

**BT-1811**  
**Examination –Nov- 2022**  
**B.Tech. I/II Sem : Common for all branches**  
**Engineering Chemistry**

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

**Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.**

**Word limit be observed as follows:**

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**Part c – Max 100 words and              Part d – Max 400 words.**

**Word limit NOT to be followed for diagram, numerical, derivation.**

- Q.1 (a) What are the main disadvantages of using hard water in boiler? 02
- (b) Difference between Sludge and Scale. 02
- (c) Write the principle of Ion exchange process of softening water and What are the advantages of Ion exchange process? 03
- (d) Describe the method of determination of Hardness by Complexometric or EDTA Method with chemical reactions. 07

**OR**

- i. A sample of water is found to contains following dissolving salts in milligrams per litre  $Mg(HCO_3)_2 = 73$ ,  $CaCl_2 = 111$ ,  $Ca(HCO_3)_2 = 81$ ,  $MgSO_4 = 40$  and  $MgCl_2 = 95$ . Calculate temporary and permanent hardness and total hardness. 04
- ii. Explain the cause of caustic embrittlement in boilers and suggest a remedy. 03
- Q.2 (a) How fuels are classified. Give one example for each. 02
- (b) Define calorific value. Explain higher & lower calorific value. 02
- (c) Explain ultimate analysis. Give its significance. 03
- (d) i. How Metallurgical coke is manufactured by Otto-Hoffman's method? 04
- ii. When 0.5g of a fuel on complete combustion in excess oxygen, increases temperature of water in a calorimeter containing 1000g of water to  $2.10^0C$ . Calculate gross (higher) calorific value and net calorific value of the fuel if the fuel contains 7% of  $H_2$  and the water equivalent of the calorimeter is 120 g. 03

**OR**

- i. How Synthetic petrol is manufactured by Bergius Process? 04
- ii. Calculate the minimum of air by weight required for the complete combustion of fuel having the following composition by weight 03

$C = 82\%$ ;  $H_2 = 13\%$ ;  $O_2 = 3\%$

$C = 0.82$  kg;  $H_2 = 0.13$  kg;  $O_2 = 0.03$  kg

- Q.3 (a) Mention three advantages of synthetic rubber over natural rubber.
- (b) What is vulcanization? How it is done?
- (c) What are thermosetting and thermoplastic polymers? Give examples for each.
- (d) Write short notes on following polymers  
(a) Bakelite (b) Teflon (c) Polyethylene (d) Nylon

**OR**

Explain in detail Electrical, magnetic, optical, and mechanical properties of nanostructured materials

- Q.4 (a) Give two examples for acidic refractories, basic refractories and neutral refractories.
- (b) What are the requirements of a good refractory?
- (c) Give the classification and functions of Lubricants. Explain briefly.
- (d) Explain following properties of lubricants-  
(i) Viscosity Index (ii) Flash Point (iii) Fire Point  
(iv) Cloud Point (v) Pour Point

**OR**

Explain the manufacturing of Portland cement by Dry process.

- Q.5 (a) Write applications of IR spectrophotometer
- (b) What is Chromatography? Write types of it.
- (c) Describe the principle behind nuclear magnetic resonance (NMR) spectroscopy.
- (d) Explain Beer-Lambert's law. Discuss the instrumentation of UV-Visible Spectrophotometer.

**OR**

Briefly discuss working of Gas Chromatography

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**B.Tech. I/II Sem: Common for all Branches**  
**Basic Electrical & Electronics Engineering**

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

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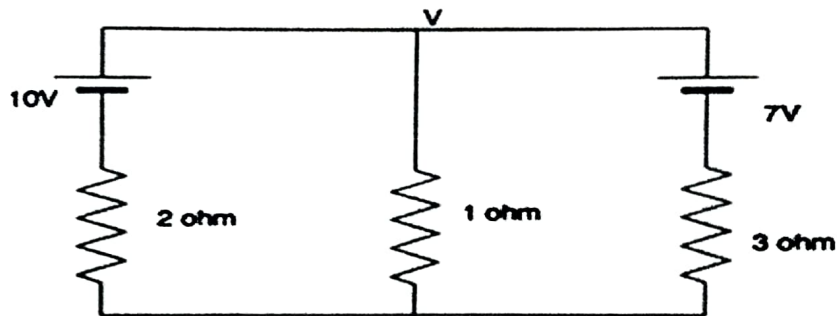
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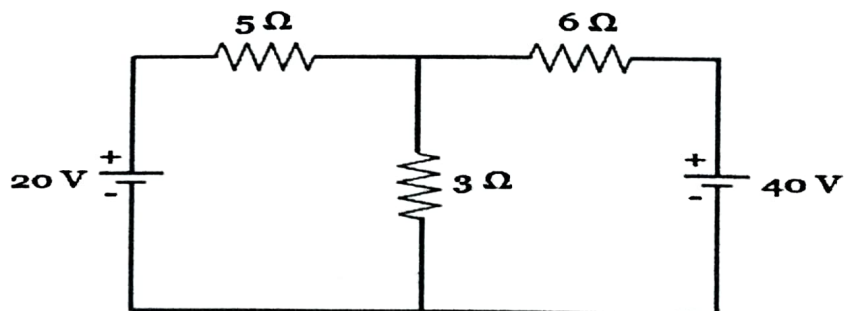
Word limit NOT to be followed for diagram, numerical, derivation.

