

Q.3 Find the half range cosine series of $f(x) = x(\pi - x)$ in the interval $(0, \pi)$.

Q.4 If $x^x\, y^y\, z^z = c$, then show that at $x = y = z$, $\frac{\partial^2 z}{\partial x\, \partial y} = -(x \log ex)^{-1}$

Q.5 Show that curl grad $r^n = 0$; where $\vec{r} = xi + yj + zk$

Q.6 Change the order of integration and evaluate $\int_0^1 \int_{e^x}^e \left[\frac{1}{\log y}\right] dx\, dy$

Q.7 Use Gauss theorem to evaluate $\int_S F.n\, ds$, where $F = 4xy\, i + yz\, j - xz\, k$ and S is the surface of the cube bounded by the planes $x = 0, x = 2, y = 0, y = 2, z = 0, z = 2$.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×20=80]**

Attempt any two questions

Q.1 Prove that the surface area of the solid generated by revolution of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about the major axis is –

$2\pi ab\left[\sqrt{1-e^2} + \frac{1}{e}(\sin^{-1}e)\right]$, where $b^2 = a^2(1-e^2)$.

Q.2 Test the convergence of the series:

$$\sum_{n=1}^{\infty} \frac{1^2.5^2.9^2 - - - (4n-3)^2}{4^2.8^2.12^2 - - - (4n)^2}$$

Q.3 Find the Fourier series for $f(x) = x^2$ in $(-\pi, \pi)$. Hence, using Parseval's theorem, prove that $\sum_{n=1}^{\infty} \frac{1}{n^4} = \frac{\pi^4}{90}$

Q.4 Prove that the extreme value of the function $u = a^2x^2 + b^2y^2 + c^2z^2$, where $x^2 + y^2 + z^2 = 1$ and $\ell x + my + nz = 0$, given by the equation.

$$\frac{\ell^2}{u-a^2} + \frac{m^2}{u-b^2} + \frac{n^2}{u-c^2} = 0$$

Q.5 Verify the Green's theorem is plane for $\int_C \left[(3x^2 - 8y^2)dx + (4y - 6xy)dy\right]$, where C is the boundary of the region defined by $x = 0$, $y = 0$, and $x + y = 1$.

1E2201

Roll No. _____ Total No of Pages: 3

1E2201

B. Tech. I - Sem. (Main / Back) Exam., Dec. 2019

MA-101 Engineering Mathematics-I

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[5×2=10]**

All questions are compulsory

Q.1 State Euler's theorem on homogeneous function f(x, y).

Q.2 Define point of inflexion of a curve.

Q.3 Write the definition of Gamma function and Beta function.

Q.4 State Stokes' theorem.

Q.5 Give the condition of vector $\vec{F}$ to be Solenoidal vector and Irrotational vector.

PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 Show that the asymptotes of the curve $x^3 - 2y^3 + 2x^2y - xy^2 + xy - y^2 + 1 = 0$

Cut the curve in three points which lie on the line x-y+1=0.

Q.2 Find the minimum value of $u = x^2+y^2+z^2$, when $ax + by + cz = p$.

Q.3 Evaluate by using Beta integral

$$\int_0^{\infty} \frac{x^2(1+x^4)}{(1+x)^{10}} dx$$

Q.4 If u = f (y-z, z-x, x-y), Prove that

$$\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$$

Q.5 Find the directional derivative of $\phi(x, y, z) = x^2 - 2y^2 + 4z^2$ at (1, 1, -1) in the direction of the vector $2\hat{i} + \hat{j} - \hat{k}$. Also find the direction of the maximum directional derivative at (1, 1, -1) and its maximum value.

Q.6 Show that the function

$$f(x,y) = \begin{cases} \frac{xy}{\sqrt{x^2+y^2}} & , (x,y) \neq (0,0) \\ 0 & , (x,y) = (0,0) \end{cases}$$

is continuous but not differentiable at (0, 0).

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 Evaluate $\int_0^1 \int_x^{\sqrt{2-x^2}} \frac{x}{\sqrt{x^2+y^2}} dx\, dy$

by changing the order of integration.

Q.2 Verify Gauss's Divergence theorem given that-

$$\vec{F} = 4\,xz\hat{i} - y^2\hat{i} + yz\hat{k}$$

and S is the surface of the cube bounded by the Plane x=0, x=1, y=0, y=1, z=0 and z=1.

Q.3 Trace the curve

$y^2 (a + x) = x^2 (a - x)$.

1E2002

Roll No. _____ Total No of Pages: 3

1E2002

B. Tech. I - Sem. (Back) Exam., Dec. 2019

Common to all Branch

102(O) Engineering Mathematics-I

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT- I

Q.1 (a) Find the asymptotes of the following Curve – [8]

$x^3 - 5x^2y + 8xy^2 - 4y^3 + x^2 - 3xy + 2y^2 - 1 = 0$

(b) Prove that for Ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1; \rho = \frac{a^2b^2}{P}$, P being the perpendicular from the center upon the tangent at any point (x, y) [8]

OR

Q.1 (a) Show that the point of inflexion of the curve $y^2 = (x - a)^2 (x - b)$ lie on the straight line $3x + a = 4b$. [8]

(b) Trace the curve $y^2 (a + x) = x^2 (a - x)$ [8]

UNIT- II

Q.2 (a) If $x^x y^y z^z = c$ then prove that at $x = y = z$, $\frac{\partial^2 z}{\partial x \partial y} = \frac{-1}{x \log ex}$ [8]

(b) If $u = \sin^{-1}\left(\frac{x^{1/4} + y^{1/4}}{x^{1/5} + y^{1/5}}\right)$ then prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \frac{1}{20}\tan u$ [8]

OR

Q.2 (a) Find the maximum value of – [8]

$u = \sin x \sin y \sin(x + y)$

(b) Find the maximum or minimum value of $u = x^2 + y^2 + z^2$ when $ax^2 + by^2 + cz^2 = 1$ and $lx + my + nz = 0$ [8]

UNIT- III

Q.3 (a) Find the surface area of the solid generated by the revolution of the astroid [8]

$x = a\cos^3 t$, $y = a\sin^3 t$ about the x-axis.

