BharatiyaVidyaBhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Munshi Nagar, Andheri (W) Mumbai – 400058

RE-EXAM JUNE 2022

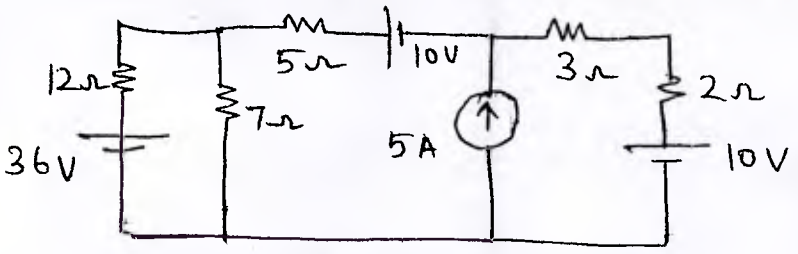
F.Y. B.Tech C/M/E Sem I

Program: F. Y-Btech (C/M/E) **Duration:** 3hrs
Course Code: ES-BT102 **Semester:** I
Course Name: BEE-I **Maximum Points:** 100

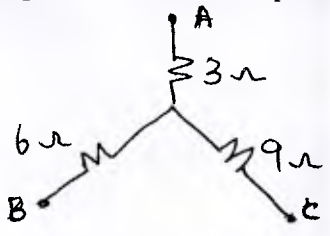
Basic Elect. Engg. 13/6/22

- Answer any five questions.
- Make suitable assumptions wherever necessary.

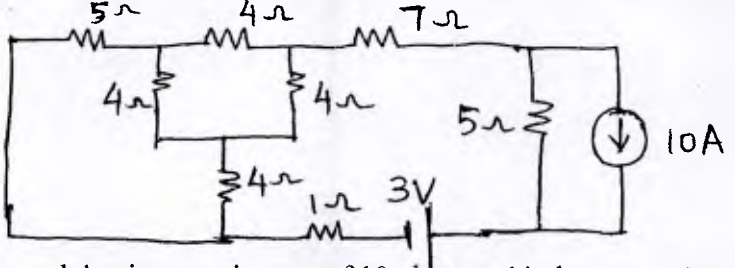
Q.No	Questions	Points	CO	BL	PI
Q1.a	Find the current through the 5ohm resistor by mesh analysis.	8	1	3	2.4. 1.3.



1b.	State and prove Maximum power transfer theorem.	5	1	1	2.4.
1c	Draw the phasor diagram of a transformer for lagging power factor load.	4	3	1	1.3.
1d	Convert the given Star to delta equivalent:	3	1	3	

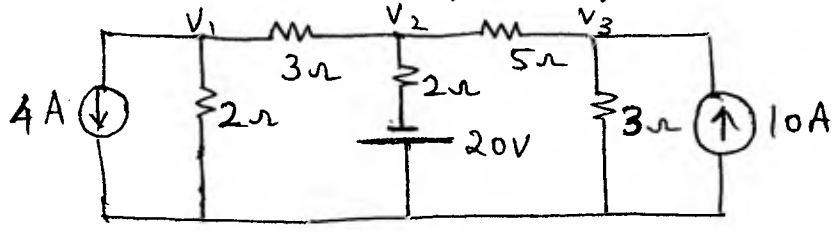


Q2a	Draw the power triangle and name its sides.	4	2	1	2.4. 1.3.
b	Find the current through 7 ohm resistor by star delta transformation.	8	1	3	1.3.

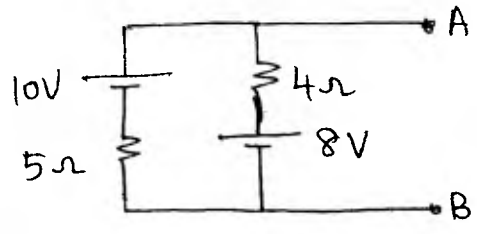


c	Three coils each having a resistance of 10 ohms and inductance of 0.03H are connected in delta to a three phase 400v,50Hz supply. Calculate line current and reactive power, apparent power and power absorbed.	8	2	3	1.3.

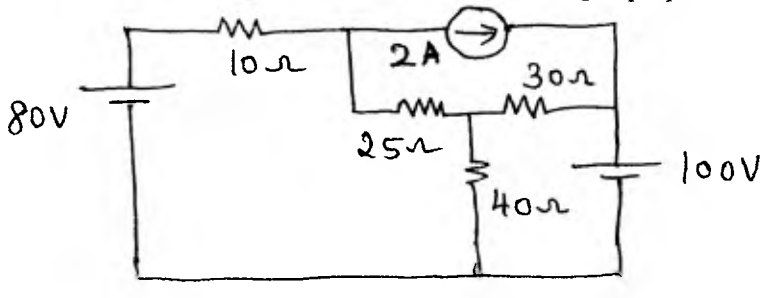
Q3.a.	Explain the working principle of single phase transformer and list the losses for the same.	5	3	2	2.4. 1.3.
b	Find current through 5 ohm resistor by nodal analysis.	7	1	3	



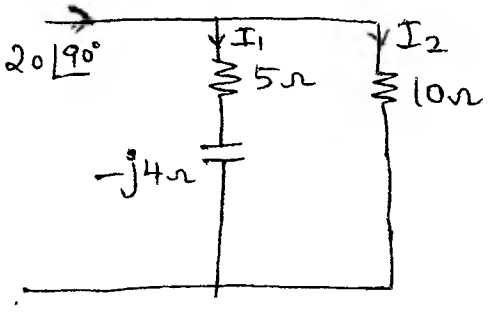
c	A choke coil is connected in series with a fixed resistor .A 230V,50Hz supply is applied and a current of 2.5A flows. If the voltage drops across the coil and fixed resistor are 140V and 150V respectively ,calculate the value of the fixed resistance, resistance and inductance of the coil and power drawn by the coil.	8	2	3	2.4. 1.3.
Q4.a.	Derive the relation between line current and phase current, line voltage and phase voltage in a delta connected three phase system with neat circuit and phasor diagrams.	8	2	2	2.4. 1.3.
4b.	Three identical coils each having a resistance of 10 ohms and reactance of 30ohms are connected in star to a three phase line of 440v,50Hz supply.Calculate i) line current ,phase current, ii) active ,reactive and apparent power. iii) readings on each wattmeter connected to measure power.	8	2	3	1.3.
4c.	Convert the given circuit into single current source in parallel with a single resistance between A and B.	4	1	3	2.4. 1.3.



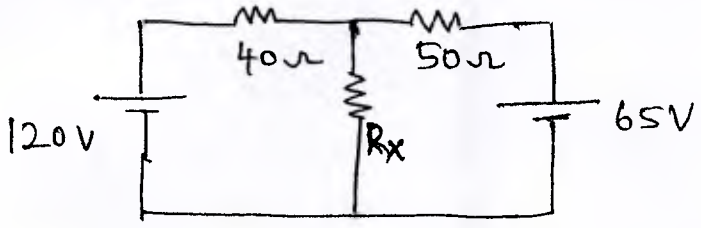
Q5a	Find current through the 25 ohm resistor using superposition theorem.	8	1	3	2.4. 1.3.



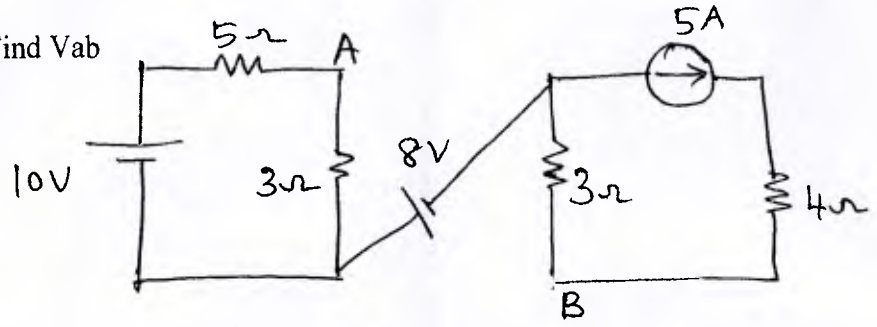
5b.	Find the currents I1 and I2.	8	2	3	2.4. 1.3.



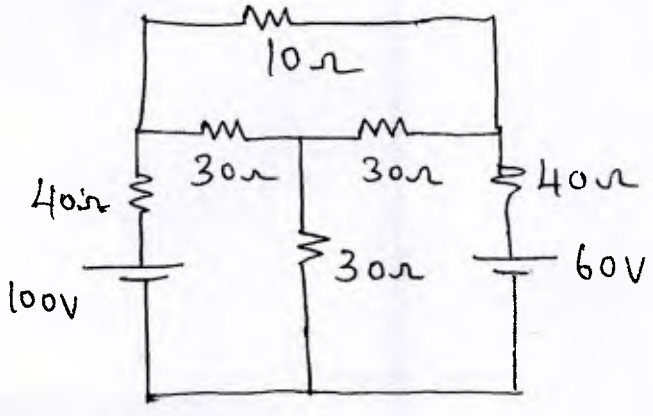
5c	Derive the emf equation of a single phase transformer.	4	3	2	
Q6a.	A 5 kVA ,1000v/200v,50Hz ,single phase transformer gave following results OC test(HV) 1000v 0.24A 90W SC test (HV) 50V 5A 110W Calculate the circuit parameters and draw the equivalent circuit.	8	3	3	2.4. 1.3.
6b.	Obtain Norton's equivalent for given circuit. Across Rx.	8	1	3	2.4. 1.3.



6c	Find Vab	4	1	3	



	Answer any two:	20			2.4. 1.3.
Q7a	Explain two types of single phase induction motors with neat circuit and phasor diagrams.		3	2	
7b.	Explain working principle of a dc motor. With neat diagram explain the main parts of a dc machine. Mention the function of each part.		3	2	
7c	Explain Two wattmeter method of power measurement with neat circuit and phasor diagrams.		3	2	
7d	Find current through 10ohm resistor by Thevenin's theorem..		1	1	



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SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)Munshi Nagar, Andheri (W) Mumbai – 400058

16/4/22

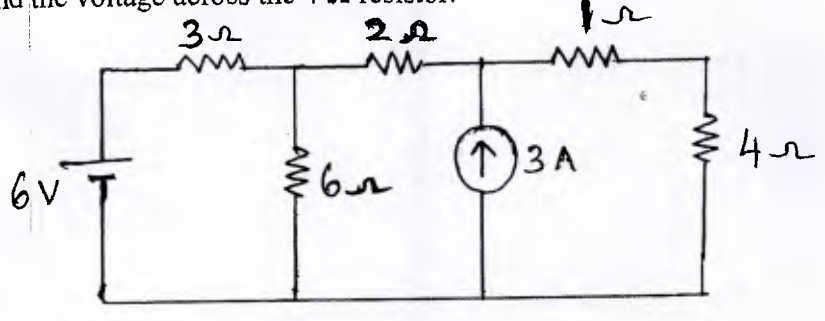
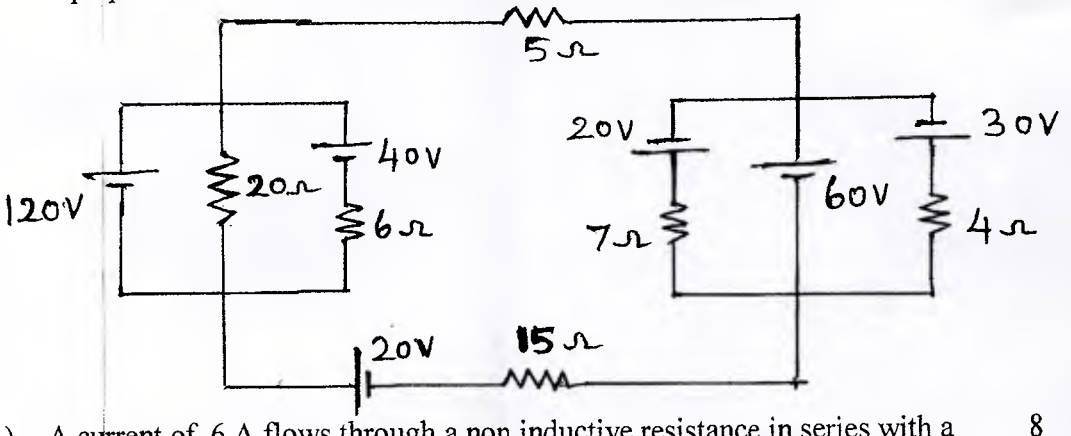
End Semester – APRIL 2022 Examination F.Y. B.Tech (CM, E) Sem I

Program: FY(C/M/E) **Duration:3 hours**

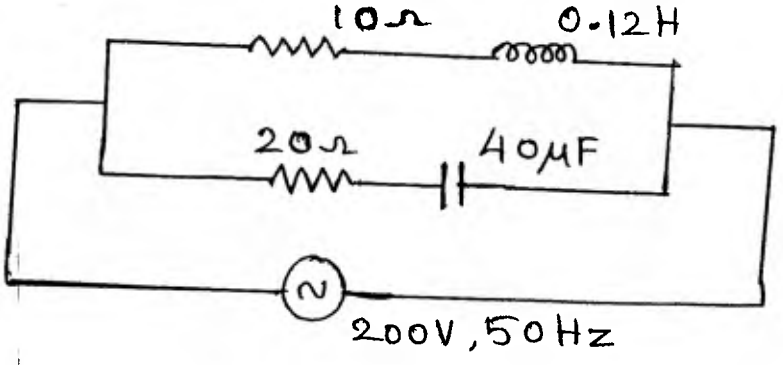
Course Code: ES-BT102 **Maximum Points:100**

Course Name:BEE-I Basic Elect. **Semester:I**

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figures to the right indicates full marks.

Q.No	Questions	Points	CO	BL	PI
Q1 (a)	Find the voltage across the 4 Ω resistor. 	8	1	3	2.4.1
(b)	For the given circuit ,find the current through 5Ω resistance by using superposition theorem. Verify the same using Thevenin's theorem. 	12	1	3	2.4.1
Q2.(a-)	A current of 6 A flows through a non inductive resistance in series with a coil when supplied at 230 V,50 Hz. If the voltage across the resistance is 120 V and across the coil is 180 V. Determine the total power dissipated in the circuit.	8	2	3	2.4.1
Q2.(b)	Draw and explain the phasor diagram of a single phase transformer for the inductive load.	6	3	2	2.4.1

Q2.(c) For the circuit shown below, find the supply current, current in each branch and total power factor. 6 1 3 2.4.1



Q3(a) Explain with the help of a neat diagram how three phase active and reactive power can be measured using two wattmeter method for a balanced star connected inductive load. Draw the phasor diagram for the same and also derive the expression for the power factor. 10 2 2 2.4.1

Q3(b) The readings when open circuit and short circuits tests are conducted on a 4 KVA, 200/400 V ,50 Hz, single phase transformer are given below. Find the equivalent circuit parameters and draw the equivalent circuit referred to primary. 10 3 3 2.4.1

O.C. test (LV side)	200V	0.7 A	70W
SC test (HV side)	15V	10A	85W

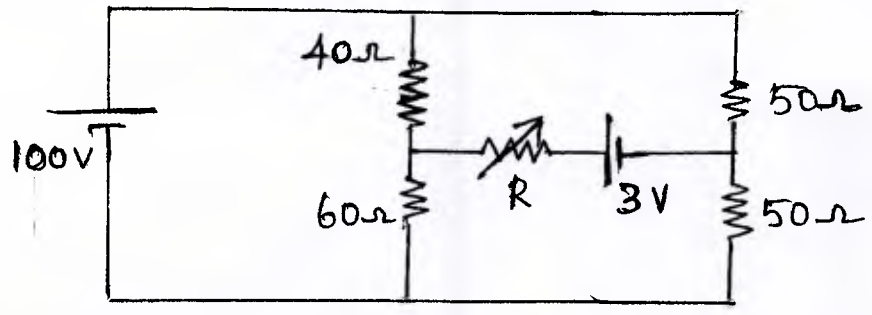
Q4. (a) Three similar coils A,B and C are available. Each coil has a 9Ω resistance and a 12Ω reactance. They are connected in delta to a three phase 440V,50 Hz supply. Calculate for this load, the (i)phase current,(ii) line current,(iii) power factor,(iv) total KVA ,(v) active power and (vi)reactive power. If these coils are connected in star across the same supply, calculate all the above quantities. 12 2 3 2.4.1

Q4.(b) A 50 KVA, single phase transformer has load cycle for a day as follows: 8 3 3 2.4.1

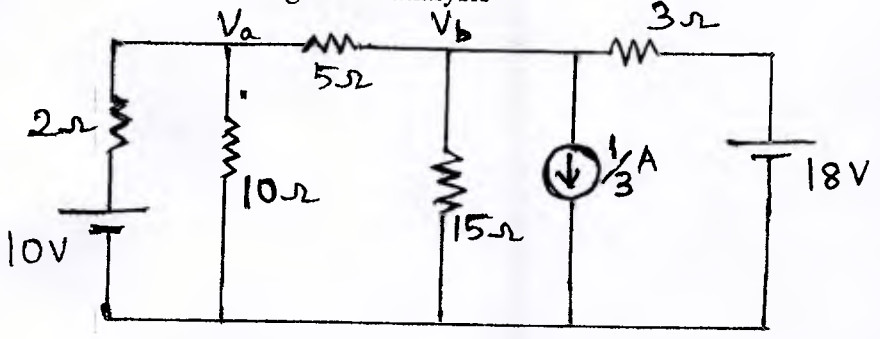
50 KVA at 0.8 pf	10 hours
25 KVA at 0.6 pf	10 hours
No load	4 hours

The iron losses is 1000W and full load copper losses 1200W.Caculate all day efficiency.