- Q.1 (a) State kirchoffs laws KCL and KVL? 02  
 (b) What are voltage sources? Give example? 02  
 (c) State and explain thevenins theorem? 03  
 (d) Using node voltage method find voltage V 07



OR

- Using superposition theorem find the current in 3 ohm branch resistor? 07



- Q.2 (a) Define power and power factor in AC circuits? 02  
 (b) Deduce relations and formulas in single phase RL series AC circuit? 02  
 (c) Find impedance, current and power factor of the RC series circuit if the applied voltage is 200volts, the frequency is 50 Hz; R=10 ohm; L=50mH; C=100 microfarad. 03  
 (d) Derive the relationship for line currents, line voltage, phase current and phase voltage in star connected circuits? 07

**OR**

What are three phase AC circuit? Compare three phase AC circuit with single phase circuit stating its advantages?

- Q.3 (a) What are types of losses in transformer?  
(b) State and explain principle of transformer?  
(c) A single phase 50 Hz transformer has 30 primary and 350 secondary turns. The net cross sectional area of core is  $250 \text{ cm}^2$ . If the primary winding is connected to a 230 V, 50 Hz supply, calculate (i) Peak value of flux density in the core; (ii) Voltage induced in the secondary winding. Neglect losses, What is the primary current when the secondary current is 100 Amperes?  
(d) Explain open circuit and short circuit test in single phase transformer?

Time : 3 Hrs  
Note: 7

07

**OR**

What is efficiency in transformer? How is normal efficiency compared to all day efficiency? Derive the maximum condition of efficiency in transformer?

- Q.4 (a) What is rotating machine? Mention different types of machines?  
(b) State the principle of Induction motor?  
(c) A 4 pole generator with wave wound armature has 51 slots each having 24 conductors. The flux per pole is 0.01 weber. At what speed must the armature rotate to give an induced emf of 220V. What will be the voltage developed if the winding is lap connected and the armature rotates at the same speed.  
(d) Explain in detail with diagram the constructional parts of DC machine?

02  
02  
03  
07

**OR**

A separately excited generator develops a no load emf of 150V At an armature speed of 200 rpm and a flux per pole of 0.2 wb. Determine the generated emf (a) the speed increase to 300 rpm and the pole flux remains unchanged. (b) the speed remains at 200 rpm and pole flux decreased to 0.08 wb and (c) the speed increases to 400 rpm and the pole flux is decreased to 0.07 wb.

- Q.5 (a) Explain V-I characteristics of diode?  
(b) What are logic gates? Name the different logic gates?  
(c) Explain the working of a full wave rectifier?  
(d) What is a transistor? Draw electrical symbol of transistor? Also describe the currents in a typical transistor.

02  
02  
03  
07

**OR**

Convert

- (i)  $(39)_{10}$  to  $(?)_2$
- (ii)  $(1213)_8$  to  $(?)_{10}$
- (iii)  $(16E)_{16}$  to  $(?)_2$
- (iv)  $(10101011)_2$  to  $(?)_8$

07

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with simple ph...

**BT-1813**  
**Examination – Nov- 2022**  
**B.Tech. I/II Sem: Common for all Branches**  
**Engineering Graphics**

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 28

**Note: Total number of questions are 10. Attempt any one question (Including all part) from each unit. Assume missing data, if any, suitably.**

**UNIT-I**

- Q.1 (a) A 3.2 cm long line represents a distance of 4 meter. 07  
Extend the line to measure unto 25meter and  
show on it units of meter and 5meter. Show a length of  
16 meter on this scale.
- (b) The major axis of an ellipse is 110 mm long and the 07  
minor axis is 70 mm long. Draw an ellipse by  
concentric circle method.

**OR**

- Q.2 (a) The area of a field is 50,000 sq m. The length and the 07  
breadth of the field, on the map is 10 cm and 8 cm  
respectively. Construct a diagonal scale which can  
read upto one metre. Mark the length of 235 metre on  
the scale. What is the R.F. of the scale?
- (b) Draw the involutes of square size of 30 mm. 07

**UNIT-II**

- Q.3 (a) Two points A and B are in the H.P. The point A is 30 07  
mm in front of V.P. , while B is behind V.P. The  
distance between their projectors is 75 mm and the line  
joining their top views makes an angle of  $45^0$  with xy.  
Find the distance of the point B from V.P.

of a 75 mm long line measures 55 mm. 07  
is in the VP, its one end being 25 mm above  
the HP. Draw its projection.