(b) Evaluate the Integral $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dxdy$ changing into polar co – ordinates. [8]

OR

Q.3 (a) Evaluate $\int_0^1 \int_{e^x}^e \frac{1}{\log y} dxdy$ by changing the order of integration. [8]

(b) To prove Relation between Beta and Gamma Function [8]

$B(m, n) = \frac{\lceil m \lceil n}{\lceil m+n}$ $(m > 0, n > 0)$

UNIT- IV

Q.4 Solve the following differential equations –

(a) $(1 + y^2)\, dx = (\tan^{-1} y - x)\, dy$ [5]

(b) $\frac{dy}{dx} + \frac{y}{x} \log y = \frac{y}{x^2} (\log y)^2$ [5]

(c) $(x^3 + xy^2 + a^2y)\, dx + (y^3 + yx^2 - a^2x)\, dy = 0$ [6]

OR

Q.4 Solve the following differential equations –

(a) $(D^2 + a^2)\, y = \sec ax$ [5]

(b) $(D^2 - 4D + 4)\, y = e^{2x} + \sin 2x$ [5]

(c) $(D^2 + 2D + 1)\, y = x \cos x$ [6]

UNIT- V

Q.5 (a) Solve – [8]

$$x^2 \frac{d^2y}{dx^2} + 3x \frac{dy}{dx} + y = \frac{1}{(1-x)^2}$$

(b) Solve $\sin^2 x \frac{d^2y}{dx^2} = 2y$ given $y = \cot x$ is a solution. [8]

OR

Q.5 Solve

(a) $\frac{d^2y}{dx^2} + (3 \sin x - \cot x) \frac{dy}{dx} + (2 \sin^2 x)\, y = e^{-\cos x} \sin^2 x$ [8]

(b) Use the method of variation of parameters to solve – [8]

$$\frac{d^2y}{dx^2} - y = \frac{2}{1 + e^x}$$

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1E2402

Roll No. _____ Total No of Pages: 3

1E2402

B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019

1FY2-02 Engineering Physics

Time: 3 Hours **Maximum Marks: 160**

Min. Passing Marks: 56

Instructions to Candidates:

Attempt all ten questions from Part A, fiver questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×3=30]**

All questions are compulsory

Q.1 What is Diffraction?

Q.2 Draw labelled diagram of Michelson's Interferometer.

Q.3 Define Matter waves.

Q.4 Define basic postulates of wave function.

Q.5 What is 'Q' factor in Laser?

Q.6 What is Population inversion?

Q.7 Define Fermi energy.

Q.8 Define Intrinsic and Extrinsic semiconductors.

Q.9 State Faraday's law.

Q.10 State Bio-Savart law.

PART – B

(Analytical/Problem solving questions) **[5×10=50]**

Attempt any four questions

Q.1 In Newton's ring experiment, the diameters of the 4^{th} and 12^{th} dark rings are 0.400 cm and 0.700 cm respectively. Find the diameter of the 20^{th} dark ring.

Q.2 A diffraction grating is just able to resolve two lines of λ = 5140.34 Åand 5140.85 Å in the first order. Will it resolve the lines 8037.20 Å and 8037.50 Å in the second order?

Q.3 An electron is trapped in infinitely deep cubical potential well of with 1 Å. What is its first excitation energy?

(Give $m_e = 9.1\times10^{-31}$ kg, $h = 6.62\times10^{-34}$ Js)

Q.4 How optical fibers can be used in Medical, Science and Communication fields?

Q.5 Derive the relation between Einstein's Coefficients and discuss the result.

Q.6 Classify the elements as conductors, insulators and Semiconductors on the basic of band theory of solids with suitable diagram.

Q.7 Derive Poisson's and Laplace's equations.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×20=80]**

Attempt any two questions

Q.1 The intensity of light diffracted from a plane transmission grating is given by-

$$I = I_0 \left(\frac{\sin\alpha}{\alpha}\right)^2 \left(\frac{\sin N\beta}{\sin\beta}\right)^2$$

Where symbols have their usual meanings. Find the position of maxima and minima. [10+10=20]

Q.2 Write down Schrodinger's time dependent and time independent wave equations. Give physical significance of wave function. [10+10=20]

Q.3 Define spatial and temporal Coherence with their examples. Show that visibility is a measure of degree of Coherence. [5+5+10=20]

Q.4 Describe the construction and working of He-Ne Laser. How is population inversion achieved in such a laser? [10+10=20]

Q.5 What is Hall Effect? Give an elementary theory of Hall Effect. Obtain the expression for all Hall coefficient in terms of Hall voltage. [5+15=20]

1E2204

Roll No. _____ Total No of Pages: 3

1E2204

B. Tech. I - Sem. (Back) Exam., Dec. 2019

PY-101 Engineering Physics

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

*Attempt any **five questions** including Question No. 1, which is compulsory. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

Q.1 Compulsory, answers for each sub questions be given in about 25 words - [8×2=16]

(a) What is working principle of Michelson's Interferometer?

(b) State Law of Malus.

(c) Differentiate between Covalent & Metallic bonding.

(d) What are the boundary conditions for Schrodinger's Wave equation?

(e) Explain the Holography in interferometry.

(f) What factors affect the "Fraunhofer Diffraction"?

(g) What is Laser? Explain its principle?

(h) What is the Physical meaning of numerical aperture of an optical fiber?

Q.2 (a) With Schematic diagram explain the working of a 'Michelson's interferometer'. Obtain the expression for circular interference fringes. [8]

(b) Write Short Note on- [8]

(i) Anti-reflection Coating

(ii) Interference filters

Q.3 (a) Using the concept of electric field vector of electromagnetic waves. Explain plane, elliptically and circularly polarized light. [8]

(b) What is optical Activity? Write the Laws of optical activity of optical active solution? [8]

Q.4 (a) Explain the terms mobility of charge carries and Hall Effect. Obtain an expression for the Hall Coefficient in the terms of the density of conduction electrons. [8]

(b) Describe the formation energy bands in solids and hence explain how it help to classify the materials into conductors and semi-conductor. [8]

Q.5 (a) Write down the Schrodinger's time independent Wave Equation for a free particle confined in a one dimensional box of size. Obtain Eigen values and normalized wave function for this particle. [8]

(b) Determine the expectation value of position of a particle in one dimensional box. [8]

Q.6 (a) What do you mean by the word Coherence? Explain temporal and spatial Coherence. Give Example of one experiment each which demonstrate temporal and spatial Coherence. [8]

(b) Compare the maximum angle of acceptance and numerical aperture of two fibers characterized by core and cladding index n_1 and n_2 respectively. [8]

(i) n!= ∠6, << =1.5

(ii) n_1= 2J, n_2=1.5

Q.7 (a) Discuss the construction and working of He-Ne laser. What is the role of He? Give some important application of this laser. [8]

(b) Write Short Note on- [8]

(i) Holographic Microscopy

(ii) Semiconductor Laser

1E2003

Roll No. _____ Total No of Pages: 4

1E2003

B. Tech. I - Sem. (Back) Exam., Dec. 2019

Common to all Branch

103 (O) Engineering Physics-I

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT- I

Q.1 (a) Describe the construction and working of Michelson interferometer. How would you use it to measure the wavelength of monochromatic light? [5+5=10]

(b) When a thin film of a transparent material of refractive index 1.5 for wavelength 5890 Å is inserted in one of the arms of a Michelson's interferometer, a shift of 65 circular fringes is observed. Calculate the thickness of the film. [6]

OR

Q.1 (a) Explain the formation of the Newton's rings in reflected light. Prove that the diameter of dark rings are proportional to the square root of the natural number. [5+5=10]