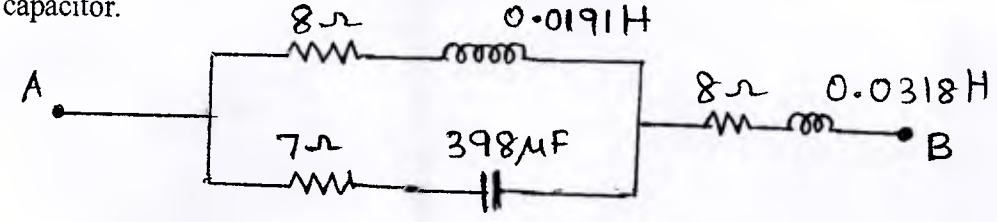
Q5.(a)	Determine the value of R for maximum power transfer. Also find the magnitude of the maximum power transferred for the given circuit.	10	1	3	2.4.1



Q5(b)	Three coils each with a resistance of 10 Ω and reactance of 10 Ω are connected in star across a three phase 50 Hz,400V supply. Calculate (i) line current (ii) readings on the two wattmeters connected to measure the power.	10	2	3	2.4.1
Q6.(a)	Find Va and Vb using Nodal analysis	6	1	3	2.4.1



Q6.(b)	In the circuit shown below,determine what voltage having frequency of 50 Hz must be applied across AB in order that a current of 10 A may flow in the capacitor.	6	2	3	2.4.1



Q6(c)	Derive the relation between the line parameters and phase parameters in delta connected balanced system with the help of a neat phasor diagrams.	8	2	2	2.4.1
Q7(A)	Write short notes on any two(2*10) (i) Construction and working principle of d.c. motors. (ii) Types of single phase induction motors. (iii) Working principle and emf equation of single phase transformer.	20	3	2	2.4.1

13/4/2022

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End-Sem-I Exam

April. 2022

F.Y. B.Tech (C,M,E) Sem I

Max. Marks: **100 marks** Duration: **180 Min**

Class: F.Y B.TECH C/M/E Semester: **I** Program: F.Y.B.Tech

Name of the Course: **Engineering Chemistry –I** Course Code :BS- BT-106

Instructions:

1 Question **No** (Q6) is compulsory
2 Attempt any 4 from Q1,Q2,Q3, Q4, Q5

Que. No	Questions	Points	CO	BL	PI
Q1					
a	Explain different types of water	**5**	1	2	2.2.3
b	Write note on hardness of water with its different type	**5**	1	1	1.2.1
c	Explain the ion-exchange method with suitable chemical reactions. Write regeneration reaction of cation ion and anion exchange resin with its applications	**10**	1	2	2.2.3
Q2					
a	Write a short note on the acid value of lubricant with its significance	**5**	4	1	1.2.1
b	Define lubricant? explain the important function of lubricant	**5**	4	1	1.3.1
c	Why solid lubricants are important? Explain solid, semisolid, and liquid lubricants	**10**	4	2	2.2.4
Q3					
a	Explain the reverse-osmosis method for removal of hardness	**5**	3	2	2.2.3
b	Write short note on zeolite process	**5**	3	1	1.2.1
c	Describe Gas chromatography for determination of the unknown volatile constituent	**10**	2	2	2.2.4
Q4					
a	Explain the COD of water with a chemical reaction	**5**	1	2	2.2.3
b	Write a short note on the generation of hydrogen from water	**5**	1		1.2.1
c	Explain saponification value with chemical reaction and its	**10**	4	2	2.2.3

	significance? Find out saponification value of 3.5 mL oil sample was saponified using 0.5 N KOH solutions. The sample required 24 mL 0.5 N HCl. The blank titration reading was found 44 mL. (Density of oil 0.95g/mL).				
Q5					
a	Explain nanowire and nanocones with their applications	**5**	5	2	2.2.3
b	Write applications of nanomaterials in a different field	**5**	5	1	1.2.1
c	Explain properties affected by nanomaterials	**10**	5	2	2.2.3
Q6					
a	Convert the unit	**5**	1	2	2.1.3
b	Calculate the temporary, permanent, and total hardness of the water sample contain $Mg(HCO_3)_2$=40mg/L, $CaSO_4$= 40mg/L $CaCl_2$= 20mg/L	**5**	1	3	3.2.1
c	50 mL standard hard water containing 1.0mg/mL CaCO3 consumed 50 mL of EDTA. 100 mL of unknown hard water sample consumed 25 ml of EDTA using EBT as indicator. After boiling, filtration of same hard water(100mL) consumed 5 mL of EDTA using EBT as indicator Calculate total, permanent and temporary hardness of water	**5**	1	3	3.2.1
d	A 100 ml of a sewage water sample was reflexed with 10 ml of 0.25N K2Cr2O7in presence of dilute H_2SO_4 And Hg_2SO4. The Unreacted dichromate required 5.2 mL of 0.1N Ferrous Ammonium sulphate solution.10ml of $K2Cr_2O_7$ and 50ml of distilled water under same condition as the sample required 20.2 ml of 0.1N ferrous ammonium sulphate solution. Calculate the COD of sample	**5**	1	3	3.2.1

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SARDAR PATEL COLLEGE OF ENGINEERING
(An Autonomous Institution Affiliated to University of Mumbai)

End Semester Examination for F.Y.B Tech (Civil/Mechanical/Electrical)

Batch: 2021-22

F.Y. B.Tech (C,M,E) Sem I 20/4/22

CLASS/SEM : **F.Y.B Tech (C/M/E) Sem.-I** DURATION: **3 Hrs**

COURSE NAME : **ENGINEERING PHYSICS-I** MAX. MARK: **100**

COURSE CODE: **BSBT105**

- **Question No 1 is compulsory.**
- **Answer any FOUR out of remaining SIX questions.**
- **Marks are given against the questions.**
- **Diagrams have to be drawn wherever necessary.**
- **Assume suitable data (if necessary) and state your assumption/s clearly.**
- **Answers to the sub questions of the same question should be grouped together and written.**
- **Marks will be given on the basis of what will be written in the paper irrespective of your intentions! GOOD LUCK!**

		MN	CO	BL	PI
Q1.	**(4 marks) for a to e**				
a.	Ultraviolet light of wavelength 350nm and intensity $1 W/m^2$ is directed at a potassium surface. Find the maximum kinetic energy of the photoelectrons. Given that the work function of potassium is 2.2eV.	1	1	2	1.2.1
b.	Derive uncertainty relation for energy and time from position and momentum uncertainty expression.	2	1	2	1.1.1 1.2.1
c.	Deduce energy values for a free quantum mechanical particle moving along positive X-direction and hence sketch a graph for the same.	3	2	1	1.1.1 1.2.1
d.	Draw the following planes in a cubic unit cell (i)(320) (ii) (103)	4	3	1	1.1.1 1.2.1
e.	Calculate resistivity of copper if number of electrons per unit volume is $10.41 \times 10^{28}/m^3$ and mobility of electrons is $0.003 m^2/V\text{-}s$.	5	4	1	1.2.1
Q2.					
a.	**(8 marks)** Explain Compton effect and hence derive an expression for Compton wavelength.	1	1	3	1.1.1 1.2.1
b.	**(8 marks)** Explain Heisenberg's uncertainty principle (only mathematically) of position and momentum using wave group. The speed of an electron is measured to be $5 \times 10^3 m/s$ to an accuracy of 0.003%. Find the value of Planck's constant given that the uncertainty in position is $3.8 \times 10^{-4} m$.	2	1	2	1.1.1 1.2.1
c.	**(4 marks)** Sodium crystalizes in a cubic structure. The edge of the unit cell is $4.3 A^\circ$. The density of sodium is 963 kg/m^3 and its atomic weight is 23. What type of unit cell does sodium belong to?	4	3	1	1.1.1 1.2.1
Q3.					
a.	**(8 marks)** Explain de-Broglie's hypothesis using Davisson Germer experiment. (Explain both mathematically and physically)	2	1	2	1.1.1
b.	**(8 marks)** Arrive at Schrodinger's one dimensional time dependent equation and reduce it to time independent form.	3	2	1	1.1.1
c.	**(4 marks)** An electric field of 150 V/m is applied to a sample of an p-type	5	4	2	1.1.1

	semiconductor whose Hall coefficient is 0.0625 m^3/C. Determine the current density in the sample assuming $\mu=0.40m^2/V\text{-}s$.				1.2.1
Q4.					
a.	**(8 marks)** Using Schrödinger's equation, obtain for a particle in a box of infinite height having a width L. Also obtain its Eigen functions (wave functions) and Eigen values (Energy values).	3	2	2	1.1.1 1.2.1
b.	**(8marks)** Draw HCP structure and explain the following: (i)Average number of atoms in a unit cell, (ii) Atomic Packing Factor. Also derive its c/a ratio.	4	3	1	1.1.1
c.	**(4 marks)** Calculate the de-Broglie wavelength of an automobile of mass $2x10^3kg$, which is moving with a speed 96km/hr and that of a proton moving with a speed of $2x10^8$ m/s. Verify the results and write proper inference for the same.	2	1	2	1.1.1 1.2.1
Q5.					
a.	**(8 marks)** Sketch and derive inter planar spacing of the planes which have the highest planar atomic densities in BCC structure. A sample of BCC iron was placed in an X-ray diffractometer using incoming X-rays with a wavelength of 0.1541 nm. Diffraction from the above panes was obtained at $2\theta=44.704^\circ$ for the first order. Calculate the value for lattice constant of BCC iron.	4	3	2	1.1.1 1.2.1
b.	**(8 marks)** Explain process of Hall effect and hence derive a relation for the Hall coefficient also mention units of the same.	5	4	2	1.1.1 1.2.1
c.	**(4 marks)** Evaluate the second energy level of an electron enclosed in a box of width $10A^\circ$. Compare it with those of glass marble of mass 1gm, contained in a box of width 30cm. Can these levels of marble be measured experimentally?	2	1	1	1.2.1
Q6.					
a.	**(8 marks)** Explain Fermi level with variation of temperature in an N-type semiconductor. In a solid, there is an energy level lying 0.02eV below the Fermi level. What is the probability of this level being not occupied by electrons at room temperature?	5	4	3 , 2	1.1.1 1.2.1
b.	**(8 marks)** Explain the formation of continuous and characteristic X-rays and sketch the spectra. What voltage must be applied to an X-ray tube for it to emit X-rays with a minimum wavelength of 30pm?	1	1	1	1.1.1 1.2.1
c.	**(4 marks)** The energy of an electron constrained to move in a one dimensional box of width $4A^\circ$ is $9.664x10^{-17}J$. Find out the order of excited state and the momentum of the electron in that state.	3	2	2	1.2.1
Q7.					
a.	**(8 marks)** Define Fermi level in a solid. Show that Fermi level lies at the mid of the forbidden gap for an intrinsic semiconductor.	5	4	2	1.1.1
b.	**(8 marks)** Using Heisenberg's uncertainty principle, prove that an electron cannot be a nucleon. An electron has a speed of 600m/s with an accuracy of 0.065%. Calculate the uncertainty with which we can locate the position of the electron.	2	1	2	1.1.1 1.2.1
c.	**(4 marks)** X-rays of unknown wavelength are diffracted from a gold sample. The 2θ angle was 64.582° for the (220) planes for the first order diffraction. What is the wavelength of the X-rays used? Given: lattice constant of gold = 0.408 nm.	4,1	3,1	2	1.1.1 1.2.1

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F. Y. B. Tech (C/M/E) Jun I

Re Examination for F.Y.B Tech (Civil/Mechanical/Electrical) 15/6/22

Batch: 2021-22

ExamDate:**15th June2022** TotalMarks:**100**

Duration: **3 Hrs**

CLASS/SEM : **F.Y.B Tech (C/M/E) Sem.-I** COURSE NAME : **ENGINEERING PHYSICS-I**

COURSE CODE: **BSBT105**

- **Question No 1 is compulsory.**
- **Answer any FOUR out of remaining SIX questions.**
- **Figures to the right indicate Module Number, Course Outcome number, Bloom's Level and Performance Indicator.**
- **Diagrams have to be drawn wherever necessary.**
- **Assume suitable data (if necessary) and state your assumption/s clearly.**
- **Marks will be given on the basis of what will be written in the paper irrespective of your intentions!**

Good luck!

		MN	CO	BL	PI
Q1.	**(4 marks) for a to e**				
a.	Explain photoelectric effect in short.	1	1	1	1.2.1
b.	The uncertainty in the location of a particle is equal to its de Broglie wavelength. Calculate the uncertainty in momentum	2	1	2	1.1.1 1.2.1
c.	Compute the energies of lowest two energy states for an electron in a square well of width 3A°.	3	2	1	1.1.1 1.2.1
d.	Derive an expression for interplanar spacing in crystal structures.	4	3	1	1.1.1
e.	Find resistivity of intrinsic germanium at 300K. Given that density of carriers is $2.5 \times 10^{19}/m^3$, mobility of electrons is $0.398 m^2/V\text{-}s$ and mobility of holes is $0.19 m^2/V\text{-}s$.	5	4	1	1.2.1
Q2.					
a.	**(8 marks)** Derive Bragg's equation for X ray diffraction. A sample of BCC iron was placed in an X-ray diffractometer using incoming X-rays with a wavelength of 0.1541 nm. Diffraction from the above planes was obtained at $2\theta = 44.704°$ for the first order. Calculate the value for lattice constant of BCC iron.	1,4	1	1	1.1.1 1.2.1
b.	**(8 marks)** State and explain Heisenberg's uncertainty principle of position and momentum using single slit diffraction experiment. The velocity of a proton in an accelerator is known to an accuracy of 0.250% of the speed of light. (This could be small compared with its velocity.) What is the smallest possible uncertainty in its position? (Neglect relativistic effects!)	2	1	2	1.1.1 1.2.1
c.	**(4 marks)** Calculate planar atomic density of (111) in SC structure. Given that the lattice constant is 3 A°.	4	3	1	1.1.1 1.2.1
Q3.					
a.	**(8 marks)** Explain de Broglie's hypothesis and hence derive an	2	1	1	1.1.1

	expression for de Broglie wavelength.				
b.	**(8 marks)** Arrive at Schrodinger's one dimensional time independent equation from its time dependent form.	3	2	1	1.1.1
c.	**(4 marks** Calculate the current produced in a small germanium plate of area 1.5cm^2 and of thickness 0.35mm, when a potential difference of 1.5V is applied across the faces. Given concentration of free electrons in germanium is 2x10^{19}/m^3. The mobility of electrons is 0.36m^2/V-s and of holes is 0.17m^2/V-s.	5	4	3	1.1.1 1.2.1
Q4.					
a.	**(8 marks)** Using Shrödinger's equation, obtain for a particle in a box, its Eigen functions and Eigen values.	3	2	2	1.1.1 1.2.1
b.	**(8 marks)** Explain using unit cell properties, HCP structure in detail. Also derive the c/a ratio for the same.	4	3	1	1.1.1
c.	**(4 marks)** Calculate the de-Broglie wavelength associated with a proton moving with velocity equal to 1/18th the speed of light.	1	1	3	1.1.1 1.2.1
Q5.					
a.	**(8 marks)** Sketch the important plane orientations in FCC structure and hence mention their interplanar spacing ratios and planar atomic densities.	4	3	2	1.1.1 1.2.1
b.	**(8 marks)** Explain Hall Effect and hence obtain relation for Hall voltage and Hall coefficient in terms of current and magnetic field.	5	4	2	1.1.1 1.2.1
c.	**(4 marks)** An electron is bound by a potential which closely approaches an infinite square well potential of width 2.5x10^{-10}m. Calculate the lowest permissible quantum energy that the electron can have.	2	1	1	1.2.1
Q6.					
a.	**(8 marks)** Define Fermi energy and hence prove that it lies in midway of the forbidden gap in an intrinsic semiconductor.	5	4	3	1.1.1 1.2.1
b.	**(8 marks)** Explain Compton scattering and hence derive an expression for maximum wavelength of scattered photons.	1	1	1	1.1.1 1.2.1
c.	**(4 marks)** Find the least energy of an electron moving in a one dimension in an infinitely high potential box of width 1A.	3	2	2	1.2.1
Q7.					
a.	**(8 marks)** Give an expression for Fermi function and hence define Fermi energy level; also plot Fermi distribution curve.	5	4	2	1.1.1
b.	**(8 marks)** Explain concept of a wavegroup and hence derive Heisenberg's uncertainty principle using this concept. An electron and a 150 gm baseball are traveling at 220 m/s measured to an accuracy of 0.065%. Calculate the uncertainty in position of each of the bodies. Compare the two values and comment.	2	1	2	1.1.1 1.2.1
c.	**(4 marks)** The X - rays of wavelength 154.2 pm produce reflections from the (111) plane of Cu which has FCC structure and density of 8.935 g /cm^3. Given that the lattice constant of Cu is 3.602A°. Evaluate the diffraction angle corresponding to the first order reflection from this plane.	4,1	1	3	1.1.1 1.2.1

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End-Sem-I Re-Exam

June 2022

F.Y. B.Tech (C/M/E) Sem I

Max. Marks: **100 marks** Duration: **180 Min**

Class: F.Y B.TECH **C/M/E** Semester: **I** Program: F.Y.B.Tech

Name of the Course: **Engineering Chemistry –I** Course Code : BS- BT-106

14/6/22

Instructions:

1 Question **No** (Q6) is compulsory

2 Attempt any 4 from Q1,Q2,Q3, Q4, Q5

Que. No	Question	Points	CO	BL	PI
Q1					
a	Explain different units of hardness	**5**	1	2	2.2.3
b	Write difference between Hard water and soft water	**5**	1	1	1.2.1
c	Explain why regeneration of cation and anion required with suitable chemical reaction. Write advantages and disadvantages of ion Exchange method.	**10**	1	2	2.2.3
Q2					
a	Write short note on cloud point and pour of lubricant with significance	**5**	4	1	1.2.1
b	Define lubricant? Explain flash point and fire point with significance	**5**	4	1	1.3.1
c	Explain different types of lubricant with suitable example	**10**	4	2	2.2.4
Q3					
a	Explain BOD method for detection of organic matter content with chemical reaction	**5**	3	2	2.2.3
b	Write short note on reverse-Osmosis	**5**	3	1	1.2.1
c	Describe Zeolite process for removal of metal cation ions from hard water with exchange reactions, regeneration reactions, advantages and disadvantages	**10**	3	2	2.2.4
Q4					
a	Explain EDTA method for detection of metal cations	**5**	1	2	2.2.3
b	Write difference between BOD and COD	**5**	1		1.2.1

c	Explain flash point and fire point with its significa... saponification value of 15 mL oil sample was saponified using ... solution. The sample required 25 mL 0.5 N HCl. The bl... reading was found 35 mL. (Density of oil 0.92g/mL).	**10**	4	2	2.2.3
Q5					
a	Explain different types of carbon nanotube	**5**	5	2	2.2.3
b	Write applications of nanomaterials in different field	**5**	5	1	1.2.1
c	Explain the properties affected by nano-materials	**10**	5	2	2.2.3
Q6					
a	Convert the unit 100PPM in to ^{0}Fr, ^{0}Cl, mg/L 50 ^{0}Cl in to ^{0}Fr , ppm, mg/L	**5**	1	2	2.1.3
b	Calculate the temporary , permanent and total hardness for water sample contain $Mg(HCO_3)_2$=20mg/L, $Ca(HCO_3)_2$ =20 mg/L, $CaSO_4$= 10mg/L	**5**	1	3	3.2.1
c	50 mL standard hard water containing 1.0 mg/mL CaCO3 consumed 25 mL of EDTA. 50mL of unknown hard water sample consumed 20 ml of EDTA using EBT as indicator. After boiling, filtration of same hard water(50 mL) consumed 10 mL of EDTA using EBT as indicator Calculate total, permanent and temporary hardness of water	**5**	1	3	3.2.1
d	A 50 ml of a sewage water sample was reflexed with 20 ml of 0.25N K2Cr2O7in presence of dilute H_2SO_4 And Hg_2SO4. The Unreacted dichromate required 10mL of 0.1N Ferrous Ammonium sulphate solution.10ml of $K2Cr_2O_7$ and 50ml of distilled water under same condition as the sample required 20ml of 0.1N ferrous ammonium sulphate solution. Calculate the COD of Sample	**5**	1	3	3.2.1

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18/4/22

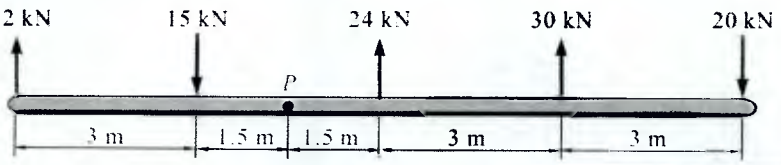
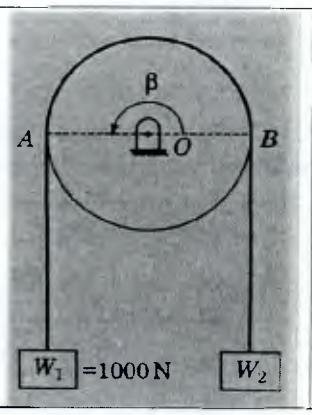
END SEMESTER EXAMINATION APRIL 2022