**OR**

- Q.4 A line AB, 90 mm long is inclined at  $45^\circ$  to the HP 14  
and its top view makes angle of  $60^\circ$  with the VP. The  
end A is in HP and 12mm in front of the VP. Draw its  
front view and find its true inclination with the VP.

### UNIT-III

- Q.5 A thin  $30^\circ - 60^\circ$  set square has its longest edge in V.P. 14  
and inclined at  $30^\circ$  to the H.P. Its surface makes an  
angle of  $45^\circ$  to the V.P. Draw its projections.

**OR**

- Q.6 A square prism, edge of base 40 mm and axis 65 mm 14  
long has its axis inclined at  $45^\circ$  to the H.P. and an edge  
of its base on the H.P. and is inclined at  $30^\circ$  to the V.P.  
Draw its projections.

### UNIT-IV

- Q.7 A square pyramid, base 40 mm side and axis 65 mm 14  
long, has its base on the H.P. and all the edges of the  
base equally inclined to the V.P. It is cut by a section  
plane, perpendicular to V.P., inclined at  $45^\circ$  to the H.P.  
and bisecting the axis. Draw its sectional top view,  
sectional side view and true shape of the section.

**OR**

- Q.8 A right cylinder of 30 mm diameter and 35 mm height 14  
of axis, is cut by a section plane inclined at  $30^\circ$  to H.P.  
and passes 18 mm from base along the axis. Draw the  
development of the truncated cylinder.

## UNIT-V

Q.9 Draw the isometric view of a cone of base cylinder 50 mm base and axis 60 mm. The cone has its base on the HP. 14

**OR**

- Q.10 (a) What are the advantages of drafting with CAD? 07
- (b) State and Explain any five editing commands used in CAD. 07

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**BT-1814**  
**Examination –Nov- 2022**  
**B.Tech. I/II Sem: Common for all Branches**  
**Communication Skills**

Time: 3 Hrs.

Max. Marks: 70

Min. Marks: 22

**Note: Total number of questions is 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.**

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Part a – Max 50 words,

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Part c – Max 100 words

Part d – Max 400 words.

**Word limit may NOT to be followed for diagram.**

**Attempt all parts of a question at one place.**

- Q.1 (a) What do you understand by parts of speech? 02  
 (b) What is subject verb agreement? 02  
 (c) How are the prepositions 'to' and 'from' used to show direction? Explain giving example. 03  
 (d) Explain how Present Perfect Tense is different from Past Indefinite Tense giving examples. 07

**OR**

How do punctuations change the meaning of a sentence considerably? Explain by giving at least two examples. 07

- Q.2 (a) What is the benefit of learning one word substitution? 02  
 (b) How does dictionary help in learning pronunciation? 02  
 (c) Differentiate between the words 'then' and 'than'? Give examples. 03  
 (d) What do you understand by the following: 07  
     (i) Prefixes and Suffixes  
     (ii) Role of Jargon

**OR**

Write short notes on the following: 07

- (i) The importance of English Language in the career of an engineering student.  
 (ii) How do learning root words help in increasing word power? Explain.

- Q.3 (a) Define communication? 02  
 (b) What is feedback in communication? 02  
 (c) Briefly explain any one advantage of 'effective communication. 03  
 (d) Discuss the advantages and disadvantages of oral communication. 07

**OR**

Discuss the semantic barriers in communication. 07



- Q.4 (a) Name the two types of reading process?  
(b) When is note taking useful?  
(c) What are the main parts of an essay?  
(d) How is technical style of writing different from literary style of writing?

**OR**

Write a note on reading speed strategies?

- Q.5 (a) What is a memorandum?  
(b) Why is a reference no. useful in letter?  
(c) What is an agenda of a meeting?  
(d) Draft a covering letter of a résumé for the post of an executive trainee?

**OR**

Discuss the importance of e-mail in the business world.

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**BT-1815**  
**Examination –Nov- 2022**  
**B.Tech. I/II Sem: Common for all Branches**  
**Engineering Mathematics - I**

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

**Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.**

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- Q.1 (a) Define radius of curvature in Cartesian form. 02  
 (b) State Leibnitz theorem. 02  
 (c) State and prove Taylor’s theorem. 03  
 (d) Find the first five terms in the expansion of  $\log(1+\sin x)$  by Maclaurin’s theorem 07

**OR**

Discuss maximum or minimum value of 07

$$f(x,y) = y^2 + 4xy + 3x^2 + x^3.$$

- Q.2 (a) Find Cube root of 127 approximately is 02  
 (b) If  $u=f(y/x)$ , tshen show that  $x\partial u/\partial x+y\partial u/\partial y = 0$  02  
 (c) Define Beta function. 03  
 (d) 07

If  $x^x y^y z^z = c$  then,  $\frac{\partial^2 z}{\partial x \partial y}$

**OR**

If  $z=e^{\frac{x^2+y^2}{x+y}}$  07  
 then,  $x\partial z/\partial x+y\partial z/\partial y$  is?