(b) In Newton's ring experiment by reflected light the diameters of the 4^{th} and 12^{th} dark rings are 0.4cm and 0.7cm, respectively. Find the diameter of the 20^{th} dark ring. What will be the order of dark ring which is formed where the thickness of air film is equal to wavelength of light used. [5+1=6]

UNIT- II

Q.2 (a) Using the concept of electric vector of electromagnetic wave, discuss plane, circularly and elliptically polarized light. [8]

OR

(b) What is Quarter wave plate? Explain how it is used to analyse - [2+3+3=8]

(i) Elliptically polarized light and

(ii) Circularly polarized light

Q.2 (a) What do you mean by optical rotation. Discuss how will you measure specific rotation of sugar solution using Laurent's half shade Polarimeter. [8]

OR

(b) A tube of sugar solution 20cm long is placed between crossed Nicols and illuminated with light of wavelength 6000 Å. If the optical rotation produced is 13° and the specific rotation is $65°(cm^{-1})\ (g/cm^3)^{-1}$, determine the strength of the solution. [8]

UNIT- III

Q.3 (a) Discuss Fraunhofer's diffraction due to simple slit. Derive the expression for its intensity and show that the intensities of first and secondary maxima are respectively $\frac{1}{22}$ and $\frac{1}{61}$ of the intensity of central maxima. [8]

(b) Examine if two spectral lines of wavelength 5890Å and 5896Å, can be clearly resolved in the- [8]

(i) First order and

(ii) Second order by a diffraction grating 2cm wide and having 425 lines/cm.

OR

Q.3 (a) Give theory of plane transmission grating and show how will you determine wavelength of light. [8]

(b) Parallel light (5000 Å) is normally incident on a slit. The central maxima spreads out at 30° on both sides of the direction of the incident light. Calculate the width of slit. For what width of the slit, the central maxima would spread out to 90° from the direction of incident light? [6+2=8]

UNIT- IV

Q.4 (a) What do you mean by the term "bonding in solid" Explain covalent and metallic bonding. [2+3+3=8]

(b) The Hall voltage for the metal sodium is 0.001mV measured at current I=100mA and magnetic field B=2 Tesla. The width of the specimen and conductivity of sample are 0.05mm and $2.09\times10^{7}\ \Omega^{-1}\ m^{-1}$, respectively. Calculate – [8]

(i) The number of carriers per cubic meter in sodium and

(ii) The mobility of electrons in sodium.

OR

Q.4 (a) Derive an expression for the conductivity of a semiconductor. [8]

(b) Write short notes on the following –

(i) X-ray diffraction & Bragg's law [4]

(ii) Hall effect [4]

UNIT- V

Q.5 (a) Using principal of special theory of relativity, derive expression for relativistic variation of mass with velocity. [8]

(b) Show that addition of any velocity to the velocity of light merely reproduces the velocity of light [4]

(c) Show that massless particles can exist only if they move with the speed of light. [4]

OR

Q.5 (a) Deduce Einstein's mass-energy relation $E=mc^2$. Show that the total energy E and momentum p are related as $E^2 = p^2c^2 + m_0^2c^4$, where m_0 is the rest mass and c is speed of light. [6+4=10]

(b) The mean life time of muon at rest is 2.2×10^{-6} sec. Calculate the average distance it will travel in vacuum before decay, if its velocity is 0.9c. [6]

1E2403

Roll No. _____ Total No of Pages: 3

1E2403

B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019

1FY2-03 Engineering Chemistry

Time: 3 Hours **Maximum Marks: 160**

Min. Passing Marks: 56

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×3=30]**

All questions are compulsory

Q.1 Define Caustic Embrittlement. [3]

Q.2 What is break point chlorination? [3]

Q.3 Give 2-2 examples of secondary solid fuel, secondary liquid fuel and secondary gaseous fuel. [3]

Q.4 What is Cetane number? [3]

Q.5 State Pilling-Bedworth rule. [3]

Q.6 Why does corrosion occur in steel pipe connected to copper plumbing? [3]

Q.7 Why Gypsum is added in the cement? [3]

Q.8 What do you understand by steam emulsion number? [3]

Q.9 How Aspirin is useful in prevention of heart attacks? [3]

Q.10 State Markovnikov's rule. [3]

PART – B

(Analytical/Problem solving questions) **[5×10=50]**

Attempt any five questions

Q.1 Explain zeolite method of water softening. [10]

Q.2 Discuss the flue gas analysis by Orsat's apparatus. [10]

Q.3 What do you understand by calorific value? Distinguish between gross and net calorific value. [10]

Q.4 Explain sacrificial anodic protection method to minimize corrosion. [10]

Q.5 Define flash and fire point and its determination using PENSKY MARTIN apparatus. [10]

Q.6 Explain Fischer Tropsch process with neat and labelled diagram. [10]

Q.7 Explain electrophilic substitution reactions of benzene with the help of suitable example. [10]

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×20=80]**

Attempt any four questions

Q.1 Calculate the quantity of hydrated lime and sodium carbonate required to soften 20,000 litres of water containing following salts – [20]

$CaCO_3$ = 10.0 mg/litre, $MgCO_3$ = 8.4 mg/litre, $CaC\ell_2$ = 11.1 mg/litre, $MgSO_4$ = 6.0 mg/litre assuming the purity of lime as 90% and that of sodium carbonate 95%.

Q.2 (a) 0.26 gm coal sample gave on combustion 0.039 gm of water and 0.245 gm of CO_2. Calculate the percentage of carbon and hydrogen in it. [10]

(b) Calculate the volume of air required for complete combustion of $1m^3$ of gaseous fuel having the composition: CO = 48%, CH_4 = 8%, H_2 = 40%, C_2H_2 = 2%, N_2 = 1% and remaining being ash. [10]

Q.3 Write short notes –

(a) Pitting corrosion [10]

(b) Dry theory of corrosion [10]

Q.4 Write short notes –

(a) Borosilicate glass [5]

(b) Significance of annealing [5]

(c) Extreme pressure lubrication [5]

(d) Setting and Hardening of Portland cement [5]

Q.5 (a) Explain free radical halogenation of alkane. [10]

(b) Describe the synthesis, properties and uses of Aspirin. [6+2+2=10]

1E2205

Roll No. _____ Total No of Pages: 3

1E2205

B. Tech. I Sem. (Back) Exam., Dec. 2019

CY-101 Engineering Chemistry

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

*Attempt any **five questions** including Question No. 1, which is compulsory. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL 2. NIL

Q.1 Compulsory, Answers for each sub-question be given in about 25 words. [8×2=16]

(a) What is hardness of water?

(b) Advantages of gaseous fuels.

(c) Preparation of nylon 66.

(d) Flash and Fire points of lubricants.

(e) Define galvanic corrosion.

(f) Role of gypsum in cement.

(g) Classification of refractories.

(h) Properties of glasses.