Program: F.Y. B.Tech. (C/E/M) Sem I — **Duration: 3 Hrs.**

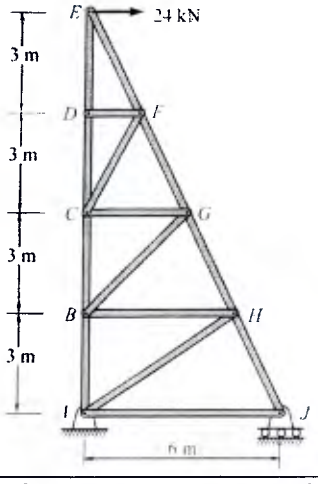
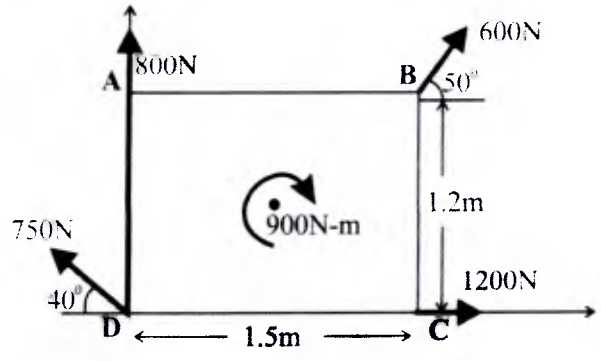
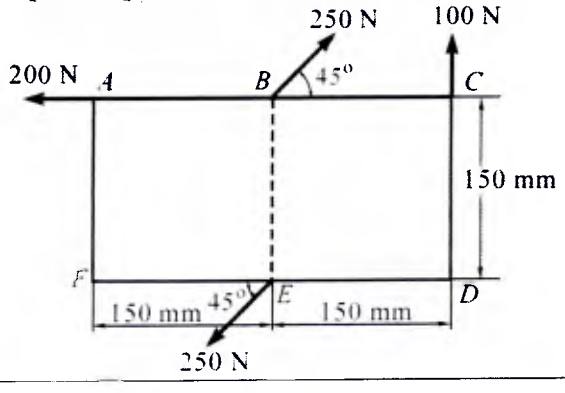
Course Code: ES-BT104 — **Maximum Points: 100**

Course Name: Engineering Mechanics-I — **Semester: 1**

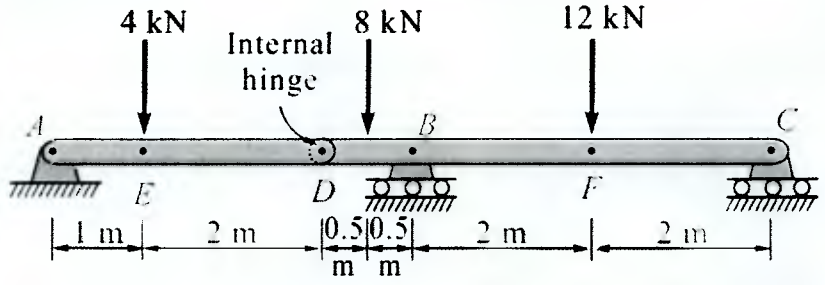
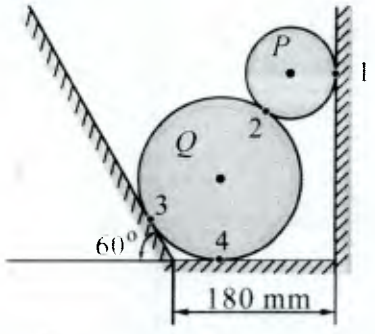
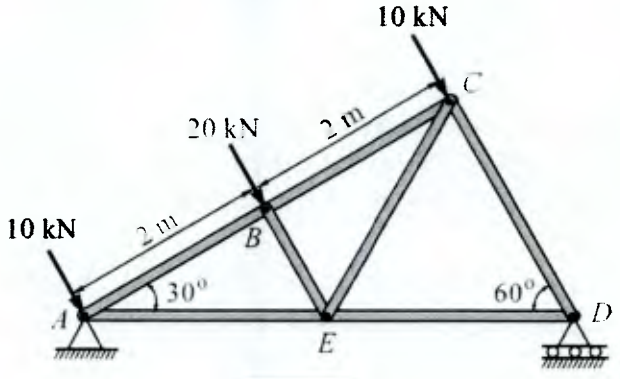
Notes: 1) Attempt **any FIVE** questions out of SEVEN questions.
2) Assume suitable data wherever required and state it clearly.
3) Answers to all the sub questions should be grouped together.

Q. No.	Questions	Points	CO	BL	PI
Q.1.a)	Explain different types of truss with example.	6	CO3	L2	1.3.1
b)	The parallel force system of five forces of 12 kN, 15 kN, 24 kN, 30 kN and 20 kN is shown in the Figure. Reduce it to a force and a couple at point P. 	6	CO1	L1, L2	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3
c)	A belt supports two weights W_1 and W_2 over a pulley as shown in Figure. If W_1 = 1000 N, find the minimum weight W_2 to keep W_1 in equilibrium. Assume that the pulley is locked and $\mu = 0.25$. 	6	CO2	L1, L2, L3	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3

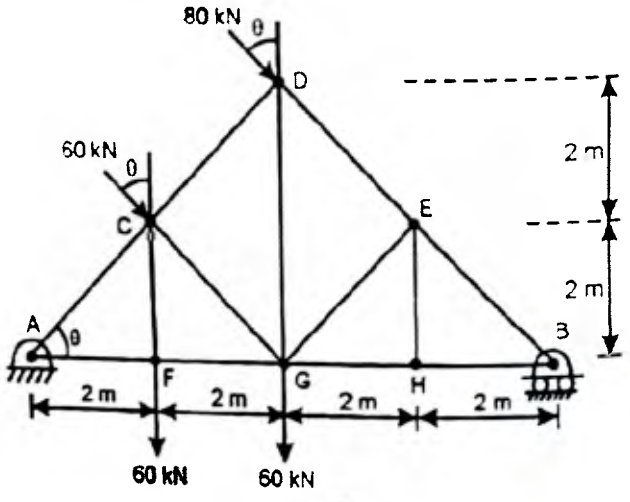
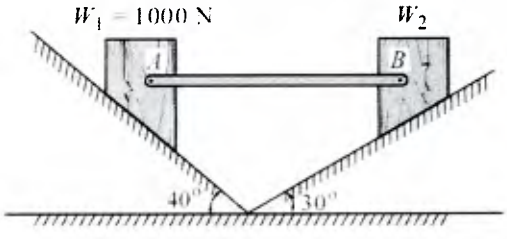
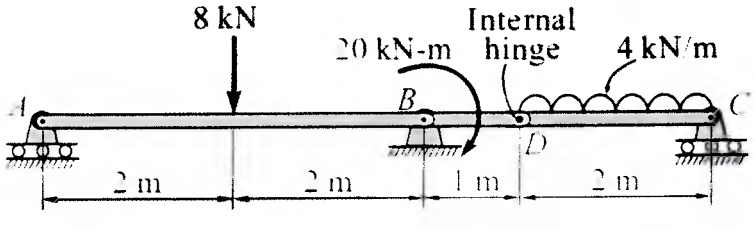
END SEMESTER EXAMINATION APRIL 2022

d)	Find all the zero-force members in the truss shown below. 	2	CO3	L1	1.3.1
Q.2.a)	Find the resultant of the force system acting on the rectangular plate shown in Figure. Also find the point where the resultant will cut the x- axis and y-axis. 	10	CO1	L1, L2	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3
b)	A 150 x 300 mm plate is subjected to four loads as shown in Figure. Find the resultant of the four loads and the two points at which the line of action of the resultant intersects the edges of the plate, with respect to point C. 	10	CO1	L1, L2	1.3.1 2.1.1 2.1.3 2.2 2.2.3

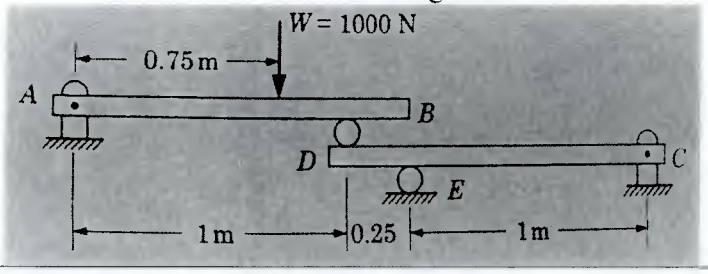
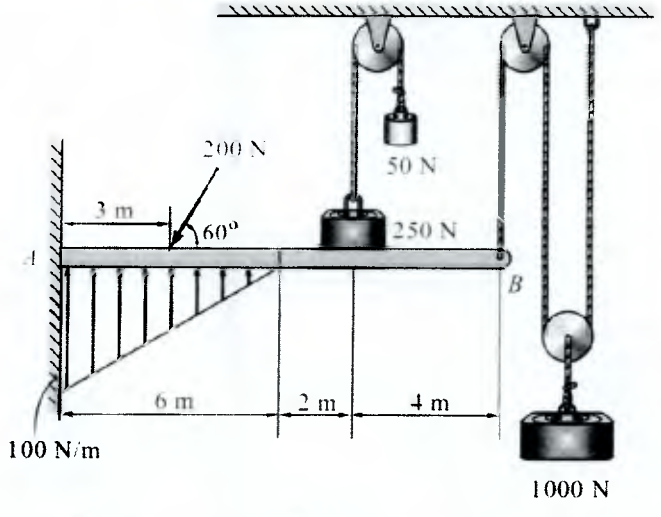
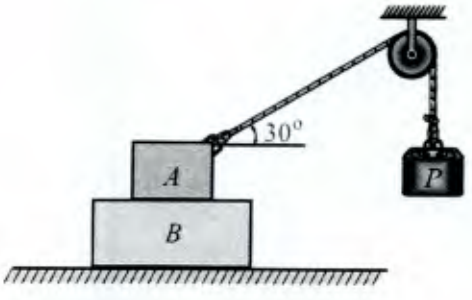
END SEMESTER EXAMINATION APRIL 2022

Q.3.a)	Determine the reactions at all the supports of the beam as shown in the Figure. 	8	CO2	L1, L2, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3
b)	Two cylinders P and Q in a channel as shown in the Figure. The cylinder P has a diameter of 100mm and weight 200 N and Q has 180 mm diameter and weight 500 N. Determine the reaction at all the contact surfaces. 	12	CO2	L1, L2, L3	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3
Q.4.a)	Determine the support reactions and forces in the members AE, EC and BC using method of joints. 	10	CO3	L1, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3
b)	For the roof truss shown, a) Identify zero force members b) Find support reactions c) Find force in CD, CG and GF by method of sections.	10	CO3	L1, L2, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3

END SEMESTER EXAMINATION APRIL 2022

					
Q.5.a)	Two blocks W_1 and W_2 resting on two inclined planes are connected by a horizontal bar AB as shown in Figure. If W_1 equals 1000 N, determine the maximum value of W_2 for which the equilibrium can exist. The angle of limiting friction is 20° at all rubbing faces. 	8	CO2	L1, L2, L3	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3
b)	Two pulleys, one 450 mm diameter and the other 200 mm diameter are mounted on parallel shafts 1.95 m apart. The pulleys are connected by a cross belt. Find the power that can be transmitted by the belt when the larger pulley rotates at 200 rpm and if the maximum permissible tension in the belt is 1 kN. Assume the coefficient of friction between the belt and the pulley to be 0.25. Also determine the initial tension in the belt.	10	CO2	L1, L2, L3	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3
c)	What is angle of repose?	2	CO2	L1	1.3.1
Q.6.a)	Calculate the reactions at the supports A, B and C of the beam loaded as shown in Figure, by the principle of virtual work. 	12	CO4	L1, L2, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3

END SEMESTER EXAMINATION APRIL 2022

b)	Two beams AB and CD are arranged and supported as shown in Figure. By using principle of virtual work, find the reaction R_E if a load W of 1000 N acts as shown in Figure. 	8	CO4	L1, L2, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3
Q.7.a)	State and explain Varignon's theorem.	2	CO2	L2	1.3.1
b)	A beam AB weighing 1000 N is supported as shown in Figure. Assuming all the pulleys to be frictionless, find the support reactions. 	8	CO2	L1, L2, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3 2.3.2
c)	Two blocks A = 100 N and B = 150 N are resting on the ground as shown in Figure. Coefficient of friction between ground and block B is 0.1 and that between block B and A is 0.3. Find the minimum value of weight P in the pan so that motion starts. Find whether B is stationary with respect to ground and A moves OR B is stationary with respect to A. 	10	CO2	L1, L2, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3

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F.Y. B.Tech (C/M/E) Sem I 16/6/22.

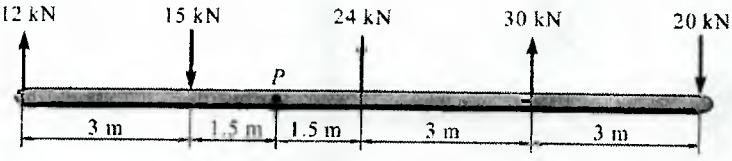
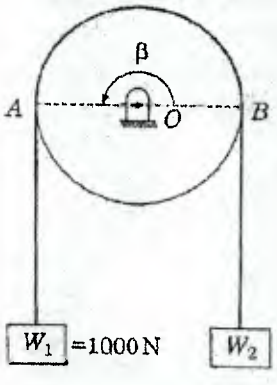
END SEMESTER RE-EXAMINATION JUNE 2022

Program: F.Y. B.Tech. (C/E/M) **Duration: 3 Hrs.**

Course Code: ES-BT104 **Maximum Points: 100**

Course Name: Engineering Mechanics-I **Semester: 1**

Notes: 1) Attempt **any FIVE** questions out of SEVEN questions.
2) **Answers to all the sub questions should be grouped together and in given sequence.**
3) Assume suitable data wherever required and state it clearly.

Q. No.	Questions	Points	CO	BL	PI
Q.1.a)	Explain different types of truss with example.	6	CO3	L2	1.3.1
b)	The parallel force system of five forces of 12 kN, 15 kN, 24 kN, 30 kN and 20 kN is shown in the Figure. Reduce it to a force and a couple at point P. 	6	CO1	L1, L2	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3
c)	A belt supports two weights W_1 and W_2 over a pulley as shown in Figure. If W_1 = 1000 N, find the maximum weight W_2 to keep W_1 in equilibrium. Assume that the pulley is locked and $\mu = 0.25$. 	6	CO2	L1, L2, L3	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3

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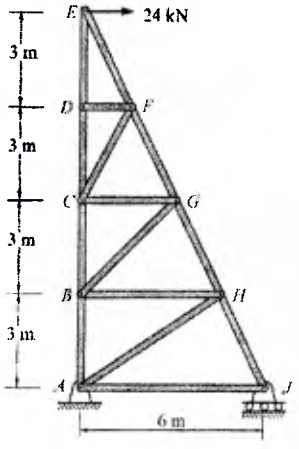
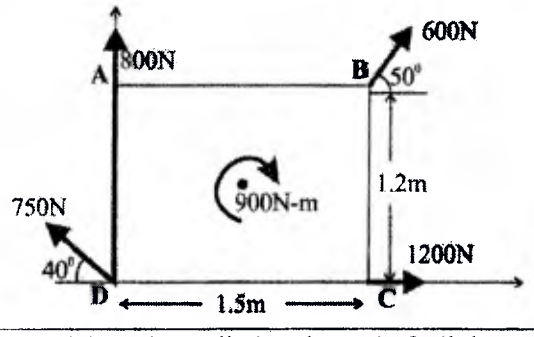
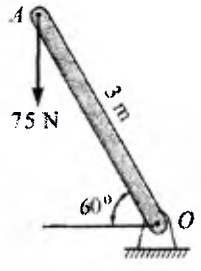
END SEMESTER RE-EXAMINATION JUNE 2022

d)	Find any two zero-force members in the truss shown below. 	2	CO3	L1	1.3.1
Q.2.a)	Find the resultant of the force system acting on the rectangular plate shown in Figure. Also find the distance of the resultant from point D. 	10	CO1	L1, L2	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3
b)	A 75 N vertical force is applied to the end of a link 3 m long, which is attached to a shaft at O as shown in Fig. Determine, i. The moment of the 75 N force about O ii. The smallest force applied at A which creates the same moment about O 	6	CO1	L1, L2	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3

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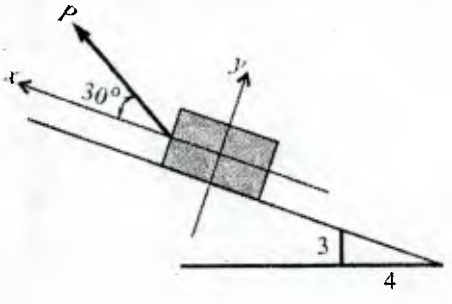
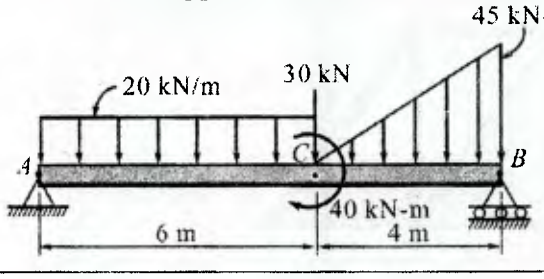
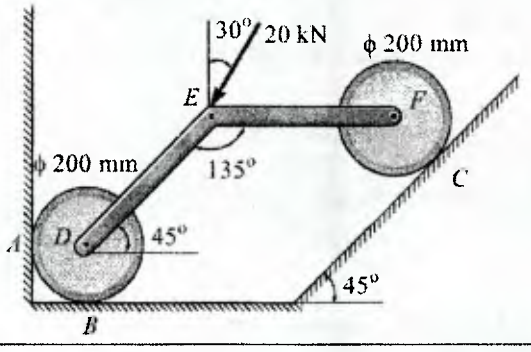
c)	A force P is acting on a block as shown in Fig. If the horizontal rectangular component of P is 40 N acting to the left then find the y component of P. 	4	CO1	L1, L2	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3
Q.3.a)	State and explain Varignon's theorem.	2	CO2	L2	1.3.1
b)	Calculate the support reactions for the beam shown in Figure. 	8	CO2	L1, L2, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3
c)	Find the support reactions at A, B, C for the rigid link DEF supported by the cylinders at D and F. The link is loaded by a single force of 20 kN as shown in the Fig 3. Neglect friction and self-weight of link and cylinders. Take diameters of cylinders as 200 mm and DE = EF = 300 mm. 	10	CO2	L1, L2, L3	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3

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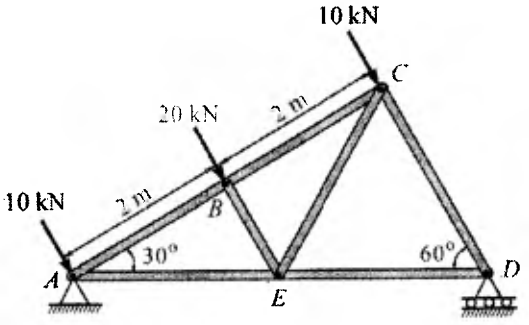
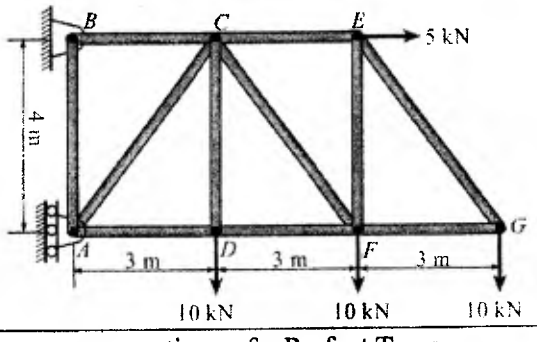
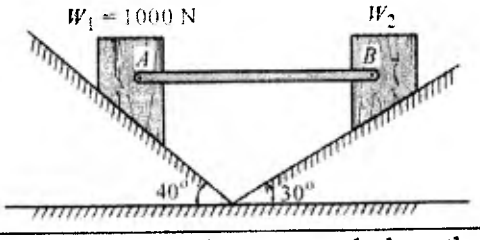
END SEMESTER RE-EXAMINATION JUNE 2022