- Q.3 (a) Prove that  $\Gamma 1 = 1$ . 02  
 (b) What is the value of  $\beta(3,2)$ . 02  
 (c) Find the limit of the series when  $n \rightarrow \infty$   $\sum_{r=1}^{n-1} \frac{1}{\sqrt{n^2-r^2}}$  03  
 (d) Change the order of integration  $\int_0^1 \int_{x^2}^{2-x} xy dx dy$  and find the value of integration. 07

**OR**

Find the value of  $\iint y dx dy$  over the area bounded by the parabola  $x^2=4y$  and  $y^2=4x$  is? 07

Q.4 (a) Explain Echelon form.

(b) Find the Eigen vector for value of  $\lambda=6$  for the given matrix  $A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$

(c) Find the rank of the given matrix by normal form

$$\begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{bmatrix}$$

(d) Find the Eigen value and the Eigen Vector for the given matrix

$$\begin{bmatrix} 3 & 4 & 2 \\ 1 & 6 & 2 \\ 1 & 4 & 4 \end{bmatrix}$$

**OR**

To solve the equations

$$x+2y-z = 3, 3x-y+2z = 1, 2x-2y+3z = 2, x-y+z = -1$$

Q.5 (a) Define

(a) Tree (b) Path (c) Degree of Vertex (d) walk

(b) Prepare the truth table to get the negation of the statement "sita is dull and careless."

(c) Let  $(B, +, \cdot, ')$  be a Boolean algebra and  $a, b$  be any two elements of  $B$ . Then prove that  $(a+b)' = a' \cdot b'$

(d) Give the function  $(xy'+xz)'+x'$  in conjunctive normal form

**OR**

Prove that  $p \rightarrow (q \rightarrow r) \leftrightarrow (p \wedge q) \rightarrow r$  is a tautology.

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**BT-1821**  
**Examination –Nov- 2022**  
**B.Tech. I/II Sem : Common for all Branches**  
**Engineering Physics**

Time : 3 Hrs

Max. Marks : 70  
 Min. Marks : 22

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- Q.1 (a) Define constrictive Interference of light. 02  
 (b) What is diffraction grating? 02  
 (c) Explain the double refraction of polarization of the light with necessary diagram. 03  
 (d) Describe Newton’s rings experiment with diagram for determining the wavelength of monochromatic light. 07

**OR**

Derive the expression for intensity distribution due to single slit diffraction. 07

- Q.2 (a) Define Gradient of Scalar field. 02  
 (b) Explain Gauss’s Theorem. 02  
 (c) If  $\phi(x,y,z)= 3xy^2-yz^2$  find  $\phi$  point(1,2,1). 03  
 (d) Derive Maxwell’s first and second equations. 07

**OR**

Derive electromagnetic magnetic wave equation in free space. 07

- Q.3 (a) Explain group velocity. 02  
 (b) Define wave functions  $\psi$ . 02  
 (c) Explain Heisenberg’s uncertainty principle with one proof. 03  
 (d) Derive the expression of wavelength shift in Compton effect. 07

**OR**

Derive Schrödinger time independent wave equation. 07

- Q.4 (a) What is effective mass?  
(b) Define Nano-size materials.  
(c) Explain Meissner effect.  
(d) Discuss working of the P-N junction diode with necessary diagram.

**OR**

Define Hall effect and derive Hall coefficient expression.

- Q.5 (a) Define stimulated emission.  
(b) Explain the Step Index fiber.  
(c) A optical fiber has core refractive index of 1.56 and cladding refractive index of 1.45. Calculate the numerical aperture of the fiber.  
(d) Discuss the construction and working of any one solid state Laser with energy –level diagram.

**OR**

Discuss construction of optical fiber and find it's an acceptance angle expression.