Q.2 What is drinking grade water? Describe various steps involve in making drinking grade municipal water. [4+12=16]

Q.3 (a) What are flue gases? Explain analysis of flue gases by Orsat's apparatus. [3+5=8]

(b) Explain proximate analysis of coal and its significance. [8]

Q.4 Write short notes on any four of the following - [4×4=16]

(a) Polyethylene

(b) Bakelite

(c) Natural rubber

(d) Synthetic rubber Buna – S

(e) Different degree of hardness

(f) Calgon conditioning for scale prevention

Q.5 (a) What is viscosity of lubricants? Describe the analysis of viscosity by Redwood viscometer. [4+6=10]

(b) Explain property setting and hardening of cement. [6]

Q.6 (a) Explain the phenomena of wet electrochemical corrosion with example. [8]

(b) Discuss the reactions involved in Lime-Soda softening process. [8]

Q.7 (a) Explain important properties of good refractories. [8]

(b) Explain the manufacturing of soft soda glass with properties and uses. [8]

1E2404

Roll No. _____ Total No of Pages: 3

1E2404

B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019

1FY1 – 04 Communication Skills

Time: 2 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[5×2=10]**

All questions are compulsory

Q.1 Distinguish between Verbal and Non-Verbal Communication.

Q.2 Define Linking verbs.

Q.3 Name the different types of Business Letters.

Q.4 Who authored the short story "The Luncheon"?

Q.5 Give the central idea of the poem "IF" by Rudyard Kipling.

PART – B

(Analytical/Problem solving questions) [4×10=40]

Attempt any four questions

Q.1 Describe the corporate communication.

Q.2 What advice does the poem "IF" gives to the present generation?

Q.3 There are quite a few places where the author uses the expressions 'my heart sank', 'panic seized' etc. in the story "The Luncheon". What was the reason for this?

Q.4 Fill in the blanks with appropriate Linking Words:

(i) Promise me that you will phone me.....you get to the airport.

(ii) "I'll take some money with me just.....I see something I want to buy".

(iii) Jen promised to look after Harriet's cat.....she was on holiday.

(iv) I set the alarm for 6.30 in the morning..... I wouldn't miss the train.

(v) We waited at the platform.....the train had disappeared into the distance.

Q.5 Write a paragraph on "An Accident Scene" or "Why should people speak English?" in 100-200 words.

Q.6 Your College organized an adult literacy camp in its neighborhood. Write a report in 150-200 words on the camp for your college newsletter. You are Sunil/Sunitha, the Secretary.

Use the following clues; no. of volunteers – hours spent in teaching – location of the class – chairs, blackboards – no. of people attending the camp – benefits.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 What is the significance of the title of the story "How Much Land Does a Man Require?" by Leo Tolstoy.

Q.2 Describe the meaning, importance and cycle of Communication.

Q.3 Write a letter applying for the following job that appeared in the Employment News on May 23rd:

Part-Time help required by fast food restaurant would suit student.

Apply to: The Manager, Pizza Hut

Main Street, Indraprastha Industrial Area, Kota, Rajasthan 3240005.

1E2202

Roll No. _____ Total No of Pages: 3

1E2202

B. Tech. I - Sem. (Back) Exam., Dec. 2019

HU-101 Communication Skills

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

*Attempt any **five questions** including Question No. 1, which is compulsory. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

Q.1 Compulsory, answers for each sub questions be given in about 25 words - [8×2=16]

(a) What is meant by communication?

(b) Write any two objectives of communication.

(c) What is meant by formal communication?

(d) Who is the author of 'The Night Train at Deoli'?

(e) What is essence of 'No Men Are Foreign'?

(f) Write two qualities of good communication.

(g) Draw a chart of cycle of communication.

(h) What is meant by 'feedback' in communication?

Q.2 (i) Change the following sentences into indirect speeches - [4×2=8]

(a) He said, "My mother cooks our breakfast."

(b) Varun said to me, "I am doing my work."

(c) She said, "My brother arrived yesterday."

(d) Ram said to me, "I will stay here."

(ii) Change the passive voices of following sentences – [4×2=8]

(a) Ragini can win the match.

(b) Even a rat may help a lion.

(c) Who will sell tea?

(d) He will not steal my book.

Q.3 Prepare your bio-data along with an application for the post of system analyst. [16]

Q.4 (a) Write an essay on "Students and Social Service." [8]

(b) Political Reforms you want in India. [8]

Q.5 Discuss the message given by "The Night Train at Deoli". Write the summary of story and express the character of basket-seller. [16]

Q.6 What do you learn from the story "How Much Land Does A Man Need? by Leo Tolstoy? Describe the narrator's view for "Pahom". [16]

Q.7 Give explanation of poem with reference and context - [16]

"Where the mind is without fear and the head is held high, where the world has not been broken up into fragments by narrow domestic walls."

1E2405

Roll No. _____ Total No of Pages: 2

1E2405

B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019

1FY1 – 05 Human Values

Time: 2 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[5×2=10]**

All questions are compulsory

Q.1 What do you mean by right understanding and why is it needed?

Q.2 Differentiate between animal consciousness and human consciousness.

Q.3 Why do we need to understand ourselves?

Q.4 What do you mean by glory and gratitude?

Q.5 What is the natural characteristics of human order?

PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 What is the need for value education in technical institutes?

Q.2 What are the three basic requirements to ensure happiness and prosperity for human beings? Discuss.

Q.3 Human being is a co-existence of a conscious self (I) and the material body. Discuss.

Q.4 We need to understand and live with Sanyam to ensure health. Explain.

Q.5 All nature is submerged in space. Elaborate.

Q.6 Discuss the criteria that we should follow for assessing and developing appropriate technology.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 Critically examine the process of self-exploration for value education.

Q.2 Human beings live in relationships. Analyze the salient values in relationships.

Q.3 How are the entities in nature inter-connected and mutually fulfilling to each other. Evaluate.

1E2203

Roll No. _____ Total No of Pages: 2

1E2203

B. Tech. I - Sem. (Back) Exam., Dec. 2019

HU-103 Human Values

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

*Attempt any **five questions** including Question No. 1, which is compulsory. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

Q.1 Compulsory, answers for each sub questions be given in about 25 words -

(a) What do you understand by the terms happiness and prosperity? [2]

(b) Differentiate between 'animal consciousness' and 'human consciousness'. [2]

(c) What do you mean by the concepts of 'Sanyama' and 'Swasthya'? [2]

(d) Define the feelings of glory and gratitude. [2]

(e) What are the four orders in nature? [2]

(f) Define the concepts of units and space. [2]

(g) What do you mean by the term profession? [2]

(h) What is the need for value education in technical institutions? [2]

Q.2 What is self-exploration? Discuss the purpose of self-exploration. [16]

Q.3 "I am the seer, doer and enjoyer. The body is my instrument". Discuss [16]

Q.4 Discuss the feelings of 'Trust' and 'Respect' in human relationships. [16]

Q.5 Discuss the five dimensions of human endeavor in the light of comprehensive human goal. [16]

Q.6 Discuss the implications of value based lining at the four levels. [16]

Q.7 The issues in professional ethics are becoming very complex in the current scenario Discuss. [16]

1E2001

Roll No. _____ Total No of Pages: 4

1E2001

B. Tech. I - Sem. (Back) Exam., Dec. 2019

Common to all Branch

101(O) Communicative English

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT- I

Q.1 Answer any four sections of the following sections: [4×4=16]

Section – A

(i) Put the suitable forms of verbs in the following paragraph:

I got up. The Burmans…….. (be) already…… (race) past me across the meadows. It was obvious that the elephant will never rise again, but he (be)……..not dead. He…… (breathe) very rhythmically with long rattling gasps.