Q.4.a)	Determine the support reactions and forces in the members AE and BC using method of joints. 	12	CO3	L1, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3
b)	For the truss loaded as shown in Fig, find the force in members CE and CF by method of sections only. 	6	CO3	L1, L2, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3
c)	State any two assumptions of a Perfect Truss.	2	CO3	L2	1.3.1
Q.5.a)	Two blocks W_1 and W_2 resting on two inclined planes are connected by a horizontal bar AB as shown in Figure. If W_1 equals 1000 N, determine the minimum value of W_2 for which the equilibrium can exist. The angle of limiting friction is 20° at all rubbing faces. 	8	CO2	L1, L2, L3	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3
b)	Two pulleys, one 450 mm diameter and the other 200 mm diameter are mounted on parallel shafts 1.95 m apart. The pulleys are connected by a cross belt. Find the power that can be transmitted by the belt when the larger pulley rotates at 200 rpm and if the maximum permissible tension in the belt is 1 kN. Assume the coefficient of friction between the belt and the pulley to be 0.25.	10	CO2	L1, L2, L3	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3

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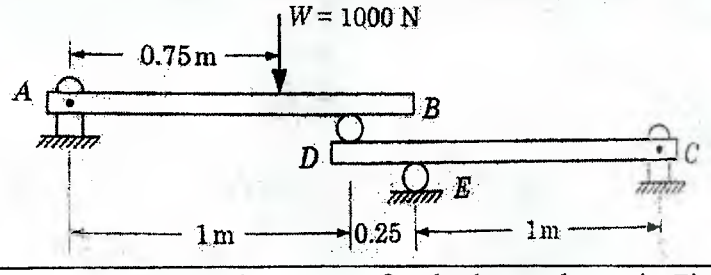
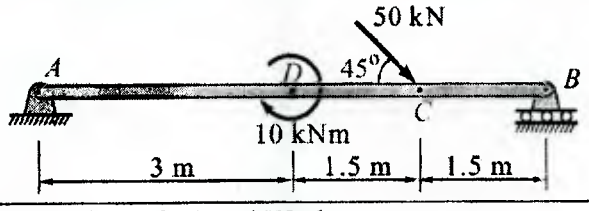
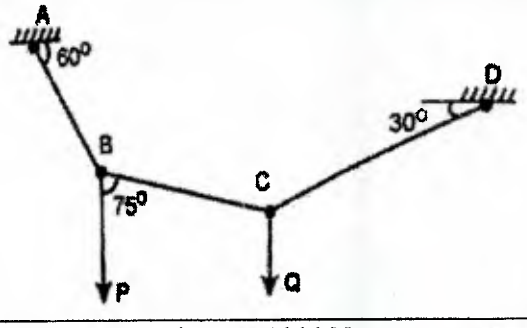
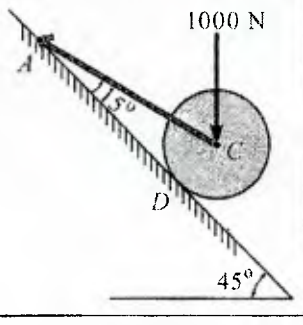
END SEMESTER RE-EXAMINATION JUNE 2022

c)	What is angle of repose?	2	CO2	L1	1.3.1
Q.6.a)	Two beams AB and CD are arranged and supported as shown in Figure. By using principle of virtual work, find the reactions R_D and R_E, if a load W of 1000 N acts as shown in Figure. 	8	CO4	L1, L2, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3
b)	Find the reactions at the support for the beam shown in Fig by principle of virtual work. 	9	CO4	L1, L2, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3
c)	State the principle of Virtual Work.	3	CO4	L2	1.3.1
Q.7.a)	A string ABCD carries two loads P and Q. If P = 50 kN, find force Q and tensions in strings BC and CD as shown in the Fig. 	6	CO2	L1, L2, L3	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3
b)	A roller of weight W = 1000 N rests on a smooth inclined plane. It is kept from rolling down the plane by string AC as shown in the Figure. Find the tension in the string. 	4	CO2	L1, L2, L3	1.3.1 2.1.1 2.1.3 2.2.2 2.2.3

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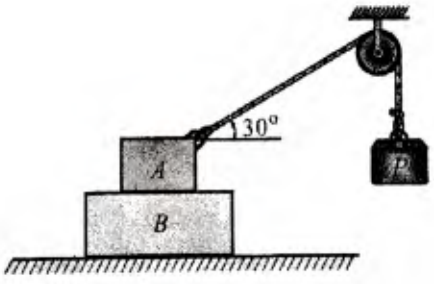
c)	Two blocks A = 100 N and B = 150 N are resting on the ground as shown in Figure. Coefficient of friction between ground and block B is 0.1 and that between block B and A is 0.3. Find the minimum value of weight P in the pan so that motion starts. Find whether B is stationary with respect to ground and A moves OR B is stationary with respect to A. 	10	CO2	L1, L2, L3	1.3.1 1.4.1 2.1.1 2.1.3 2.2.2 2.2.3

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Invigilator Name:	Name:
Signature with date:	Registration Number:

END SEMESTER EXAMINATION APRIL 2022

SET A

22/4/22

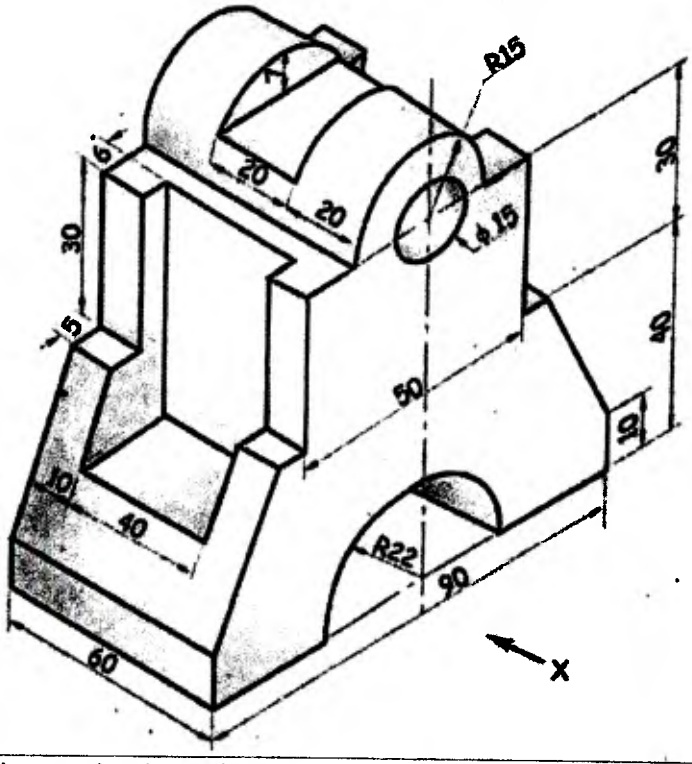
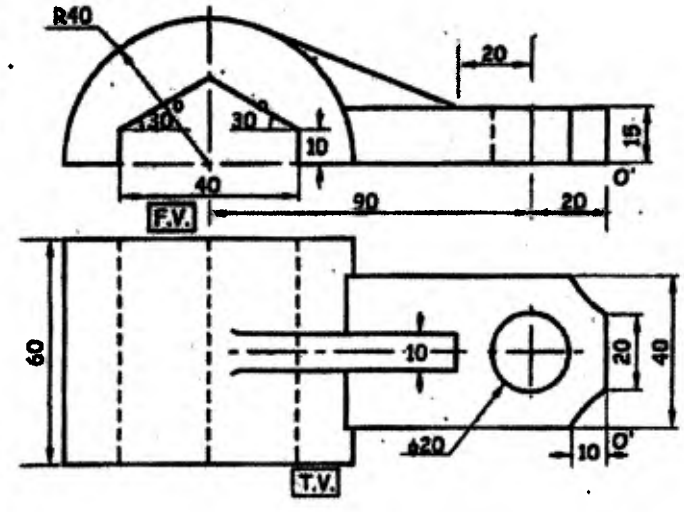
Program: First Year B.Tech Civil Engg Sem I
Course Code: ES-BT103
Course Name: Engineering Graphics

Duration: 03 Hr.
Maximum Points: 100
Semester: I

Notes:

1. Attempt any **FIVE** questions.
2. Assume suitable data wherever necessary and justify the same.
3. Create the folder in the **D drive** to save the drawings.
4. Folder name should be end semester exam (ESE) followed by student's registration number (Ex.: **ESE_C2110058**).
5. File name for respective questions should the question number itself (Ex.: **Q1/Q2**).
6. Each drawing should be **saved separately** mentioning question number as the drawing file name.
7. Q1 and Q2 etc. files must be saved separately in the same folder.
8. Before leaving the examination hall, verify all drawings are uploaded on the **server** as well as on the **classroom**.
9. Save the work frequently.

Q.No.	Questions	Points	CO	BL	PI
1	A ball thrown in air attains 100 m height and covers horizontal distance 150 m on ground. Draw the path of the ball (projectile).	20	1,4	3	5.1.1
2	Line AB 100 mm long is 30^0 and 45^0 inclined to HP & VP respectively. End A is 10 mm above HP and it's VT is 20 mm below HP. Draw projections of the line and it's HT.	20	1,4	3	5.1.1
3	A triangular lamina of 25 mm sides rests on one of its corners on VP such that the median passing through the corner on which it rests is inclined at 30^0 to HP and 45^0 to VP. Draw its projections.	20	2,4	3	5.1.1
4	A cone of base 60 mm diameter and the axis 80 mm long lies on HP with its axis inclined at 45^0 and 30^0 to HP and VP, respectively. Draw the top and front views of the cone.	20	2,4	3	5.1.1

5	Figure shows an isometric drawing of the block. Draw the following views: a) FV looking in X direction b) View from left c) TV 	20	3,4	6	5.1.2
6	Draw the isometric view of the following: 	20	3,4	6	5.1.2
7	A pole is of a shape of half hexagon and semicircle. A string is to be wound having length equal to the pole perimeter draw path of free end P of string when wound completely. (Take hexagon 30 mm sides and semicircle of 60 mm diameter).	20	1	3	5.1.1

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Invigilator Name:	**END SEMESTER EXAMINATION APRIL 2022**	Name:
Signature with date:		Registration Number:

SET B

22/4/22

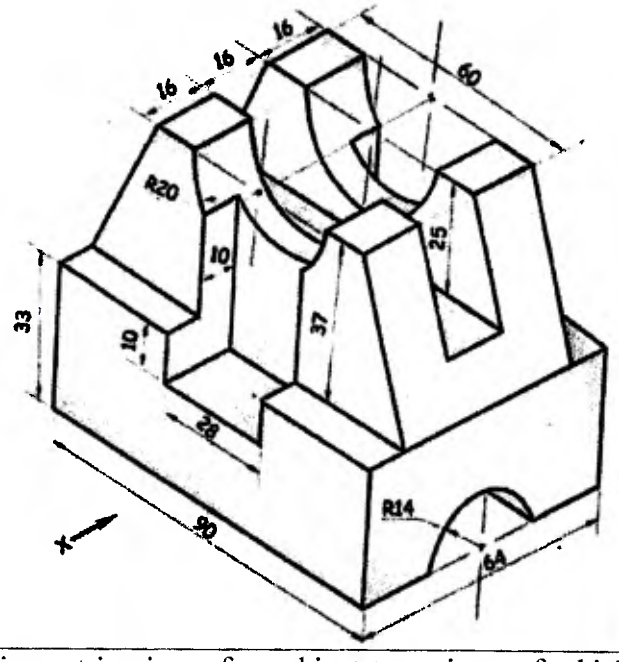
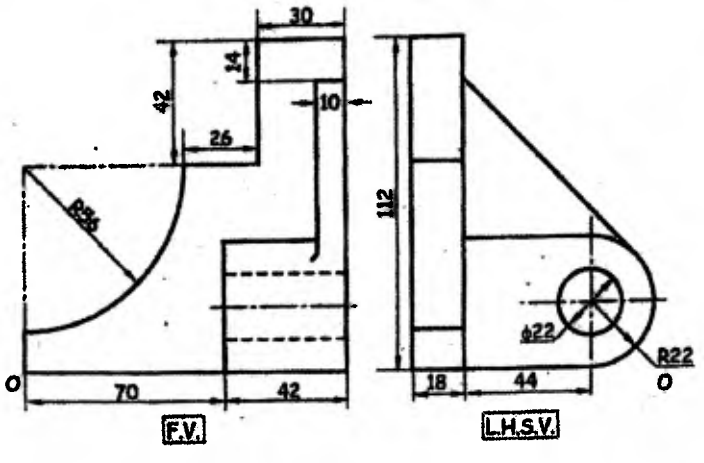
Program: First Year B.Tech Civil Engg Term I
Course Code: ES-BT103
Course Name: Engineering Graphics

Duration: 03 Hr.
Maximum Points: 100
Semester: I

Notes:

1. Attempt any **FIVE** questions.
2. Assume suitable data wherever necessary and justify the same.
3. Create the folder in the **D drive** to save the drawings.
4. Folder name should be end semester exam (ESE) followed by student's registration number (Ex.: **ESE_C2110058**).
5. File name for respective questions should the question number itself (Ex.: **Q1/Q2**).
6. Each drawing should be **saved separately** mentioning question number as the drawing file name.
7. Q1 and Q2 etc. files must be saved separately in the same folder.
8. Before leaving the examination hall, verify all drawings are uploaded on the **server** as well as on the **classroom**.
9. Save the work frequently.

Q.No.	Questions	Points	CO	BL	PI
1	Draw an isosceles triangle of 100 mm long base and 110 mm long altitude. Inscribe a parabola in it by method of tangents.	20	1,4	3	5.1.1
2	The projectors drawn from VT & end A of line AB are 40 mm apart. End A is 15mm above HP and 25 mm in front of VP. VT of line is 20 mm below HP. If line is 75 mm long, draw it's projections, find inclinations with HP & VP.	20	1,4	3	5.1.1
3	A circle of 50 mm diameter is resting on HP on end A of it's diameter AC which is 30^0 inclined to HP while it's TV is 45^0 inclined to VP. Draw it's projections.	20	2,4	3	5.1.1
4	A cube of 30 mm side rests with one of its edges on HP such that one of the square faces containing that edge is inclined at 30^0 to HP and the edge on which it rests being inclined to 60^0 to VP. Draw its projections.	20	2,4	3	5.1.1

5	For the object given in figure draw the following views: a) FV looking in X direction b) RHSV c) TV 	20	3,4	6	5.1.2
6	Draw an isometric view of an object two views of which are as shown in figure. 	20	3,4	6	5.1.2
7	Point P is 80 mm from point O. It starts moving towards O and reaches it in two revolutions around.it Draw locus of point P (To draw a Spiral of TWO convolutions).	20	1	3	5.1.1

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Invigilator Name:	RE EXAMINATION JUNE 2022	Name:
Signature with date:	F.Y. B.Tech (Civil) Sem I	Registration Number:

Program: First Year B.Tech Civil Engg
Course Code: ES-BT103
Course Name: Engineering Graphics

Duration: 03 Hr.
Maximum Points: 100
Semester: I

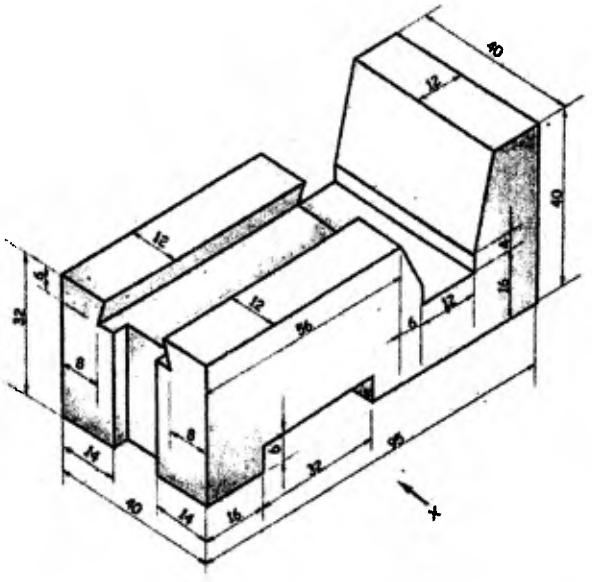
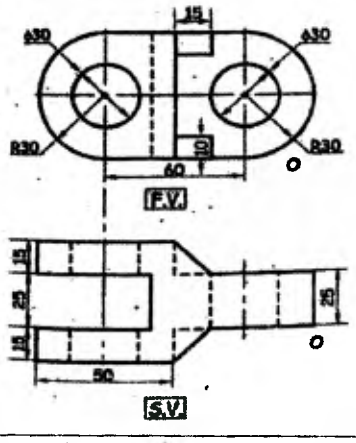
18/6/22

Notes:

1. Attempt any **FIVE** questions.
2. Assume suitable data wherever necessary and justify the same.
3. Create the folder in the **D drive** to save the drawings.
4. Folder name should be end semester exam (ESE) followed by student's registration number (Ex.: **ESE_C2110058**).
5. File name for respective questions should the question number itself (Ex.: **Q1/Q2**).
6. Each drawing should be **saved separately** mentioning question number as the drawing file name.
7. Q1 and Q2 etc. files must be saved separately in the same folder.
8. Before leaving the examination hall, verify all drawings are uploaded on the **classroom**.
9. Save the work frequently.

Q.No.	Questions	Points	CO	BL	PI
1	Draw a helix of one convolution, upon a cone, (UPON A CONE) diameter of base 70 mm, axis 90 mm and 90 mm pitch. (The axial advance during one complete revolution is called The pitch of the helix).	20	1,4	3	5.1.1
2	A line AB, 75mm long, has one end A in VP. Other end B is 15 mm above HP and 50 mm in front of VP. Draw the projections of the line when sum of its Inclinations with HP & VP is 90^0, means it is lying in a profile plane. Find true angles with reference planes and its traces.	20	1,4	3	5.1.1
3	A hexagonal lamina of sides 25 mm rests on one of its corners on HP. The corner opposite to the corner on which it rests is 35 mm above HP and the diagonal passing through the corner on which it rests is inclined at 30° to VP. Draw its projections. Find the inclination of the surface with HP.	20	2,4	3	5.1.1
4	A pentagonal prism 25 mm sides of base and 60 mm axis length rests on HP on one of its edges of the base which is inclined to VP at 30^0. Draw the projections of the prism	20	2,4	3	5.1.1

RE EXAMINATION JUNE 2022

	when the axis in inclined to HP at 40^0.				
5	Figure shows an isometric drawing of the block. Draw the following views: a) FV looking in X direction b) Side View from left c) TV 	20	3,4	6	5.1.2
6	Draw the isometric view of the following: 	20	3,4	6	5.1.2
7	Major axis ab & minor axis cd is 100 and 70mm long respectively. Draw ellipse by arcs of circles method.	20	1	3	5.1.1

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RE-EXAM PAPER – JUNE 2022 Examinations

F.Y. B.Tech (Mech) Sem I

Program: BTECH (MECH.ENGG.)

Course Code: ES-BT103

Course Name: ENGG. GRAPHICS-1

Duration: 3hrs.