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BT-1822

Examination –Nov- 2022

B.Tech. I/II Sem : Common for all Branches

Basic Civil Engg. &amp; Engg. Mechanics

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

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- Q.1 (a) List the component parts of a building 02  
 (b) Compare framed structure with load bearing 02  
 (c) What different types of cement and where they are used 03  
 (d) Explain with sketch different types of foundations and their suitability for construction. 07

OR

What are the engineering properties of bricks and field test to assure their qualities 07

- Q.2 (a) Define Coplanar and non coplanar forces 02  
 (b) The resultant of two forces is 10N and it is inclined at  $60^\circ$  to one of the forces whose magnitude is 5N. Determine the magnitude and direction of the other force. 02  
 (c) Differentiate between triangle and polygon law of forces 03  
 (d) A string 2m long is tied to the ends of a uniform rod that weighs 60N and is 1.6m long. The string passes over a nail, so that the rod hangs horizontally. Calculate Tension in the string. 07

OR

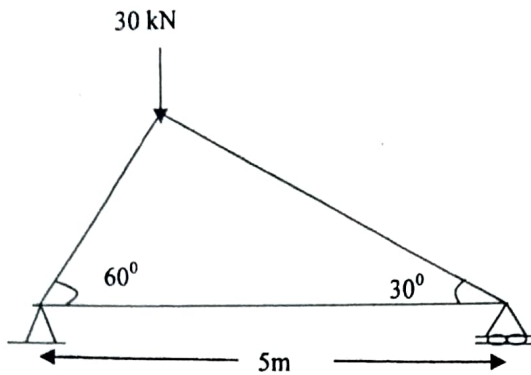
A flat belt running on a pulley 1.0m in diameter is to transmit 7.5 kW at a speed of 200 rev/min. The angle of embrace of belt and pulley is 170 degrees and the coefficient of friction between belt and pulley is 0.25. If the pull in belt is not to exceed 200N/cm. Determine the width of the belt. 07

- Q.3 (a) Differentiate between plane frame (truss) and space frame 02  
 (b) Differentiate between statically determinate and indeterminate frame (truss) 02  
 (c) What are assumptions made in the analysis of a frame 03

(d) Determine the forces in all the members of a truss with the loading and supports shown in figure using

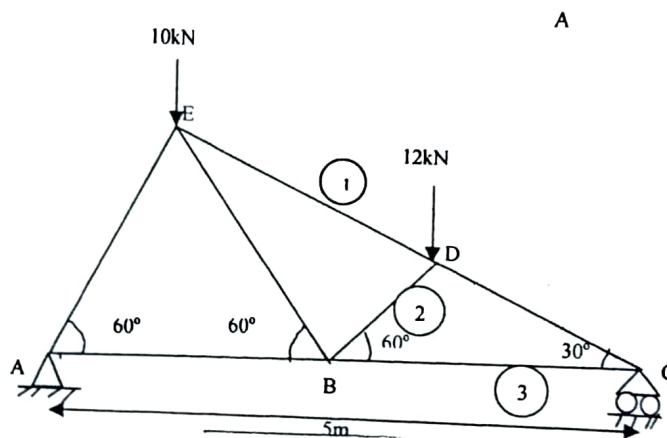
- 1) Method of joints 2) Graphical method

Determine the reactions and bending moment diagram

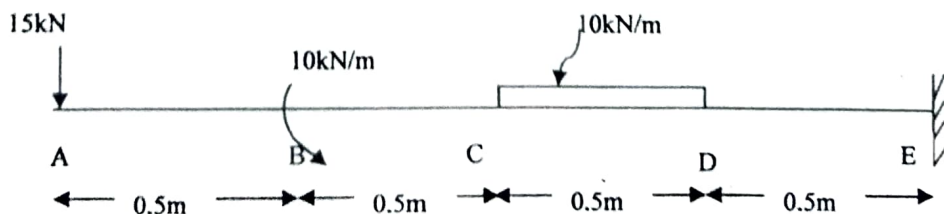


OR

Determine the forces in the members marked (1),(2),(3) of the truss loaded and supported as shown in figure using method of section



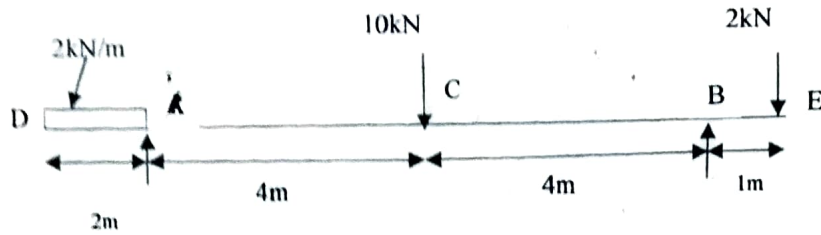
- Q.4 (a) Derive the relation between load intensity, shear force and bending moment 02  
 (b) Define point of Contraflexure 02  
 (c) List various types of beams with neat sketch 03  
 (d) Draw shear force and bending moment diagram For the beam loaded as shown in figure 07