Section – B

(ii) Convert the following sentences into passive voice:

(1) They held the gathering near the temple.

(2) Do not park your vehicle here.

(3) Accidents kill thousands of people every year.

(4) When will they announce the results?

Section – C

(iii) Put the following into indirect speech.

(1) Lina said, "Did Max fly to London two weeks ago."?

(2) Jennifer said, "Where are you playing badminton these days."?

(3) He said to me, "Let us go to watch a movie".

(4) The teacher said, "Work hard to succeed in life."

Section – D

(iv) Put the verbs in brackets into the correct tense:

(1) The spy will reveal the secret if he..... (know) about it.

(2) If you boil soup, it..... (taste) better.

(3) If the trip had not been so expensive, he..... enjoy it.

(4) Would you mind living in this country if government.....(guarantee) your safety?

Section – E

(v) Fill in the blanks with suitable modals:

(1) .....you bring me a book on Tolstoy? (Polite request)

(2) You.....submit the fine as you have violated traffic rules. (Compulsion)

(3) He.....play piano when he was 10 years old. (Past ability).

(4) .....you succeed in your endeavors! (Wish).

UNIT- II

Q.1 Write a paragraph of about 200 words on any of the following topics: [8]

(i) Work is Worship.

(ii) Honesty is the best policy.

(iii) Health is Wealth.

OR

Write Dialogues between two friends about preparation for the examination.

Q.2 Make a Precis of the following passage: [8]

Among the manifold misfortunes that may befall humanity, the loss of health is one of the severest. All the joys which life can give can't outweigh the sufferings of the sick. Give the sick man everything and leave him in suffering and he will feel that half of the world is lost to him. Lay him on a soft Silken Couch; he will nevertheless be under the pressure of his sufferings while the miserable beggar, blessed with health, sleeps sweetly on the hard ground. Good health is a state of complete physical, mental and social wellbeing. For a healthy life cycle, a person needs to have a balanced diet and has to exercise regularly.

OR

Write a report on the problem of child labour in factories (follow the divisions of the report introduction, discussion, conclusions and recommendations).

UNIT- III

Q.1 "Six feet from his head to his heels was all he needed". Comment on the element of greed in the main protagonist of the story 'How Much Land Does a Man Need.' In the light of this ironic statement. [8]

OR

Write a Summary of the story 'The Luncheon'?

Q.2 How did the last leaf become an old Painter's masterpiece? [8]

OR

Draw a character sketch of Pahom.

UNIT- IV

Q.1 What is propagated in the essay 'The Gandhian Outlook' by S. Radha Krishnan? [8]

OR

'Our Own Civilization' by C.E.M. Joad contains the truth of life. Explain it in detail.

Q.2 What is the meaning of real liberty in a free country? Explain it in the light of the essay 'On the Rule of the Road'. [8]

OR

Write in detail the advantages of our civilization.

UNIT- V

Q.1 "The poem 'If' is rather an inspirational instruction in the achievement of idealized ethical and moral behaviour". Justify the statement in the light of the poem 'If'. [8]

OR

Write the summary of the poem 'No men are Foreign.'

Q.2 Write the theme of 'The Character of a Happy life' written by Sir Henry Wotton. [8]

OR

Describe the message of the poem 'The Unknown Citizen'.

1E2408

Roll No. _____ Total No of Pages: 4

1E2408

B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019

1FY1 – 08 Basic Electrical Engineering

Time: 2 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. Scientific Calculator 2. NiL

PART – A

(Answer should be given up to 25 words only) **[5×2=10]**

All questions are compulsory

Q.1 Explain the concept of voltage and current source transformation with an example.

Q.2 What is meant by power factor of an AC circuit? What is its minimum value and its maximum value?

Q.3 What is eddy current loss and how can this loss be reduced?

Q.4 What is meant by slip of an induction motor?

Q.5 Distinguish between a Rectifier and an Inverter.

PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 Find the current through 3Ω Resistor in the circuit shown in Figure 1. by using Thevenin's theorem.

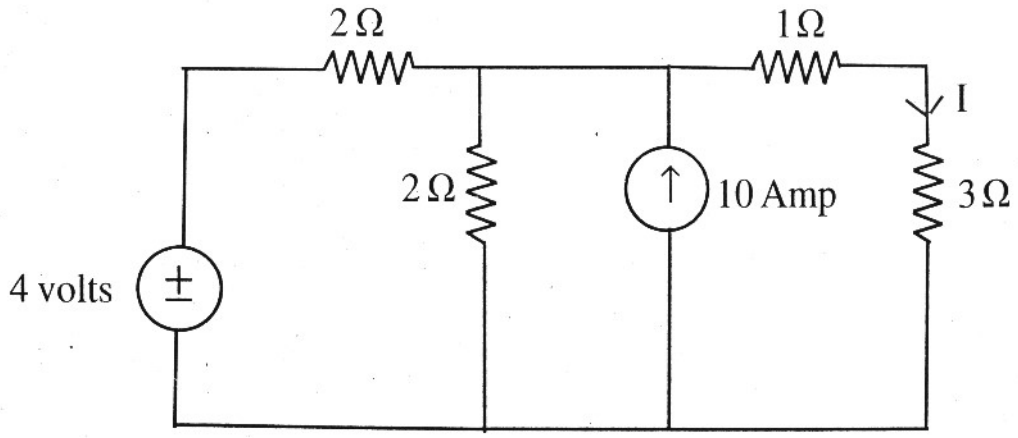


Figure -1

Q.2 For the circuit shown in Figure. 2. determine the voltages at nodes B and C and calculate the current through the 8Ω resistor.