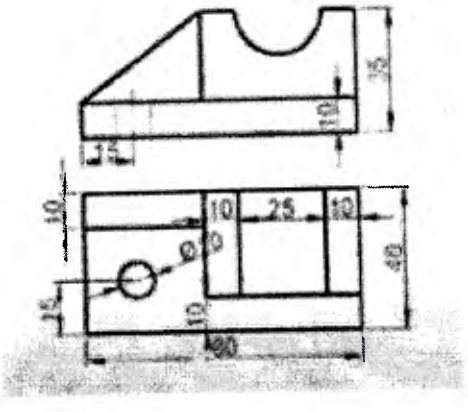
Maximum Points: 100

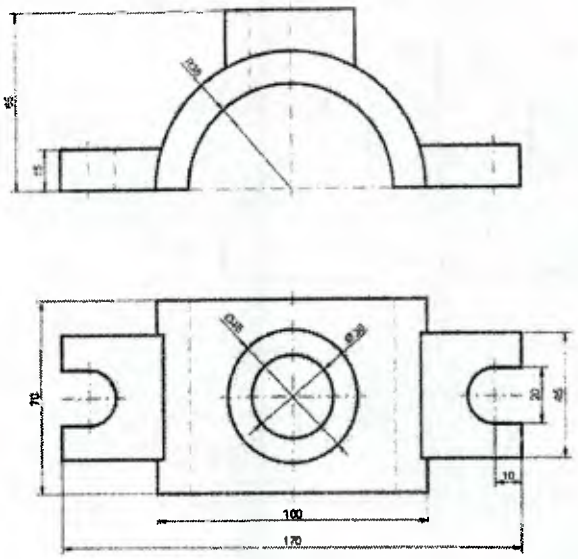
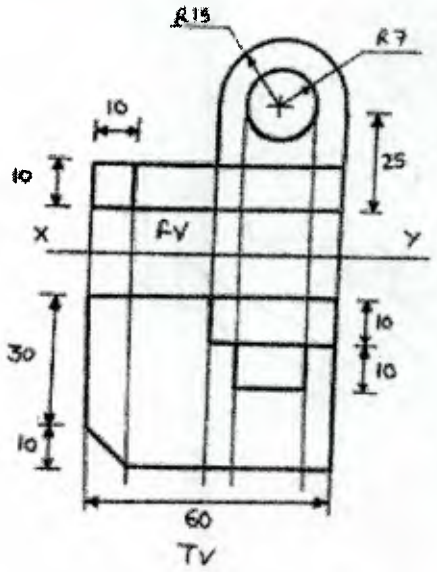
Semester: I

18/6/22.

- Solve any five questions
- Use first angle method of projection
- Figures to the right in points column indicates full marks
- Assume suitable data wherever necessary

Q.No.	Questions	Points	CO	BL	PI
Q.1 (a)	An Equilateral triangle PQR of side 60 mm inscribed in a circle rolls without slipping along a straight line 30 degree to horizontal. Trace the path of vertices P, Q & R for one complete revolution. Assume initial position of the vertex point 'P' in contact with the horizontal line.	[10]	2,3	3	5.1.2
(b)	The end A of a straight line AB 90 mm long, is in the second quadrant and 15 mm from both the H.P. and V.P. End B is in the third quadrant. The line is inclined at 300 with the HP and distance between the end projectors measured parallel to the XY line is 60 mm. Draw the projection of line, find its inclination with the VP. Also locate the traces.	[10]	1	3	5.2.1
Q.2 (a)	Draw the projections of a regular hexagon of 25 mm sides having one of its sides in HP and inclined at 60° to VP and its surface making an angle of 45 degree with HP.	[10]	1,3	2	3.2.1
(b)	A Square Pyramid side of base 40 mm & axis length 55 mm has one of the corner of its base with its axis inclined at 45 degree to the H.P. and 30 degree to V.P. Draw the projections, if apex is nearer to V.P.	[10]	3	3	3.2.1
Q.3 (a)	Draw a Hypocycloid of a circle of 40mm diameter which rolls inside another circle of 200mm diameter for one revolution.	[10]	2,3	3	5.1.2

(b)	The F.V. of a 85 mm long straight line AB measure 60 mm while its T.V. measure 70 mm. Draw the projection of line AB if its end A is 10 mm above H.P. & 20 mm behind V.P. while its end B in the first quadrant. Determine the inclination of the line with the reference plane. Also locate the traces	[10]	1	3	5.2.1
Q.4 (a)	A right circular cone, diameter of the base 60 mm and height of the axis 80 mm is resting on a point of its base circle rim on H.P. with apex 55 mm above H.P. The top view of axis of the cone makes an angle of 45 degree with V.P. Draw the projections of cone, if its apex is in V.P.	[10]	3	3	3.2.1
(b)	 **Figure -1** Draw the isometric view of above figure -1	[10]	2,3	3	3.2.1
Q.5 (a)	A regular pentagon of 30 mm sides is resting on HP on one of its sides with its surface 45 degree inclined to HP. Draw it's projections when the side in HP makes 30 degree angle with VP	[10]	1,3	2	3.2.1

(b)	 Figure 4 shows the F.V. & T.V of an object. Redraw the F.V & T.V and construct the Missing Left hand side view. (LHSV) of figure 4	[10]			
Q.6 (a)	 Redraw the front view, top view of the above given figure and also construct its missing left hand side view	[10]	2,3	3	5.2.1
(b)	Draw the isometric view of below figure -3	[10]	2,3	3	3.2.1

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RE-EXAM PAPER – JUNE 2022 Examinations

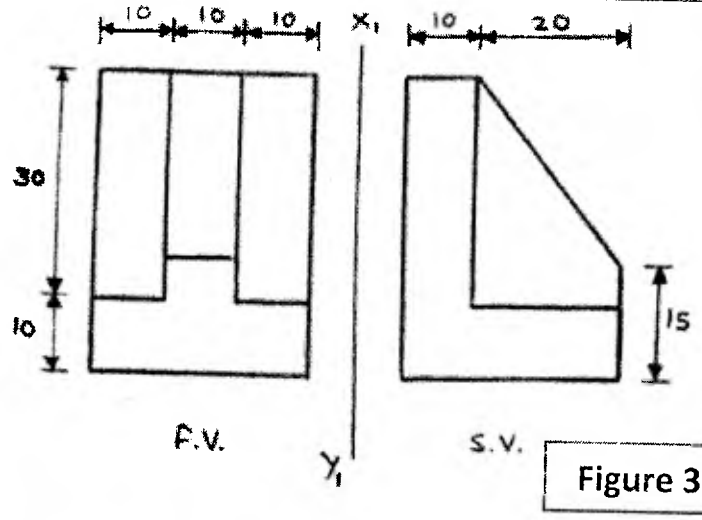
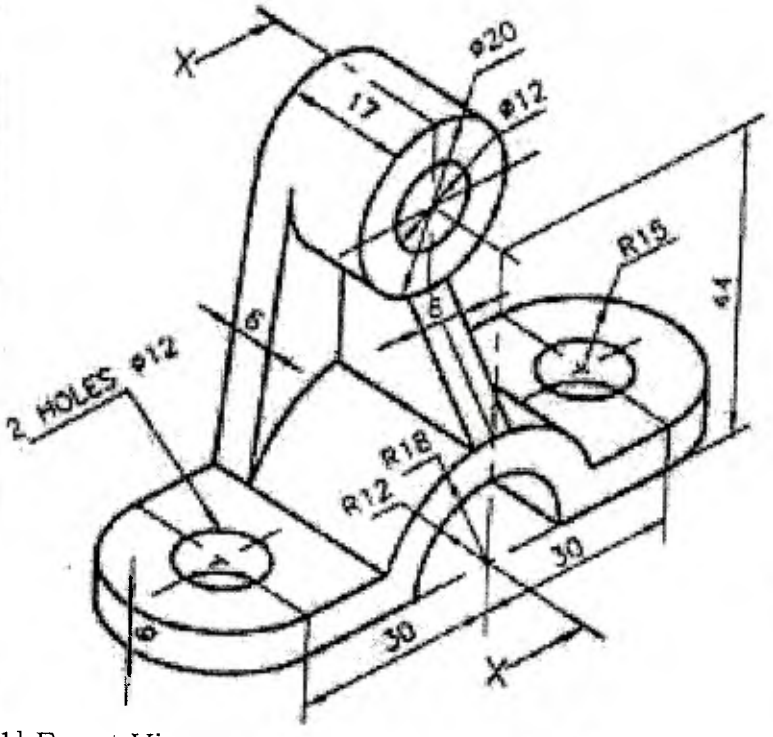


Figure 3

Q.7 Draw



1] Front View
2] Top View &
3] Left Hand Side View
of the given figure -2

Figure 2

[20] | 2,3 | 3 | 5.2.1

********** All the Best **********

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Re-Examination - June 2022 Examinations

SET-A

F.Y. B. Tech (CBCGS) Sem I

Program:Electrical Engineering

Duration: 03 hour

Course Code: ES-BT103

Maximum Points:100 marks

Course Name:Engineering Graphics-I

Semester:**I**

18/6/22.

Notes:

1. Solve **any five** questions.
2. Draw neat schematic diagrams,**highlight** important points.
3. Assume suitable data if necessary and mention it.
4. **Use first angle method of projection only**.

Exam Seat No	
Reg.NO.	
Machine NO.	
Sign of Invigilator	

Q. No.	Questions	Marks	CO	BL	PI
Q1 A	Square prism side of base 40mm and axis length 60mm has one of the side of base on the ground. the axis of solid is inclined to the ground at an angle 30 degree and T.V. of axis is inclined at angle 45 degree with V.P. draw its projections when Apex away from the observer.	10	2	2	1.3.1
Q1 B	Draw an isometric view of the following using natural scale.	10	1, 2	2	1.3.1

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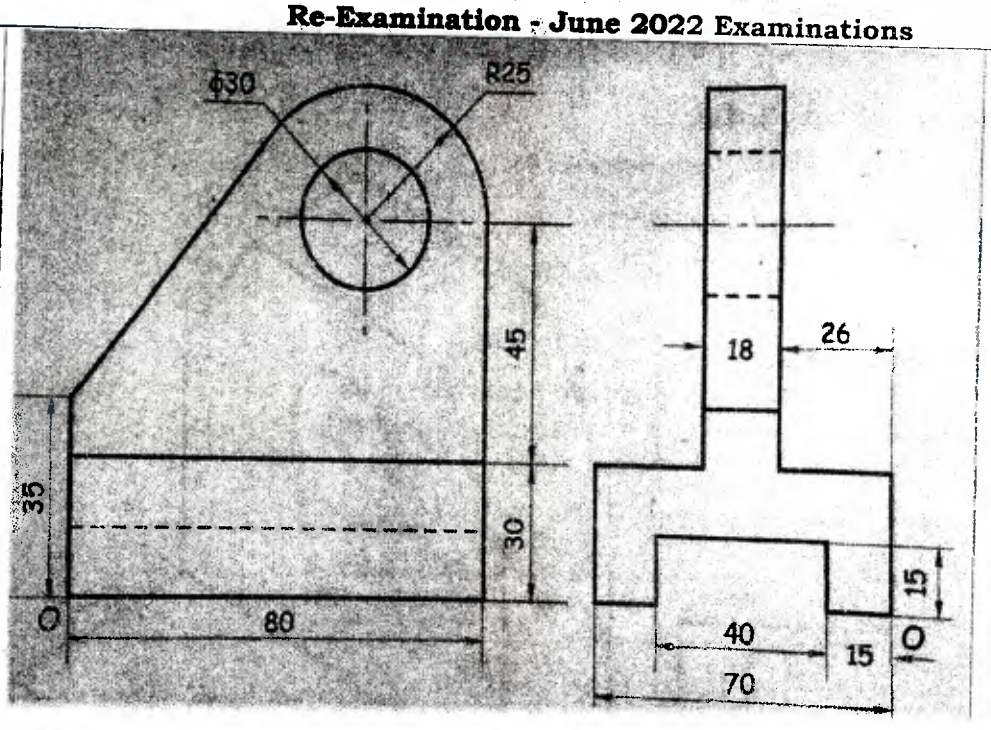
Re-Examination - June 2022 Examinations



Q2 A	The distance between the end projectors of a line AB is 35 mm. The line AB is 70 mm long and is inclined at 30° to the H.P. The end point A is 10 mm above the H.P. and 20 mm in front of the V.P. Draw the projection of line AB.	10	1, 2	2	1.3.1
Q2 B	A hexagonal lamina of side 25 mm is resting in the H.P. on one of its side and inclined at 45^0 to the V.P. the surface of a plane is inclined at 45^0 to H.P. draw its projections.	10	1, 2	2	1.3.1
Q3 A	The plan ab of a straight line AB is 140mm long and its makes an angle 45^0 with XY.the end A is in the V.P. and 85mm from the H.P. the end B is 20mm from the H.P. and the whole line in the fourth quadrant.draw the projections of the line and determine the true length and the inclination of line.	10	1, 3	2	1.3.1
Q3 B	Hexagonal lamina of side 25mm is resting in the V.P. on one of its corner. draw its projection the diagonal passing through that corner makes an angle 45 degree and 30 degree to HP and V.P. respectively.	10	2, 3	2	1.3.1
Q4 A	Construct a curve generated by a circle of diameter 50 mm , when it rolls over an another circle of diameter 150mm. name the curve. draw the tangent and normal at any point on the curve.	10	1	2	1.3.1
Q4 B	Draw the projections of the cone , base 50 mm diameter and axis 75 mm long, having one of its generators in the V.P. and inclined at 30^0 to the H.P. the apex is in the H.P.	10	1, 2	2	1.3.1

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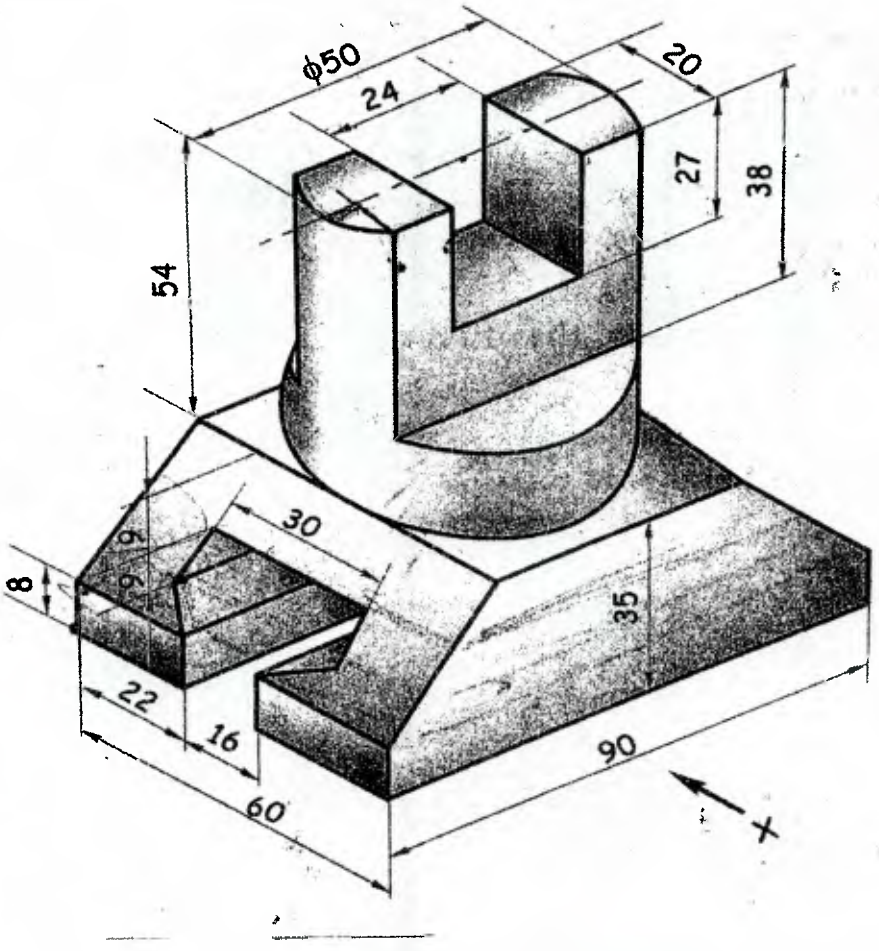
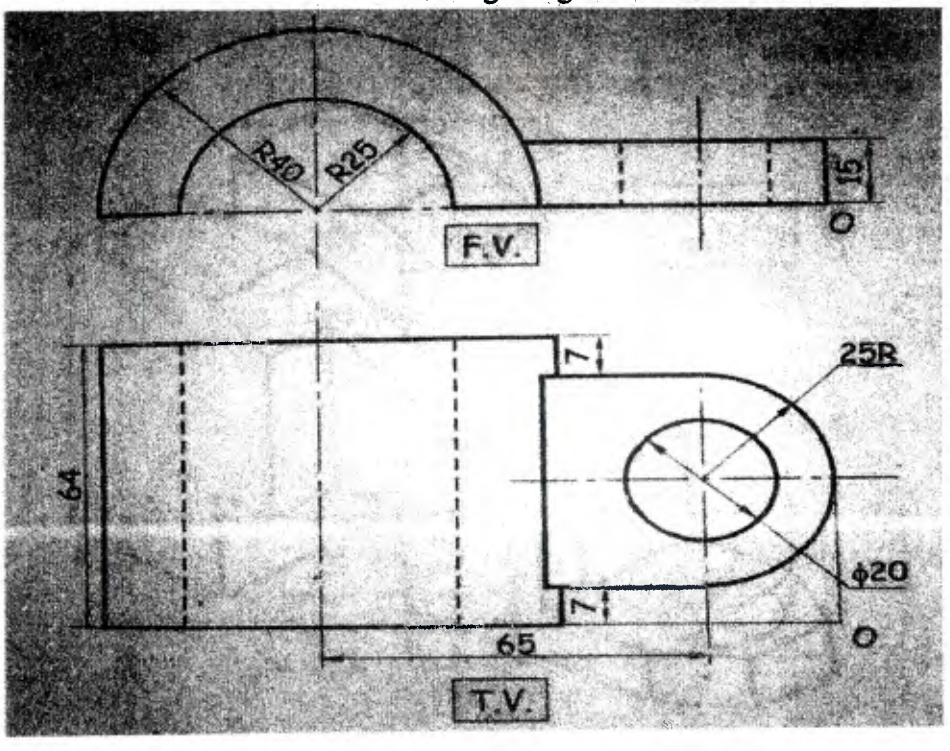
Re-Examination - June 2022 Examinations

Q5 A	Draw the involute of a regular pentagon of side 20 mm. draw tangent and normal at a point on the involute 80mm from the center of the pentagon	10	1, 2	2	1.3.1
Q5 B	The end P of a line PQ ,120 mm long , is in the second quadrant and 20 mm from both reference planes. End Q is in the third quadrant. The line is inclined at 30^0 with the H.P.and the distance between the end projector measured parallel to the XY line is 80 mm. draw the projections of line, find its inclination with the V.P.	10	1	2	1.3.1
Q6 A	Draw the following orthographic projection view of figure 1 1}FRONT VIEW 2} TOP VIEW 3} LHSV  	20	1, 2, 3	2	1.3.1
Q7 A	A line 110mm long has its plan and elevation lengths 80 mm and 90 mm respectively.one end of line 'P' is in H.P. and other end 'Q' is in V.P. draw its projections.assume the line in the third quadrant. find inclination of the line	10	3	2	3.2.3

	with the H.P. and V.P. also locate its Traces.				
Q7 B	Draw an isometric view of the following using natural scale. 	10	3	2	1.3 .2

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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Munshi Nagar, Andheri (W) Mumbai – 400058

Re-Examination - June 2022 Examinations

F. Y. B. Tech CE Held Sem I

SET-B

Program:Electrical Engineering

Course Code: ES-BT103

Course Name:Engineering Graphics-I

Duration: 03 hour 18/6/22

Maximum Points:100 marks

Semester:**I**

Notes:.1. Solve **any five** questions.

2. Draw neat schematic diagrams wherever is necessary, **highlight** important points.
3. Assume suitable data if necessary and mention it.
4. **Use <u>first angle</u> method of projection only**.