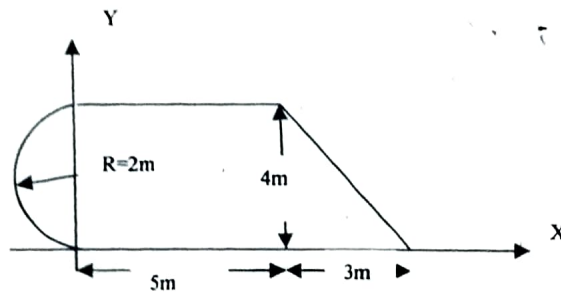
OR

Determine the reactions and point of contraflexure and construct shear force and bending moment diagram for the beam loaded in figure

07



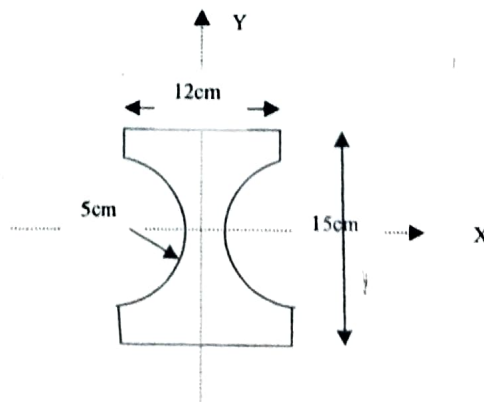
- Q.5 (a) Define Centre of gravity and centroid 02  
(b) Define Moment of Inertia and radius of Gyration 02  
(c) State Parallel axis theorem 03  
(d) Locate the centroid of the area as shown in figure with respect to the axes indicated in the figure 07



OR

Determine  $I_{xx}$  and  $I_{yy}$  of the cross section of a beam section shown in figure

07



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**BT-1823**  
**Examination –Nov- 2022**  
**B.Tech. I/II Sem: Common for all Branches**  
**Basic Mechanical Engineering**

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

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**Word limit NOT to be followed for diagram, numerical, derivation.**

- Q.1 (a) What is thermodynamic system? Write various type of system. 02  
 (b) Name all boilers mounting and accessories of steam boilers. 02  
 (c) Define the following term (a) Coefficient of performance (b) tonne of refrigeration 03  
 (d) Describe how wet steam, dry saturated steam and superheated steam is produced. 07  
 Explain with neat and clean sketch.

**OR**

Calculate enthalpy of 1kg of steam at pressure of 8bar and dryness fraction of 0.8. How much heat would we required to raise 2 kg of this steam from water at 20deg. C. 07

- Q.2 (a) Define following property of fluids (a) Density (b) Specific volume (c) Specific gravity (d) Viscosity. 02  
 (b) What is Newton law of Viscosity? 02  
 (c) How fluids are classified? Explain. 03  
 (d) A plate, 0.025 mm distant from a fixed plate, moves at 60cm/s and requires a force of 2 N per unit area i.e.  $2\text{N/m}^2$  to maintain this speed .Determine the fluid viscosity between the plates. 07

**OR**

Determine the specific gravity of fluid having viscosity 0.05 poise and kinematic viscosity 0.035 strokes. 07

- Q.3 (a) Classify I.C. Engines. 02  
 (b) Compare petrol and diesel engine. 02  
 (c) Describe with suitable sketch the working of two stroke petrol engine. 03  
 (d) Explain the Otto cycle and derive an expression for efficiency of Otto cycle. 07

**OR**

Write down the working of four stroke diesel engine with the help of neat sketch.

- Q.4 (a) What is alloy steel? Why is alloying done?  
(b) State and explain Hook's law and modulus of elasticity.  
(c) Draw stress-strain curve for mild steel. Also discuss the various properties mild-steel related to this curve.  
(d) Explain brief various properties of engineering materials.

**OR**

Draw and explain Iron-Carbon diagram equilibrium diagram.

- Q.5 (a) What are the different type of welded joint?  
(b) What are the advantage and limitation of gas welding?  
(c) Explain Oxy-Acetylene welding, with neat sketch?  
(d) How is lathe specified? Give operation which can be performed in lathe?

**OR**

Draw a sketch of simple drilling machine and show its different components.

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**BT-1825**  
**Examination –Nov- 2022**  
**B.Tech. I/II Sem: Common for all Branches**  
**Engineering Mathematics - II**

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

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- Q.1 (a) Solve  $(D^2 - 4D + 4)y = 0$  02
- (b) Examine the exactness of the equation  $ye^x dx + (2y + e^x)dy = 0$  02
- (c) Solve  $(1 + y^2)dx = (\tan^{-1}y - x)dy$ . 03
- (d) Solve by variation of parameter  $(D^2 - 2D + 1)y = e^x/x^2$ . 07