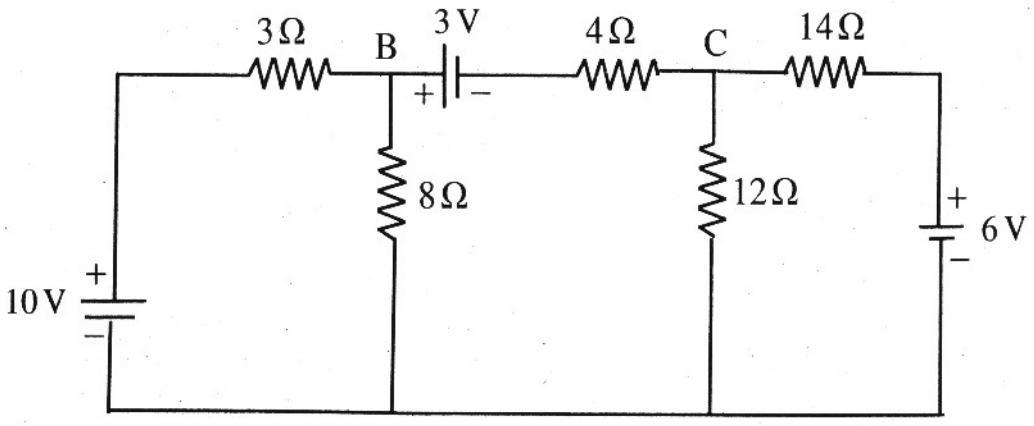


Figure - 2

Q.3 A voltage wave has the variation as shown in figure 3. Determine –

(a) The average and RMS value of voltage.

(b) If the voltage of part (1) is applied to a 50 Ω resistor. Find the power dissipated in watts.

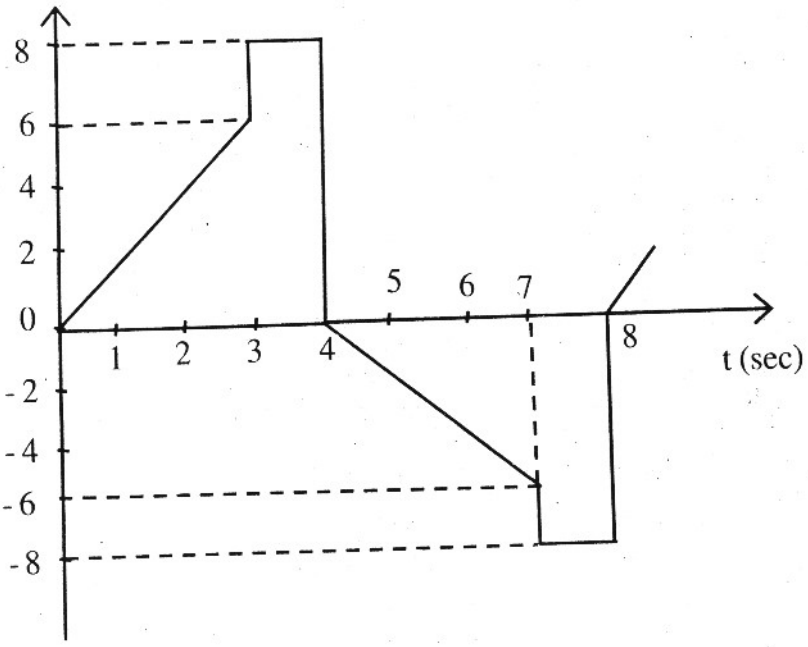


Figure - 3

Q.4 Derive EMF equation of single phase transforms. Also explain that why transformer is known as constant flux device.

Q.5 Explain in detail the construction and principle of working of a three – phase Induction motor.

Q.6 Explain the working of a single – phase full bridge Inverter with the help of circuit diagram and output voltage waveform.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 (a) A non – inductive resistance of 10Ω is connected in series with an inductive coil across 200V, 50 Hz a.c. supply. The current drawn by the series combination is 10 A. The resistance of the coil is 2Ω. Design a circuit first and then calculate inductance of the coil, power factor of the coil, Power factor of the circuit and voltage across the coil.

(b) Distinguish between active powers, reactive power and apparent power with the help of power triangle.

Q.2 (a) What is a SCR? Sketch static I –V characteristics of a thyristor. Label the various voltages, currents and the operating modes on this sketch.

(b) Explain the torque – speed characteristic and speed control of separately excited DC motor.

Q.3 (a) Why protective devices are used for overload and short – circuit protections? Why do we use an ELCB in an electrical installation?

(b) Calculate the energy consumed per month by the following loads –

(i) 4 tube lights of 40 W used on an average of 8 hours per day.

(ii) 3 fans of 8 W used on an average of 10 hours per day.

(iii) 1 fridge of ¼ kW rating operating 12 hours per day.

The supply voltage is 230V, 50 Hz. Also calculate the electricity bill if cost of one unit of energy is ₹ 5/- only.

1E2005

Roll No. _____ Total No of Pages: 3

1E2005

B. Tech. I - Sem. (Back) Exam., Dec. 2019

Common to all Branch

105 (O) Basic Electrical and Electronics Engineering

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

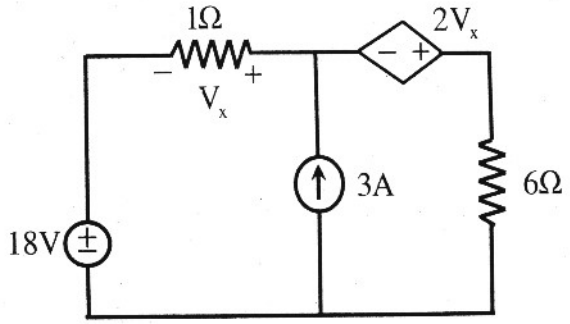
Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT- I

Q.1 (a) State and explain Maximum power transfer theorem by suitable example. [8]

(b) Calculate the current in 6Ω resistor for the circuit shown in fig (1) using superposition theorem. [8]

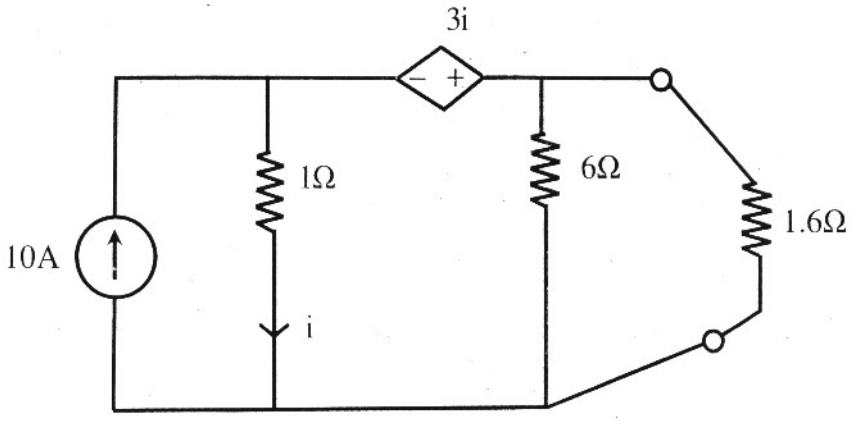


Fig(1)

OR

Q.1 (a) State and explain Norton's Theorem with a suitable example. [8]

(b) Find the current through 1.6 Ω resistor in the circuit shown in figure (2) using Norton's Theorem. [8]



Fig(2)

UNIT- II

Q.2 An inductive load is connected in series with a non-inductive resistance of 8Ω. The combination is connected across an a.c. supply of 100 volts, 50Hz. A voltmeter is connected across the non-inductive resistor and then across the inductive load gives the reading of 64 volts and 48 volts respectivel. Calculate the following-