Exam Seat No	
Reg.NO.	
Machine NO.	
Sign of Invigilator	

Q. No.	Questions	Marks	CO	BL	PI
Q1 A	Square prism side of base 40mm and axis length 60mm has one of the side of base on the ground. the axis of solid is inclined to the ground at an angle 30 degree and T.V. of axis is inclined at angle 45 degree with V.P. draw its projections when Apex near to the observer.	10	1, 2	2	1.3.1
Q1 B	Draw an isometric view of the following using natural scale.	10	1, 2, 3	2	1.3.1

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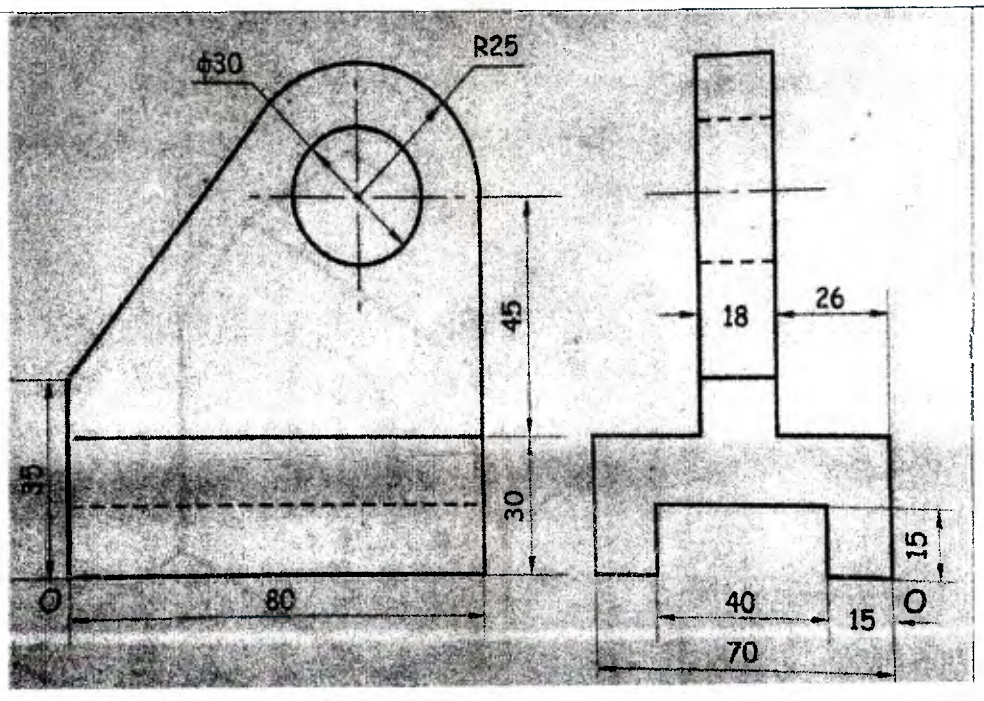
Re-Examination - June 2022 Examinations

					
Q2 A	The distance between the end projectors of a line AB is 35 mm. The line AB is 70 mm long and is inclined at 30° to the H.P. The end point A is 10 mm above the H.P. and 20 mm in front of the V.P. Draw the projection of line AB.	10	1, 2	2	1.3.1
Q2 B	A hexagonal lamina of side 25 mm is resting in the H.P. on one of its side and inclined at 45^0 to the V.P. the surface of a plane is inclined at 45^0 to H.P. draw its projections.	10	1, 2	2	1.3.1
Q3 A	The plan ab of a straight line AB is 140mm long and its makes an angle 45^0 with XY.the end A is in the V.P. and 85mm from the H.P. the end B is 20mm from the H.P. and the whole line in the fourth quadrant.draw the projections of the line and determine the true length and the inclination of line.	10	1, 2	2	1.3.1
Q3 B	Hexagonal lamina of side 25mm is resting in the V.P. on one of its corner. draw its projection the diagonal passing through that corner makes an angle 45 degree and 30 degree to HP and V.P. respectively.	10	2, 3	2	1.3.1
Q4 A	Draw a curve for rolling circle of 40 mm diameter. Which roll inside of base circle of 200 mm diameter for one convolution. Name the curve. Draw tangent and normal at any point on the curve.	10	1	2	1.3.1
Q4 B	A cone of base diameter 50 mm and axis 70 mm long is lying on one of its generator on the H.P. with top view makes an angle of 45^0 with the XY line. Draw its projections.	10	2, 3	2	1.3.1

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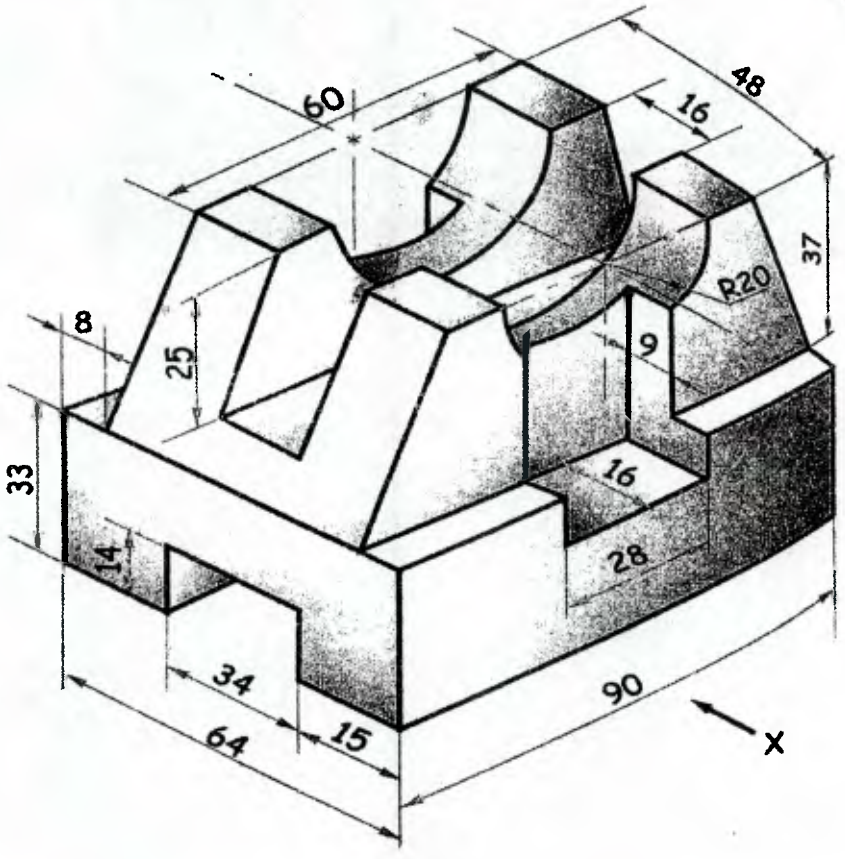
Re-Examination - June 2022 Examinations

Q5 A	Draw the involute of a regular pentagon of side 20 mm. draw tangent and normal at a point on the involute 80mm from the center of the pentagon	10	1, 2	2	1.3.1
Q5 B	The end P of a line PQ ,120 mm long , is in the second quadrant and 20 mm from both reference planes. End Q is in the third quadrant. The line is inclined at 300 with the H.P.and the distance between the end projector measured parallel to the XY line is 80 mm. draw the projections of line, find its inclination with the V.P.	10	1	2	1.3.1
Q6	Draw the following orthographic projection view of figure 1}FRONT VIEW 2} TOP VIEW 3} LHSV  	20	2, 3	2	1.3.1
Q7 A	A line AB , 90mm long has its one end A is in the H.P. and 35mm behind the V.P. and other end B in the V.P. and 55mm below the H.P. draw the projections of line and find its inclination with the H.P. and V.P.also locate its Traces.	10	3	2	3.2.3

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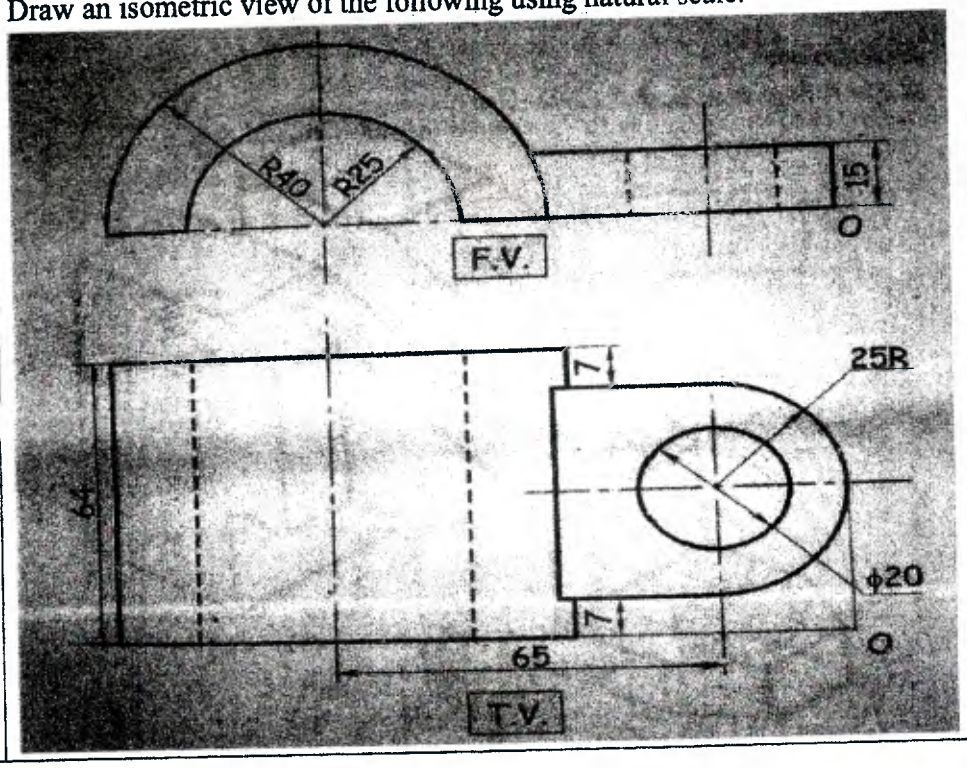
Re-Examination - June 2022 Examinations

Q7 B	Draw an isometric view of the following using natural scale. 	10	2, 3	2	1.3 .2

SARDAR PATEL COLLEGE OF ENGINEERING

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Munshi Nagar, Andheri (W) Mumbai – 400058

END SEMESTER EXAMINATION – APRIL 2022 Examinations

F.Y. B. Tech Sem I (Mech)

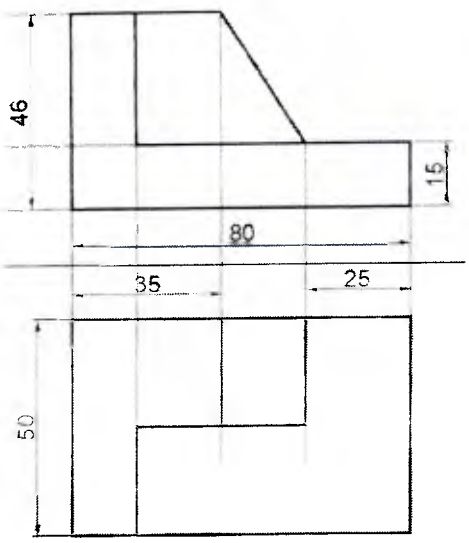
Program: BTECH (MECH.ENGG.) **(SET-A)** **Duration:** 2hrs.

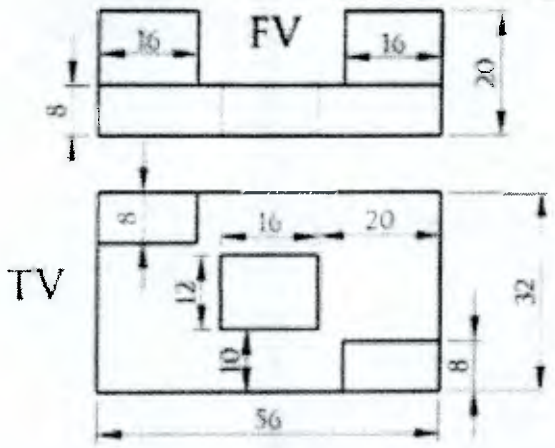
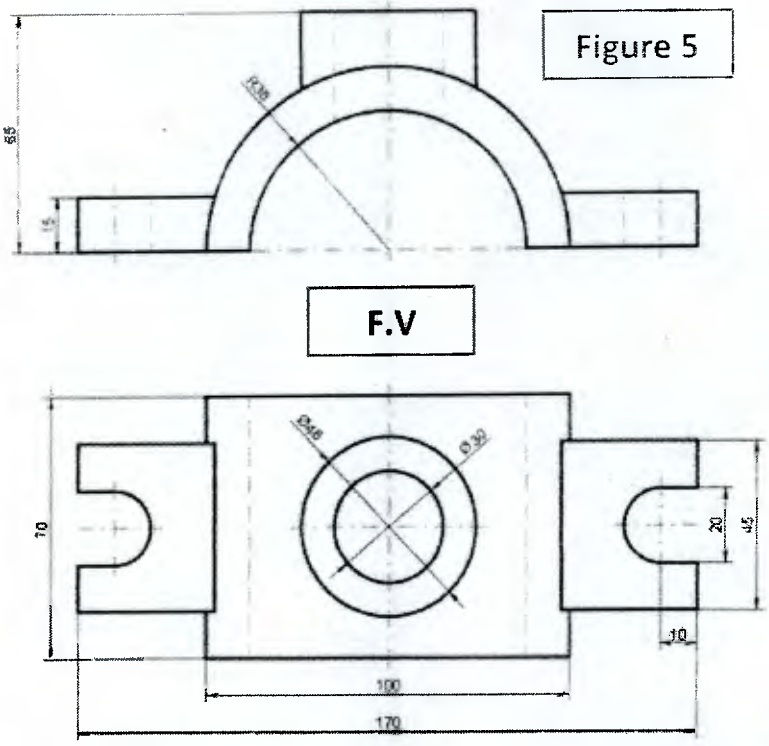
Course Code: ES-BT103 **Maximum Points:** 100

Course Name: ENGG. GRAPHICS-1 **Semester:** I

- Solve any five questions using CAD software
- Use first angle method of projection
- Figures to the right in points column indicates full marks
- Assume suitable data wherever necessary

Q.No.	Questions	Points	CO	BL	PI
Q.1 (a)	A circle of 50 mm diameter rolls on the circumference of another circle of 150 mm diameter and outside it. Draw the curve traced by a point P on the circumference of rolling circle for one complete revolution of a circle. Also name the curve.	[10]	2,3	3	5.1.2
(b)	The plan ab of a straight line AB is 140 mm long and it makes an angle of 45 degree with XY. The end A is in V.P. and 85 mm, from H.P. The end B is 20 mm from H.P. and the whole line is in the fourth quadrant. Draw the projection of line determine the true length & inclination of line	[10]	1	3	5.2.1
Q.2 (a)	A Rectangular plane of 30 x 50 mm is resting on one of its corner on V.P. with diagonal passing through that corner inclined to H.P. at 30 degree and to V.P. at 45 degree. Draw its projections.	[10]	1,3	2	3.2.1
(b)	A Right Circular cylinder diameter of base 50 mm & axis height 70 mm has one of the circumference point of base in the H.P. such that its axis is inclined at 30 degree to H.P. and the axis appears to be inclined at 45 degree to V.P. in the T.V. Draw its projections	[10]	3	3	3.2.1
Q.3 (a)	Draw a Hypocycloid of a circle of 40mm diameter which rolls inside another circle of 200mm diameter for one revolution.	[10]	2,3	3	5.1.2

(b)	The end A of a straight line AB 90 mm long, is in the second quadrant and 15 mm from both the H.P. and V.P. End B is in the third quadrant. The line is inclined at 30^0 with the HP and distance between the end projectors measured parallel to the XY line is 60 mm. Draw the projection of line, find its inclination with the VP. Also locate the traces.	[10]	1	3	5.2.1
Q.4 (a)	A hexagonal Pyramid of 30 mm side of base & slant edges 65mm long is lying on one of its triangular surfaces in V.P. and its axis is inclined at an angle of 45 degree with H.P. Draw the projections, if apex is nearer to observer	[10]	3	3	3.2.1
(b)	 **Figure -1** Draw the isometric view of above figure -1	[10]	2,3	3	3.2.1
Q.5 (a)	A regular pentagon of 30 mm sides is resting on HP on one of its sides with its surface 45 degree inclined to HP. Draw it's projections when the side in HP makes 30 degree angle with VP	[10]	1,3	2	3.2.1

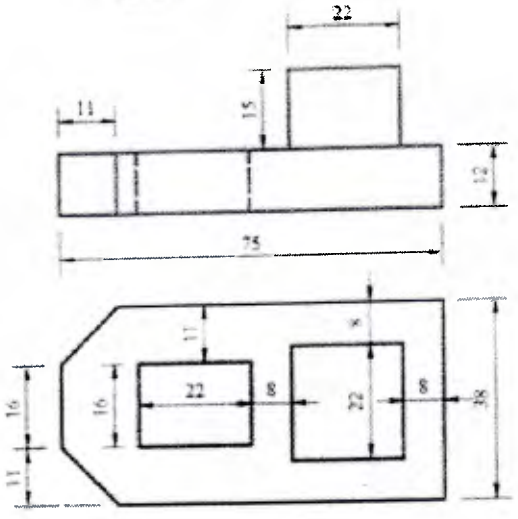
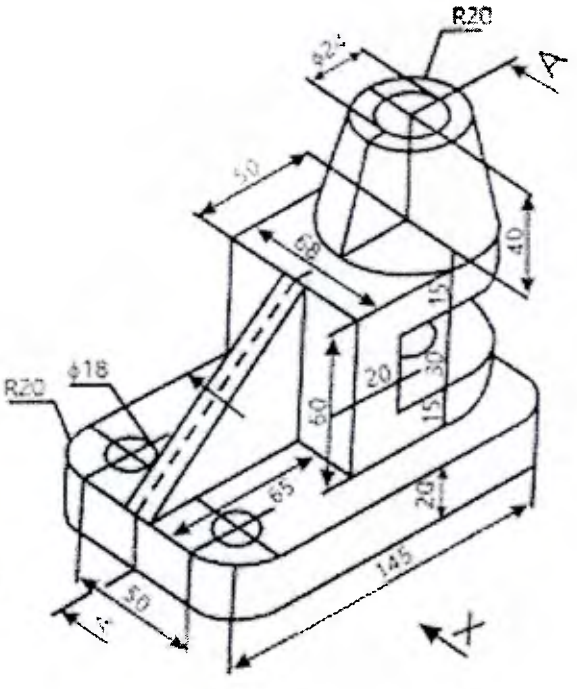
(b)	 Figure 4 shows the F.V. & T.V of an object. Redraw the F.V & T.V and construct the Missing Left hand side view. (LHSV) of figure 4	[10]			
Q.6 (a)	Figure 5 shows the F.V. & T.V of an object. Redraw the F.V & T.V and construct the Missing Left hand side view. (LHSV) of figure 5 	[10]	2,3	3	5.2.1

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

END SEMESTER EXAMINATION – APRIL 2022 Examinations

(b)	 **Figure -3** Draw the isometric view of above figure -3	[10]	2,3	3	3.2.1
Q.7	 Figure 2 Draw 1] Sectional Front View along section A-A 2] Top View & 3] Left Hand Side View of the given figure -2	[20]	2,3	3	5.1

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SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Munshi Nagar, Andheri (W) Mumbai – 400058

END SEMESTER EXAMINATION – APRIL 2022 Examinations

F.Y. B. Tech (Mech) Sem I 22/4/22

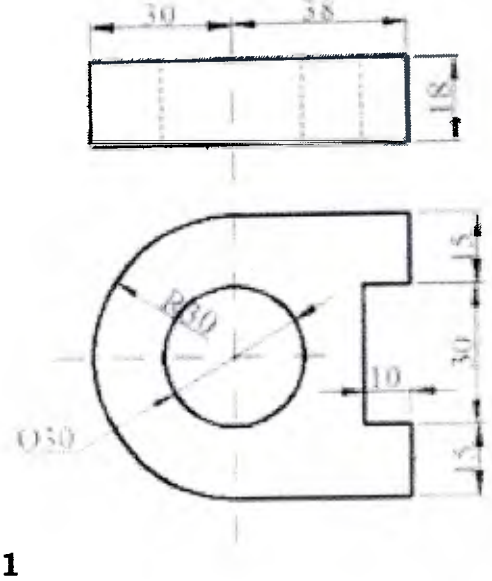
Program: BTECH (MECH.ENGG.) **(SET-B)** **Duration:** 2hrs.