**OR**

Solve  $(D^3 + 3D^2 + 2D)y = x^2$  07

- Q.2 (a) Write general form of Legendre's linear differential equation. 02
- (b) Solve  $(x^4)d^3y/dx^3 - (2x^3)d^2y/dx^2 - x^2dy/dx + xy = 0$  02
- (c) Solve  $(x^2)d^2y/dx^2 - 4xdy/dx + 6y = x$ . 03
- (d) Solve  $(dx/dt) + 4x + 2y = t$  07  
 $(dy/dt) + 2x + 5y = e^t$

**OR**

Solve  $(x^3)d^3y/dx^3 - (2x^2)d^2y/dx^2 + 2y = 10(x + (1/x))$ . 07

- Q.3 (a) Find the partial differential Equation by eliminating arbitrary function  $z = f(y/x)$  02
- (b) Write the Lagrange's auxiliary equation. 02
- (c) Solve  $y^2p - xyq = x(z - 2y)$ . 03
- (d) Solve by charpit's method 07  
 $Z = px + qy + p^2 + q^2$ .

**OR**

Solve  $(D^2 + DD' - 6D'^2)z = y \cos x$ . 07

- Q.4 (a) Define Analytic function.
- (b) Show that  $f(z)=1/z$  whether it is analytic or not.
- (c) State harmonic function and if  $u(x,y) = \log(x^2-y^2)$  then show that  $u$  is harmonic.
- (d) Determine the analytic function whose real part is  $x^3-3xy^2+3x^2-3y^2$  and also find  $f(z)$  by Milne's Thomson Method.

**OR**

Show that  $e^x(\cos y - i \sin y)$  is analytic and find its derivatives.

- Q.5 (a) State and prove Cauchy's Integral formula.
- (b) Find the order of each pole and residue at it of  $\frac{1-2z}{z(z-1)(z-2)}$ .
- (c) State and prove Cauchy's Residue theorem.
- (d) Verify Cauchy's theorem for the function  $z^3 - iz^2 - 5z + 2i$ , if  $C$  is the circle  $|z - 1| = 2$ .

**OR**

Show that  $\int_0^{2\pi} \frac{d\theta}{a+b \cos\theta} = \int_0^{2\pi} \frac{d\theta}{a+b \sin\theta} - \frac{2\pi}{\sqrt{a^2-b^2}}$ , where  $a > b > 0$ .

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**BT-1831/2031**  
**Examination –Nov- 2022**  
**B.Tech. III Sem: ME, EE, EC, AI**  
**Managerial Economics**

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

**Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.**

**Word limit be observed as follows:**

**Part a – Max 50 words, Part b – Max 50 words,**

**Part c – Max 100 words and Part d – Max 400 words.**

**Word limit NOT to be followed for diagram, numerical, derivation.**

- Q.1 (a) What is opportunity cost? 02  
 (b) List out the major objectives of the firm. 02  
 (c) How does managerial economics relate with other disciplines for propounding its theories? 03  
 (d) Write scope of managerial economics. 07

**OR**

Discuss the role and responsibilities of a managerial economist. 07

- Q.2 (a) Define demand and demand curve. 02  
 (b) What is meant by industry demand and company demand? 02  
 (c) Define the concept supply and the law of supply. 03  
 (d) Explain the factors influencing the elasticity of demand in the market with an example. 07

**OR**

What is an indifference curve? What are its properties? What role does it play in consumer analysis? 07

- Q.3 (a) Why do business entities have to forecast demand? 02  
 (b) What are the functions of an Entrepreneur? 02  
 (c) What is meant by production? Define production function and describe the underlying assumptions. 03  
 (d) Explain the consumer survey method and discuss the merits and demerits of complete enumeration method and sample survey method. 07

**OR**

How will you define economies of scale? What are the sources of internal and external economies? 07

Examination –Nov- 2022

**B.Tech. III Sem: CE, EI, CS, IoT, ICB, AG**  
**Engineering Mathematics - III**

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

**Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.**

**Word limit be observed as follows:**

**Part a – Max 50 words, Part b – Max 50 words,**

**Part c – Max 100 words and Part d – Max 400 words.**

**Word limit NOT to be followed for diagram, numerical, derivation.**

- Q.1 (a) Define Fourier series 02  
 (b) Define Fourier Transform. 02  
 (c) If  $F(x) = x^2$ ,  $-\pi \leq x \leq \pi$  find  $a_0$  03  
 (d) Find the Fourier series for the function  $f(x) = x \sin x$ , in the interval  $0 < x < 2\pi$ . 07

**OR**

Find the Fourier transform of  $f(x)$ , defined by 07

$$F(x) = 1 - x^2, \quad |x| < 1$$

$$= 0, \quad |x| > 1$$

- Q.2 (a) Write the statement of First shifting theorem property. 02  
 (b) Write the statement of Division by  $t$  property. 02  
 (c) Find the Laplace Transform of  $f(t) = t \sin t$ . 03  
 (d) Evaluate  $L^{-1}\{s/(s^2+a^2)^2\}$ . By convolution theorem. 07