(i) Impedance of the load [2]

(ii) Impedance of the combination [4]

(iii) Power absorbed by the load [2]

(iv) Power absorbed by the resistor [2]

(v) Total power taken from supply [2]

(vi) Power factor of the load [2]

(vii) Power factor of whole circuit [2]

OR

Q.2 (a) What is the power factor in R – L – C circuit, its leading, lagging and resonance condition. Define form factor and peak factor. [8]

(b) A coil of resistance 1.5 Ω and impedance 6Ω is placed in series with second coil of resistance 2Ω, when the voltage of 230 V, 50Hz is applied to circuit the current flowing though circuit is 7 A. Find the inductance of second coil. [8]

UNIT- III

Q.3 (a) Explain how commutator work in a DC machine to generate DC voltage. [8]

(b) Derive EMF equation of DC Machine. [8]

OR

Q.3 Explain principle of operation of 3ϕ induction motor. Describe various applications of AC machines in detail. [16]

UNIT- IV

Q.4 (a) Explain how transistor works as an amplifier with the help of neat diagram and waveform. [8]

(b) Explain and plot characteristics of common Base configuration of transistor. [8]

OR

Q.4 Write short note on-

(a) Field effect Transistor [8]

(b) PN Junction Diode [4]

(c) Zener Diode [4]

UNIT- V

Q.5 (a) Explain briefly classification of ICs. [8]

(b) What are different types of communication system? Explain each is detail. [8]

OR

Q.5 Write short note on-

(a) Transducers [4]

(b) Thermocouple [4]

(c) Load cell [4]

(d) RTD [4]

1E2407

Roll No. _____ Total No of Pages: 3

1E2407

B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019

1FY1 – 07 Basic Mechanical Engineering

Time: 2 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[5×2=10]**

All questions are compulsory

Q.1 Define blade velocity co – efficient.

Q.2 What is the role of moderator in nuclear power plant?

Q.3 Why priming of a pump is required?

Q.4 Describe Zeroth law of thermodynamics.

Q.5 Differentiate between Joule's law and Gay – Lussac's law

PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 Write a short note on points given below-

(a) Power output of Parson's reaction turbine.

(b) Velocity diagram of Parson's reaction turbine

(c) Blade efficiency of Parson's reaction turbine.

(d) Stage efficiency of Parson's reaction turbine

(e) Nozzle efficiency of Parson's reaction turbine

Q.2 (a) Discuss various components of nuclear power plant.

(b) Differentiate between coal thermal power plant and Geo thermal power plant in brief.

Q.3 Explain working of a reciprocating pump along with their applications and neat diagram.

Q.4 Describe the following points –

(a) Case hardening

(b) Unit of Refrigeration

(c) Co – efficient of performance

(d) Cast Iron and types

(e) Cutting speed

Q.5 Explain Locomotive Boiler by using following points –

(a) Neat sketch

(b) Working principle

(c) Components / parts & their working

(d) Applications

Q.6 Explain the following processes-

(a) Soaking

(b) Brazing

(c) Soldering

(d) Drilling

(e) Extrusion

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 (a) Describe different types of belt drives.

(b) Derive an expression for the length of open belt drive.

(c) Ice is formed at 0°C from water at 20°C. The temperature of refrigerant is 10°C. Find the Ice formed per kWh. Assume latent heat of Ice is 334 kJ/kg. Assume working in perfect Carnot cycle.

Q.2 (a) Explain working of an I.C. Engine with their components.

(b) Derive the formula of mechanical efficiency and indicated power of an I.C. Engine.

Q.3 (a) Describes Electrolux refrigerator with neat sketch.

(b) Two parallel shafts 6m apart are to be connected by a belt running over pulleys of diameter 50 cm and 30 cm respectively. Determine the exact and approximate lengths of belt required.

(i) If the belt is open

(ii) If the belt is crossed

(c) What is centrifugal tension? Derive an expression for the same.

50

1E2409

Roll No. _____ Total No of Pages: 3

1E2409

B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019

ESC

2FY3-09 Basic Civil Engineering

Time: 2 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[5×2=10]**

All questions are compulsory

Q.1 What do you understand by floor space index.

Q.2 What is local attraction? How is it detected?

Q.3 What is R.C.C? Where it is used?

Q.4 What are road signs? Enumerate there categories of road signs.

Q.5 What is rain water harvesting?

51

PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 What is the impact of infrastructural development on economy of country? Discuss various branches of civil engineering.

Q.2 What are the basic sources of errors in linear measurements? Describe types of errors in taking linear measurements?

Q.3 What is the basic criteria of selection of site for buildings? Discuss various components of buildings along with their functions.

Q.4 Discuss the concept of Ecological pyramid. Describe various ecological pyramids with neat sketches.

Q.5 Explain the flow of nitrogen nutrient in environment cycle with neat sketch.

Q.6 What is 'PCU'? State the PCU Value for Vehicles. Enumerate various factors affecting PCU.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 Discuss various modes of transportation. Discuss Nagpur plan along with its Salient features.

Q.2 The following bearings were observed in a compass surveying:

Line	Corrected F.B	Corrected B.B
AB	45°00'	226°00'
BC	123°30'	303°00'
CD	181°00'	1°00'
DA	289°30'	110°00'

Calculate the correct included angles and correct magnetic bearings. Also calculate the true bearings if the magnetic declination is 2°30' East.

Q.3 Enlist Water Quality Standards. What is Water Pollution? What are its sources and effects?

53

1E2406

Roll No. _____ Total No of Pages: 4

1E2406

B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019

1FY1 – 06 Programming for Problem Solving

Time: 2 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[5×2=10]**

All questions are compulsory

Q.1 Draw the block diagram of a Computer. Explain its components. Differentiate between primary & secondary storage.

Q.2 Draw a flowchart to find the maximum among the three numbers.

Q.3 What is an algorithm? Write an algorithm to print even numbers from 2 to 100.

Q.4 Write the format of the following functions -

(a) fseek

(b) fopen

(c) getch

(d) getchar

Q.5 Differentiate between Array, Structures & Unions.

PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 (a) Write a program in C to print inverted half pyramid –

```
* * * * *
* * * *
* * *
* *
*
```

(b) Write a program in C to check Armstrong number of n digits.

Q.2 (a) What will be the output of the following "C" code?

```
#include

void main () {

int i = -1,  j = -1, k = 0, l = 2, m;

m = i++ &&j++ &&k++ || l++;

printf ("%d%d%d%d%d", i,j,k,l,m);

}
```

(b) Explain the terms Identifiers and Data Types in C. Explain the rules of Identifier declaration in C language. List all the Data Types of C with their storage size and storage format.

Q.3 Write a Pseudo Code to Multiply 2[3×3] Matrices and Transpose the output of Multiplication.