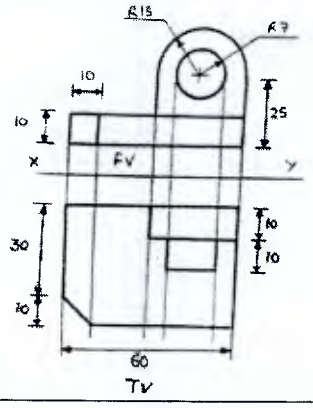
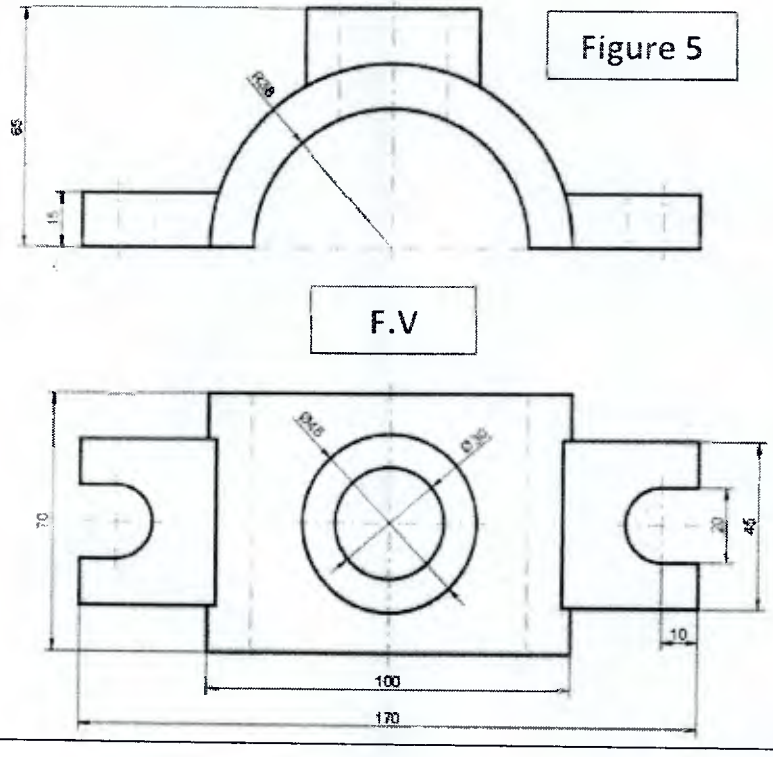
Course Code: ES-BT103 **Maximum Points:** 100

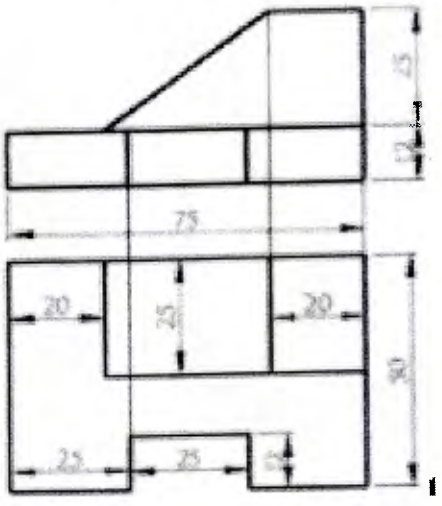
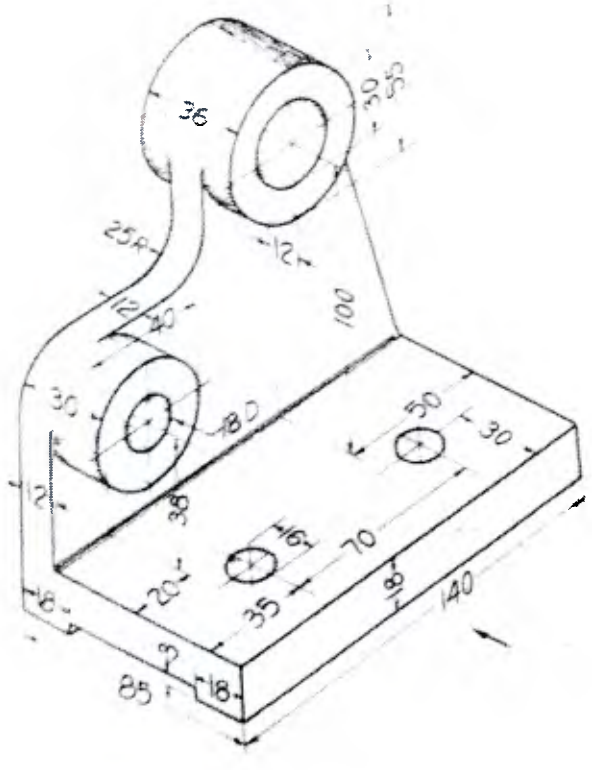
Course Name: ENGG. GRAPHICS-1 **Semester:** I

- Solve any five questions
- Use first angle method of projection
- Figures to the right in points column indicates full marks
- Assume suitable data wherever necessary

Q.No.	Questions	Points	CO	BL	PI
Q.1 (a)	Draw a Hypocycloid of a circle of 40mm diameter which rolls inside another circle of 200mm diameter for one revolution	[10]	2,3	3	5.1.2
(b)	The end A of a straight line AB 90 mm long, is in the second quadrant and 15 mm from both the H.P. and V.P. End B is in the third quadrant. The line is inclined at 30^0 with the HP and distance between the end projectors measured parallel to the XY line is 60 mm. Draw the projection of line, find its inclination with the VP. Also locate the traces.	[10]	1	3	5.2.1
Q.2 (a)	A Rectangular plane of 30 x 50 mm is resting on one of its corner on V.P. with diagonal passing through that corner inclined to H.P. at 30 degree and to V.P. at 45 degree. Draw its projections.	[10]	1,3	2	3.2.
(b)	A hexagonal Pyramid of 30 mm side of base & slant edges 65mm long is lying on one of its triangular surfaces in V.P. and its axis is inclined at an angle of 45 degree with H.P. Draw the projections, if apex is nearer to observer	[10]	3	3	3.2.
Q.3 (a)	A circle of 50 mm diameter rolls on the circumference of another circle of 150 mm diameter and outside it. Draw the curve traced by a point P on the circumference of rolling circle for one complete revolution of a circle. Also name the curve.	[10]	2,3	3	5.1.

(b)	The plan ab of a straight line AB is 140 mm long and it makes an angle of 45 degree with XY. The end A is in V.P. and 85 mm, from H.P. The end B is 20 mm from H.P. and the whole line is in the fourth quadrant. Draw the projection of line determine the true length & inclination of line	[10]	1	3	5.2.1
Q.4 (a)	A Right Circular cylinder diameter of base 50 mm & axis height 70 mm has one of the circumference point of base in the H.P. such that its axis is inclined at 30 degree to H.P. and the axis appears to be inclined at 45 degree to V.P. in the T.V. Draw its projections	[10]	3	3	.1
(b)	 **Figure -1** Draw the isometric view of above figure -1	[10]	2,3	3	3.2.1
Q.5 (a)	A regular pentagon of 30 mm sides is resting on HP on one of its sides with its surface 45 degree inclined to HP. Draw it's projections when the side in HP makes 30 degree angle with VP	[10]	1,3	2	3.2.

(b)	The Front View and Top View of an object is as shown below. Draw its missing view i.e., Side View.  	[10]			
Q.6 (a)	Figure 5 shows the F.V. & T.V of an object. Redraw the F.V & T.V and construct the Missing Left hand side view. (LHSV) of figure 5  	[10]	2,3	3	5.2.1

(b)	 **Figure -3** Draw the isometric view of above figure -3	[10]	2,3	3	3.2.1
Q.7	 **FIGURE 2** Draw 1] Front View 2] Top View & 3] Left Hand Side View of the given figure -2	[20]	2,3	3	5.2.1

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SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

23/4/22

End Semester Examination - April 2022 Examinations

SET-A

F.Y. B.Tech (Electrical) Sem I

Program: Electrical Engineering Duration: 03 hour

Course Code: ES-BT103 Maximum Points: 100 marks

Course Name: Engineering Graphics-I Semester: **I**

Notes:

1. Solve **any five** questions.
2. Draw neat schematic diagrams, **highlight** important points.
3. Assume suitable data if necessary and mention it.
4. **Use <u>first angle</u> method of projection only.**

Exam Seat No	
Reg.NO.	
Machine NO.	
Sign of Invigilator	

Q. No.	Questions	Marks	CO	BL	PI
Q1 A	A square pyramid side of base 40mm and axis length 60mm has one side of base in the H.P. the axis of solid is inclined to the H.P. at an angle 30^0 and the T.V. of axis is inclined at an angle 45^0 with the V.P. draw the projections if apex away nearer to the observer.	10	2	2	1.3.1
Q1 B	Draw an isometric view of the following using natural scale.	10	1, 2	2	1.3.1

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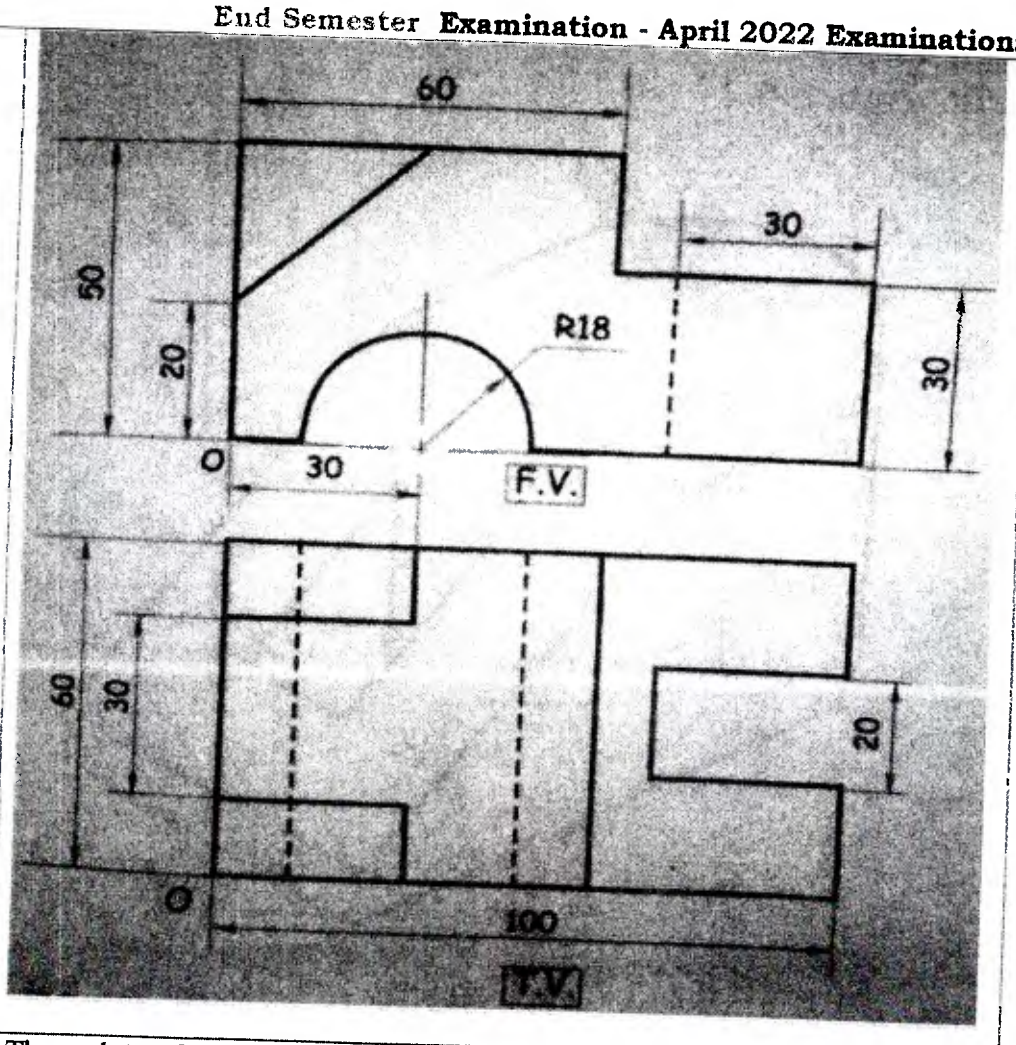
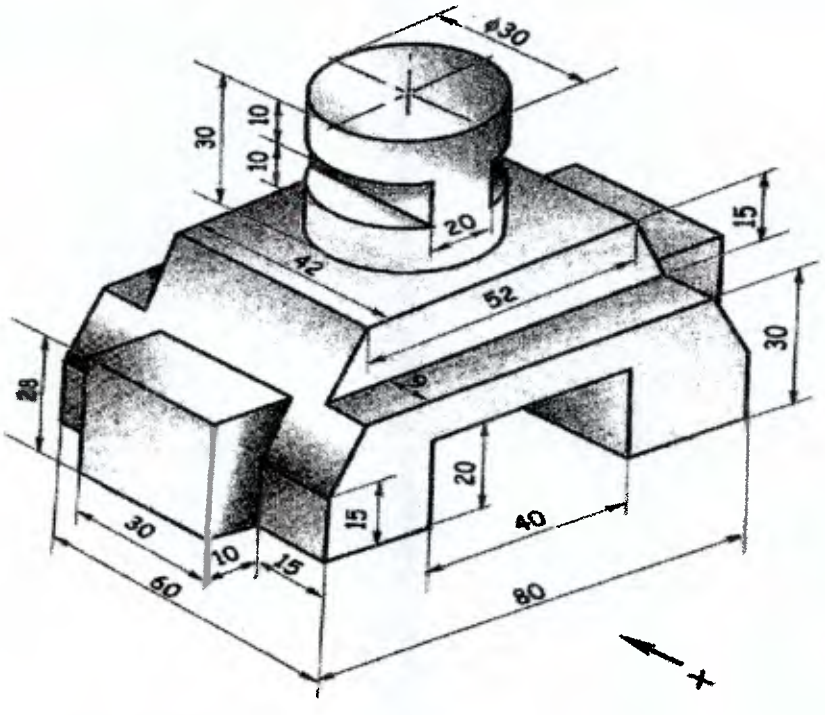
(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

End Semester Examination - April 2022 Examinations



Q2 A	The end A of straight line AB 90mm long is in the second quadrant and 15 mm from both HP and V.P. end B is the third quadrant. the line is inclined at 30 degree with the H.P. and DBEP 60mm.draw the projections of line, find its inclination with the V.P.	10	1, 2	2	1.3.1
Q2 B	A hexagonal lamina of side 25 mm is resting in the H.P. on one of its side and inclined at 45^0 to the V.P. the surface of a plane is inclined at 45^0 to H.P. draw its projections.	10	1, 2	2	1.3.1
Q3 A	The plan ab of a straight line AB is 140mm long and its makes an angle 45^0 with XY.the end A is in the V.P. and 85mm from the H.P. the end B is 20mm from the H.P. and the whole line in the fourth quadrant.draw the projections of the line and determine the true length and the inclination of line.	10	1, 3	2	1.3.1
Q3 B	A pentagonal plate of 30 mm side has one of its side in the V.P. and inclined at 30^0 to the H.P. the corner opposite to this side contained by the H.P. is 20 mm	10	2, 3	2	1.3.1

	in front of the V.P. draw the projections and find the inclination of the surface with the V.P.				
Q4 A	Construct a curve generated by a circle of diameter 50 mm , when it rolls over an another circle of diameter 150mm. name the curve. draw the tangent and normal at any point on the curve.	10	1	2	1.3 .1
Q4 B	Draw the projections of the cone , base 50 mm diameter and axis 75 mm long, having one of its generators in the V.P. and inclined at 30^0 to the H.P. the apex is in the H.P.	10	1 , 2	2	1.3 .1
Q5 A	Draw the involute of a regular pentagon of side 20 mm. draw tangent and normal at a point on the involute 80mm from the center of the pentagon	10	1 , 2	2	1.3 .1
Q5 B	The end P of a line PQ ,120 mm long , is in the second quadrant and 20 mm from both reference planes. End Q is in the third quadrant. The line is inclined at 30^0 with the H.P.and the distance between the end projector measured parallel to the XY line is 80 mm. draw the projections of line, find its inclination with the V.P.	10	1	2	1.3 .1
Q6 A	Draw the following orthographic projection view of figure 1 1}FRONT VIEW 2} TOP VIEW 3} LHSV  	20	1 , 2 , 3	2	1.3 .1

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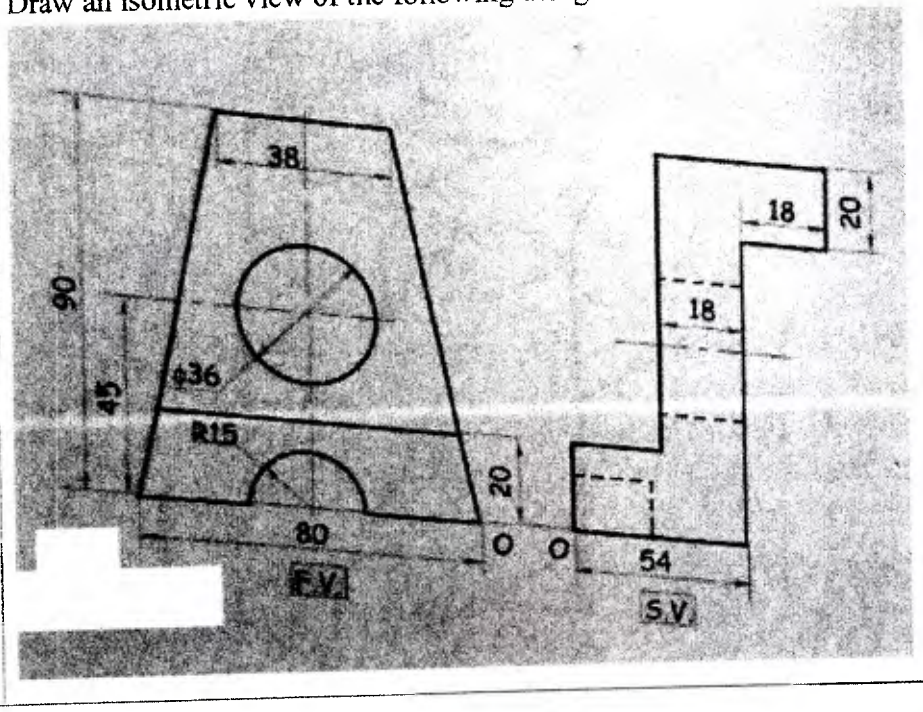
SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

End Semester Examination - April 2022 Examinations

Q7 A	A line 110mm long has its plan and elevation lengths 80 mm and 90 mm respectively.one end of line 'P' is in H.P. and other end 'Q' is in V.P. draw its projections.assume the line in the third quadrant. find inclination of the line with the H.P. and V.P. also locate its Traces.	10	3	2	3.2 .3
Q7 B	Draw an isometric view of the following using natural scale. 	10	3	2	1.3 .2