**OR**

Solve  $y'' - 2y' + y = e^t$ . Given  $y(0) = 2$ ,  $y'(0) = -1$  07

- Q.3 (a) Define interpolation and extrapolation 02  
 (b) Prove that 02

$$e^x = \left(\frac{\Delta^2}{E}\right) e^x \cdot \frac{Ee^x}{\Delta^2 e^x}$$

- (c) Using Newtons Forward interpolation formula, find the value of  $y$  for  $x = 5$ . 03
- |    |   |   |   |    |
|----|---|---|---|----|
| X; | 4 | 6 | 8 | 10 |
| Y; | 1 | 3 | 8 | 16 |

- (d) Using Lagrange Interpolation formula, find the value of  $f(15)$  from the following table : 07
- |       |    |    |    |    |
|-------|----|----|----|----|
| X:    | 5  | 6  | 9  | 11 |
| F(x): | 12 | 13 | 14 | 16 |

OR

From the following table, estimate the number of students who obtained marks between 40 and 45;

Marks x	: 30-40	40-50	50-60	60-70	70-80.
No. student y:	31	42	51	35	31

- Q.4 (a) Give the formula of Simpson's 1/3 rule 02
- (b) Evaluate  $\int_0^1 \frac{dx}{1+x}$  using Simpsons 3/8<sup>th</sup> rule and 1/3<sup>rd</sup> rule . 02
- (c) Solve;  $3x + y - z = 3$ ,  $2x - 8y + z = -5$ ,  $x - 2y + 9z = 8$  by Gauss Elimination method 03
- (d) Given that 07
- |   |       |       |       |       |       |       |        |
|---|-------|-------|-------|-------|-------|-------|--------|
| x | 1     | 1.1   | 1.2   | 1.3   | 1.4   | 1.5   | 1.6    |
| y | 7.989 | 8.403 | 8.781 | 9.129 | 9.451 | 9.750 | 10.031 |
- Find  $\frac{dy}{dx}$  at  $x = 1.1$ .

OR

Solve;  $27x + 6y - z = 85$ ,  $6x + 15y + 2z = 72$ ,  $x + y + 54z = 110$  by Jacobi's iteration method 07

- Q.5 (a) Define Euler's Method 02
- (b) Define Picart's Method 02
- (c) Solve the differential equation  $\frac{dy}{dx} = 1 - 2xy$ ,  $y(0) = 0$  by Taylor's method. 03
- (d) Find the approximate value of y at  $x = 0.2$  for the differential equation  $\frac{dy}{dx} = x + y$ , with initial condition  $y(0) = 1$  by Runge - Kutta method . 07

OR

Given the differential equation  $\frac{dy}{dx} = x - y$ , with the condition  $y = 1$ , when  $x = 0$ . Use picards method to obtain y for  $x = 0.2$ , correct to five places of decimal. Check your answer by comparing the result with the exact particular solution 07

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**BT-1841/2041**  
**Examination –Nov- 2022**  
**B.Tech. IV Sem: CE, EI, CS, IoT**  
**Managerial Economics**

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

**Note: Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.**

**Word limit be observed as follows:**

**Part a – Max 50 words, Part b – Max 50 words,**

**Part c – Max 100 words and Part d – Max 400 words.**

**Word limit NOT to be followed for diagram, numerical, derivation.**

- Q.1 (a) Define scarcity and wealth. 02  
(b) How does Economics differ from Managerial Economics? 02  
(c) Discuss the scope of Economics. 03  
(d) Explain Time perspective, Discounting Principle and objectives of firm. 07
- OR**
- Write a detailed note on theories of profit. 07
- Q.2 (a) What do you mean by Utility? 02  
(b) Define Consumer Surplus? 02  
(c) What are the types of Elasticity? 03  
(d) Explain Law of Demand in detail. 07
- OR**
- Discuss Law of Diminishing Marginal Utility with its limitations. 07
- Q.3 (a) Define Entrepreneur and Entrepreneurship. 02  
(b) Differentiate between an Entrepreneur and Manager 02  
(c) What are the methods of forecasting? 03  
(d) Explain Production function. 07
- OR**
- Discuss Training and its benefits in detail 07
- Q.4 (a) Define Ethics and social responsibility. 02  
(b) What is inflation and deflation? 02  
(c) What are accounting cost concepts? 03  
(d) Explain break even analysis with diagram. 07



**OR**

Discuss Business Life Cycle and its phases.

- Q.5 (a) Define monopoly.
- (b) What are the disadvantages of sole tradership?
- (c) What is price discrimination?
- (d) Explain perfect and imperfect competition in detail.

**OR**

Differentiate between public, private and joint stock Company.

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