Q.4 Write a program to swap two values using functions, use 2 cases -

(a) call by value and

(b) call by reference

Q.5 Explain the following conditional statements with proper syntax and example –

(a) If- else statement

(b) Switch Case

(c) While Loop

(d) Do-While Loop

Q.6 Solve the following –

(a) Convert 253.64 from base 10 to base 8

(b) The given hexadecimal number (1E.53) base 16 is equivalent to (_____) base 8

(c) Convert the binary number (01011.1011)2 into decimal

(d) Find r's and (r-1)'s complement of 5308

(e) Solve the following (10110.01)2 – (11010.10)2, using (r-1)'s compliment

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 Write a C program to find the sum of the series –

$$S = 1+\frac{x}{1!}+\frac{x^2}{2!}+\frac{x^3}{3!}+\frac{x^n}{n!}$$

Q.2 Programming on structures/pointers –

(a) Define a structure data type called time_struct containing 3 members called hour, minute and second. Develop a program that would assign values to the individual members and display the time in the form 16:40:30

(b) Write a program in C to Swap Three (3) numbers using pointers

Q.3 Explain the concept of File handling in C language. Write a Program in C language to copy the data from source file to destination file and display the same on console.

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1E2206

Roll No. _____ Total No of Pages: 3

1E2206

B. Tech. I - Sem. (Back) Exam., Dec. 2019

CS-101 Computer Programming

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[5×2=10]**

All questions are compulsory

Q.1 Explain the various tokens of the 'C' language.

Q.2 What is Array? Write the syntax of an array declaration in 'C' language.

Q.3 Differentiate between flow chart and Pseudo code.

Q.4 Perform $(10101)_2 + (01110)_2$.

Q.5 List arithmetic, relational, logical and assignment operator.

PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 What do you mean by storage device? Explain the concept of high level, assembly and low level language.

Q.2 Perform the following –

(a) $(743.91)_{10} = (?)_8$

(b) $(A1B2.6C)_{16} = (?)_8$

(c) $(7345)_8 = (?)_2$

(d) $(3596)_{10} = (?)_{16}$

Q.3 Write a 'C' program to addition of two arrays of (3×3) matrices.

Q.4 Discuss the use of structure and pointer to structure with suitable example.

Q.5 Write the program to print following pattern:

```
        *
      * * *
    * * * * *
  * * * * * * *
* * * * * * * * *
```

Q.6 Compare between parameter passing in a function "By value" and "By reference"?

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 Write a program in 'C' language to determine the youngest of three keys i.e. Ajay, Raju, Mohan, if their ages are input through the keyboard.

Q.2 Explain:

(a) Discuss switch case decision making control statement.

(b) What is command line arguments? Explain with example.

(c) What do you mean by identifiers? Explain its rules.

Q.3 Write short notes on the following:

(a) Recursion Vs iteration

(b) Types of primary memory

(c) Working of Break and Continue statement.

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1E2004

Roll No. _____ Total No of Pages: 3

1E2004

B. Tech. I - Sem. (Back) Exam., Dec. 2019

Common to all Branch

104 (O) Engineering Chemistry

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT- I

Q.1 (a) What is coke? Describe in brief the manufacturing of metallurgical coke by Otto-Hoffmann's by Product method. [10]

(b) Distinguish between solid, liquid and gaseous fuels. [6]

OR

Q.1 (a) Write short notes on any two- [2×4=8]

(i) Knocking

(ii) Reforming

(iii) Octane Number

(b) Explain the manufacturing of coal gas. Give its properties and applications. [8]

UNIT- II

Q.2 (a) Describe how the calorific value of a solid fuel is determined using Bomb calorimeter? [8]

(b) Write short notes on-

(i) Significance of ultimate analysis. [4]

(ii) Gross and net calorific value. [4]

OR

Q.2 (a) Explain the flue gas analysis by Orsat's apparatus. Give its applications. [8]

(b) A Sample of coal containing C = 75%, H_2 = 8%, O_2 = 7.5%, S = 5.0% and rest is ash. Calculate the gross and net calorific value of coal. [8]

UNIT- III

Q.3 (a) Write the preparation, structure, properties and uses of any two- [2×4=8]

(i) Buna – S

(ii) Buna – N

(iii) Butyl Rubber.

(b) Discuss the classification of polymers with suitable examples. [8]

OR

Q.3 (a) What are Fullerenes? Discuss their preparation and uses. [8]

(b) What are organic electronic materials? Explain conductivity in polymer Polyaniline. [8]

UNIT- IV

Q.4 Describe the manufacturing of Portland cement with diagram and chemical reactions involved in it. Discuss the role of gypsum in Portland cement. [16]

OR

Q.4 (a) Define Glass. Explain manufacturing of soda lime glass with chemical reactions involved in it. [10]

(b) Give the composition, properties and uses of Borosilicate glass. [6]

UNIT- V

Q.5 (a) Define Refractory. What are the characteristics of a good refractory? [8]

(b) Write short notes on- [2×4=8]

(i) Fire clay refractories [4]

(ii) Silica Refractories. [4]

OR

Q.5 (a) Explain thick layer mechanism of lubrication [8]

(b) Define viscosity. How viscosity of lubricating oil is determined using Redwood viscometer? [8]

1E2207

Roll No. _____ Total No of Pages: 2

1E2207

B. Tech. I Sem. (Back) Exam., Dec. 2019

CE-101 Environmental Engineering & Disaster Management

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 28

Instructions to Candidates:

*Attempt any **five questions** including Question No. 1, which is compulsory. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

Q.1 (a) Describe the Biotic and Abiotic environment with examples. [2]

(b) Explain the energy flow in ecosystem. [2]

(c) Explain the Population Dynamics. [2]

(d) Discuss Environmental Hazards. [2]

(e) Explain Earthquake energy. [2]

(f) What is Bio-Diversity? [2]

(g) Explain sanitary land fill. [2]

(h) What is chemical cycle? [2]

Q.2 (a) Explain Noise Pollution. What are the sources of noise pollution? Explain various measures to control noise pollution. [8]

(b) Write notes on Acid Rain and Greenhouse effect. [8]

Q.3 Write the notes on following –

(i) Ozone depletion [4]

(ii) Global warming [4]

(iii) Fire Hazards [4]

(iv) Rain water harvesting [4]

Q.4 (a) What is solid waste management? Discuss all steps involved in an ideal solid waste management practice. [8]

(b) Explain harmful effects of Air Pollution and give the different methods to control Air pollution. [8]

Q.5 (a) Describe the components of Ecosystem and role of Biodiversity in conservation of Ecosystem. [8]

(b) Explain the Environmental Acts. [8]

Q.6 Write notes –

(a) Tsunamis [4]

(b) Cyclones [4]

(c) Land slides [4]

(d) Floods [4]

Q.7 (a) Define magnitude of earthquakes and write a note of qualitative classification of earthquakes. [8]

(b) Explain major causes of damages in different types of structures during earthquakes. [8]