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Munshi Nagar, Andheri (W) Mumbai – 400058

End Semester Examination - April 2022 Examinations

F.Y. B.Tech (Extnt) Sem II 22/4/22

SET-B

Program: Electrical Engineering

Course Code: ES-BT103

Course Name: Engineering Graphics-I

Duration: 03 hour

Maximum Points: 100 marks

Semester: **I**

Notes: 1. Solve **any five** questions.
2. Draw neat schematic diagrams wherever is necessary, **highlight** important points.
3. Assume suitable data if necessary and mention it.
4. **Use first angle method of projection only.**

Exam Seat No	
Reg.NO.	
Machine NO.	
Sign of Invigilator	

Q. No.	Questions	Marks	CO	BL	PI
Q1 A	A square pyramid side of base 40mm and axis length 60mm has one side of base in the H.P. the axis of solid is inclined to the H.P. at an angle 30^0 and the T.V. of axis is inclined at an angle 45^0 with the V.P. draw the projections if apex away from the observer.	10	1, 2	2	1.3.1
Q1 B	Draw an isometric view of the following using natural scale.	10	1, 2, 3	2	1.3.1

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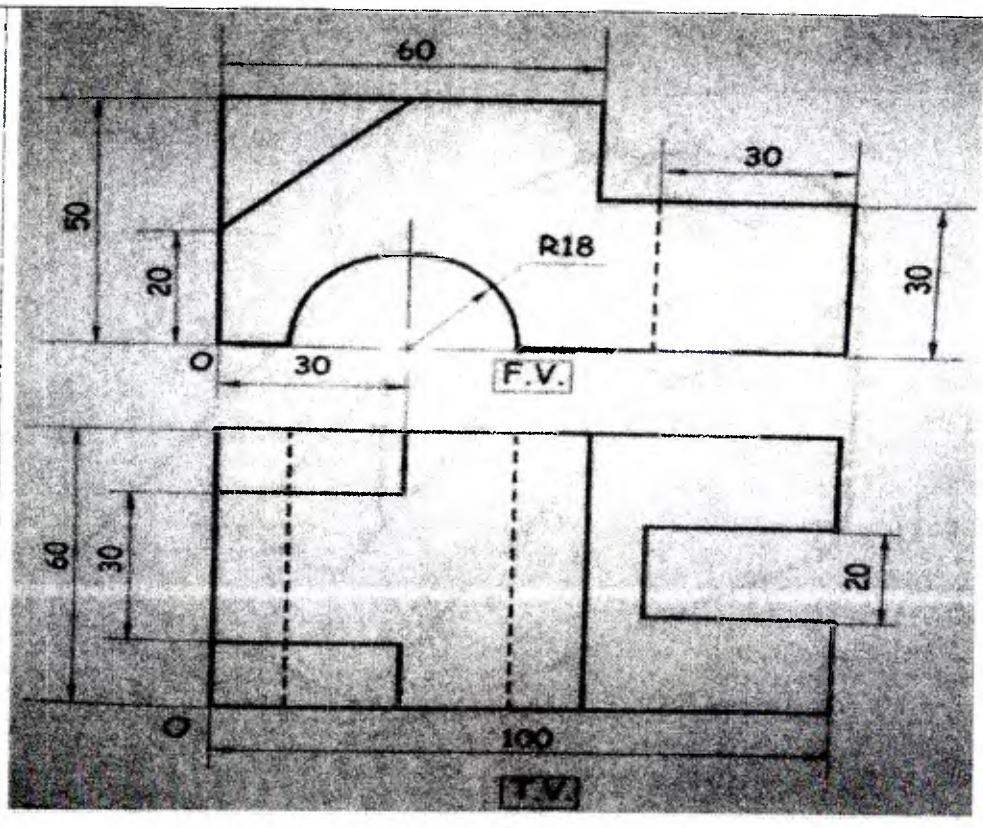
End Semester Examination - April 2022 Examinations



Q2 A	The end A of straight line AB 90mm long is in the second quadrant and 15 mm from both HP and V.P. end B is the third quadrant the line is inclined at 30 degree with the H.P. and DBEP 60mm.draw the projections of line, find its inclination with the V.P.	10	1, 2	2	1.3.1
Q2 B	A hexagonal lamina of side 25 mm is resting in the H.P. on one of its side and inclined at 45^0 to the V.P. the surface of a plane is inclined at 45^0 to H.P. draw its projections.	10	1, 2	2	1.3.1
Q3 A	The plan ab of a straight line AB is 140mm long and its makes an angle 45^0 with XY.the end A is in the V.P. and 85mm from the H.P. the end B is 20mm from the H.P. and the whole line in the fourth quadrant.draw the projections of the line and determine the true length and the inclination of line.	10	1, 2	2	1.3.1
Q3 B	A pentagonal plate of 30 mm side has one of its side in the V.P. and inclined at 30^0 to the H.P. the corner opposite to this side contained by the H.P. is 20 mm in front of the V.P. draw the projections and find the inclination of as surface with the V.P.	10	2, 3	2	1.3.1
Q4 A	Draw a curve for rolling circle of 40 mm diameter. Which roll inside of base circle of 200 mm diameter for one convolution. Name the curve. Draw tangent and normal at any point on the curve.	10	1	2	1.3.1

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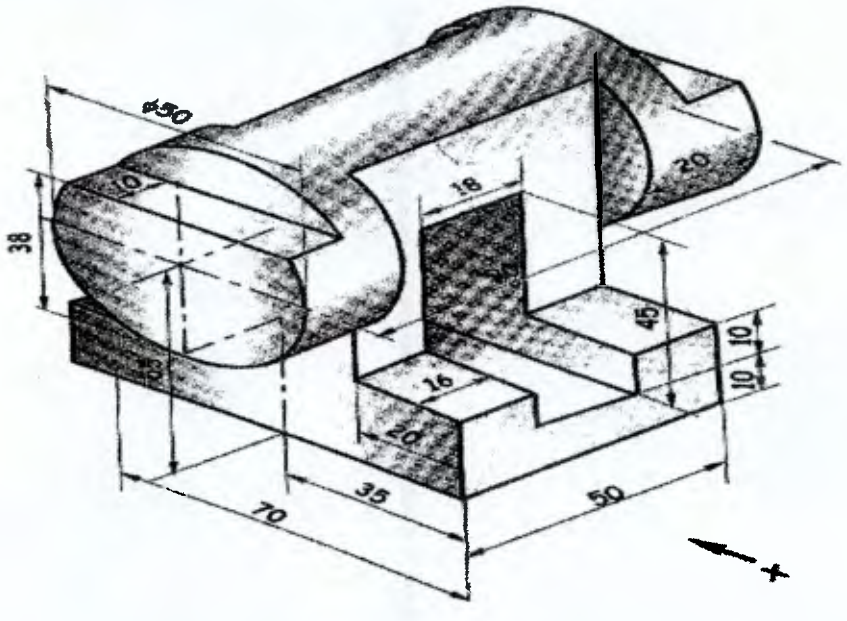
Q4 B	A cone of base diameter 50 mm and axis 70 mm long is lying on one of its generator on the H.P. with top view makes an angle of 45^0 with the XY line. Draw its projections.	10	2, 3	2	1.3.1
Q5 A	Draw the involute of a regular pentagon of side 20 mm. draw tangent and normal at a point on the involute 80mm from the center of the pentagon	10	1, 2	2	1.3.1
Q5 B	The end P of a line PQ ,120 mm long , is in the second quadrant and 20 mm from both reference planes. End Q is in the third quadrant. The line is inclined at 300 with the H.P.and the distance between the end projector measured parallel to the XY line is 80 mm. draw the projections of line, find its inclination with the V.P.	10	1	2	1.3.1
Q6	Draw the following orthographic projection view of figure 1}FRONT VIEW 2} TOP VIEW 3} LHSV  	20	2, 3	2	1.3.1
Q7 A	A line AB , 90mm long has its one end A is in the H.P. and 35mm behind the V.P. and other end B in the V.P. and 55mm below the H.P. draw the projections of line and find its inclination with the H.P. and V.P.also locate its Traces.	10	3	2	3.2.3
Q7 B	Draw an isometric view of the following using natural scale.	10	2, 3	2	1.3.2

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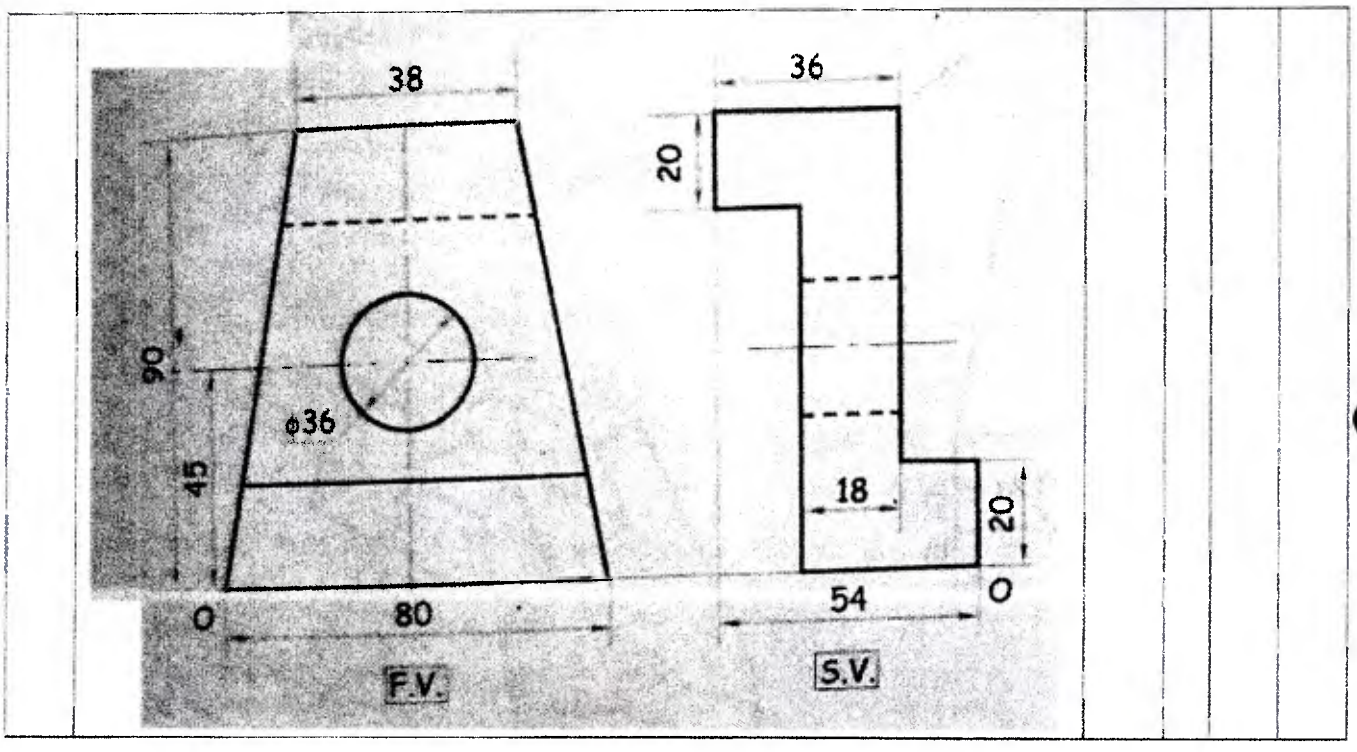

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END SEMESTER EXAMINATION APRIL 2022

F.Y. B.Tech (C, M, E) Sem I

11/4/2022

Program: First Year Engineering (C-M-E) **Duration: 3 Hours**

Course Code: BS-BT101 **Maximum Points: 100**

Course Name: Differential Calculus and Complex Numbers **Semester: I**

Note:

1. **Attempt Any Five Questions**
2. **Answers to the sub questions should be grouped together**

		Questions	Points	CO	BL	PI
1	a	Prove that $\left(\frac{1+\sin\alpha+i\cos\alpha}{1+\sin\alpha-i\cos\alpha}\right)^n = e^{in\left(\frac{\pi}{2}-\alpha\right)}$	6	CO3	BL3	1.1.2
	b	Find all the stationary points of the function $f(x,y)=x^3+3xy^2-3x^2-3y^2+7$ and examine whether the function is maximum or minimum at those points.	6	CO2	BL5	1.1.1
	c	If $u\cdot x+v\cdot y=0$ and $\frac{u}{x}+\frac{v}{y}=1$; prove that $\frac{u}{x}\left(\frac{\partial x}{\partial u}\right)_v+\frac{v}{y}\left(\frac{\partial y}{\partial v}\right)_u=0$	8	CO2	BL4	1.2.1
2	a	If $u=f\left(x^2-y^2,y^2-z^2,z^2-x^2\right)$, Prove that $\frac{1}{x}\frac{\partial u}{\partial x}+\frac{1}{y}\frac{\partial u}{\partial y}+\frac{1}{z}\frac{\partial u}{\partial z}=0$	6	CO2	BL3	1.1.1
	b	Prove that $\frac{\sin 5\theta}{\sin\theta}=16\cos^4\theta-12\cos^2\theta+1$	6	CO3	BL1	1.1.1
	c	If $y=\tan^{-1}\left[\frac{a+x}{a-x}\right]$, where a is constant, prove that $\left(a^2+x^2\right)y_{n+2}+2(n+1)xy_{n+1}+n(n+1)y_n=0$	8	CO1	BL2	1.1.2

END SEMESTER EXAMINATION APRIL 2022

3	a	If $\sin(\alpha+i\beta)=x+iy$, Prove that (i) $\frac{x^2}{\cosh^2\beta}+\frac{y^2}{\sinh^2\beta}=1$ (ii) $\frac{x^2}{\sin^2\alpha}-\frac{y^2}{\cos^2\alpha}=1$	6	CO3	BL5	1.1.1
	b	Prove that $\cos^{-1}x=\frac{\pi}{2}-\left(x+\frac{x^3}{6}+\frac{3}{40}x^5+\cdots\right)$	6	CO1	BL5	1.1.1
	c	Find the value of n so that $u=t^n e^{-r^2/4t}$ satisfies the equation $\frac{\partial u}{\partial t}=\frac{1}{r^2}\frac{\partial}{\partial r}\left[r^2\frac{\partial u}{\partial r}\right]$	8	CO2	BL2	1.1.3
4	a	Find all the roots of the equation $x^7+x^4+ix^3+i=0$	6	CO3	BL4	1.1.1
	b	Prove that $\bar{F}=(x+2y+az)\hat{i}+(bx-3y-z)\hat{j}+(4x+cy+2z)\hat{k}$ is solenoidal and determine constants a, b, and c if $\bar{F}$ is irrotational.	6	CO4	BL4	1.1.1
	c	If $u=(1-2xy+y^2)^{-1/2}$, Prove that $\frac{\partial}{\partial x}\left[(1-x^2)\frac{\partial u}{\partial x}\right]+\frac{\partial}{\partial y}\left[y^2\frac{\partial u}{\partial y}\right]=0$	8	CO2	BL3	1.1.2
5	a	Prove that $(1+i\tan\alpha)^{-i}=e^{\alpha}\cdot[\cos(\log\cos\alpha)+i\sin(\log\cos\alpha)]$	6	CO3	BL5	1.1.3
	b	Find n^{th} derivative of $y=\frac{8x}{x^3-2x^2-4x+8}$	6	CO1	BL3	1.1.1
	c	Find the Directional Derivative of $\phi=xy(x-y+z)$ at $P(1,2,1)$ in the direction of normal to the surface $x^2+y^2+az^2=4$ at $Q(1,1,1)$	8	CO4	BL4	1.1.1

END SEMESTER EXAMINATION APRIL 2022

6	a	Prove that $\log\left[\frac{\sin(x+iy)}{\sin(x-iy)}\right] = 2i\tan^{-1}(\cot x \cdot \tanh y)$	6	CO3	BL5	1.1.1
	b	Evaluate $\lim_{x\to 0} \frac{\tan x.\tan^{-1} x - x^2}{x^6}$	6	CO2	BL3	1.1.2
	c	Expand $\log\left[\tan\left(x+\frac{\pi}{4}\right)\right]$ in positive powers of x (up to x^5)	8	CO2	BL4	1.1.3
7	a	Find the constants a and b so that the surface $ax^2 - byz = (a+2)x$ will be orthogonal to the surface $4x^2y + z^3 = 4$ at $(1,-1,2)$	6	CO4	BL4	1.2.1
	b	Find the maximum and minimum values of the function $f(x,y) = x - 2y + 5z$ on the circle $x^2 + y^2 + z^2 = 30$, using the method of Lagrange's multipliers	6	CO2	BL1	1.3.2
	c	Prove that $\tan^{-1}\left[i\left(\frac{x-a}{x+a}\right)\right] = \frac{i}{2}\log\frac{x}{a}$	8	CO3	BL2	1.1.3

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END SEMESTER EXAMINATION JUNE 2022

F. Y. B. Tech (C-M-E) Sem I 20/6/22.

Program: First Year Engineering (C-M-E) **Duration: 3 Hours**

Course Code: BS-BT101 **Maximum Points: 100**

Course Name: Differential Calculus and Complex Numbers **Semester: I**

Note:

1. **Attempt Any Five Questions**
2. **Answers to the sub questions should be grouped together**

		Questions	Points	CO	BL	PI
1	a	If $\tanh x = \frac{1}{2}$, find $\sinh 2x$ and $\cosh 2x$	6	CO3	BL3	1.1.2
	b	Find the point on the surface $z^2 = xy+1$, nearest to origin. Also find the distance.	6	CO2	BL5	1.1.1
	c	If $z = f(x,y)$, $x = u\cosh v$, $y = u\sinh v$ then prove that $\left(\frac{\partial z}{\partial u}\right)^2 - \frac{1}{u^2}\left(\frac{\partial z}{\partial v}\right)^2 = \left(\frac{\partial z}{\partial x}\right)^2 - \left(\frac{\partial z}{\partial y}\right)^2$	8	CO2	BL4	1.2.1
2	a	If $u = \frac{x^2y^2z^2}{x^2+y^2+z^2} + \cos\left(\frac{xy+yz}{x^2+y^2+z^2}\right)$, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = 4\left(\frac{x^2y^2z^2}{x^2+y^2+z^2}\right)$	6	CO2	BL3	1.1.1
	b	Prove that $\sin^5\theta = \frac{1}{16}[\sin 5\theta - 5\sin 3\theta + 10\sin\theta]$	6	CO3	BL1	1.1.1
	c	If $y = (x^2-1)^n$, prove that $(x^2-1)y_{n+2} + 2xy_{n+1} - n(n+1)y_n = 0$	8	CO1	BL2	1.1.2

END SEMESTER EXAMINATION JUNE 2022

3	a	If $\cos(\alpha+i\beta)=x+iy$, Prove that $(i)\ \frac{x^2}{\cosh^2\beta}+\frac{y^2}{\sinh^2\beta}=1$ $(ii)\ \frac{x^2}{\cos^2\alpha}-\frac{y^2}{\sin^2\alpha}=1$	6	CO3	BL5	1.1.1
	b	Expand $e^{x\cos x}$ in positive powers of x up to x^4	6	CO1	BL5	1.1.1
	c	Find the value of n so that $u=t^n e^{-r^2/4t}$ satisfies the equation $\frac{\partial u}{\partial t}=\frac{1}{r^2}\frac{\partial}{\partial r}\left[r^2\frac{\partial u}{\partial r}\right]$	8	CO2	BL2	1.1.3
4	a	If ω is a complex cube root of unity, Prove that $(1-\omega)^6=-27$	6	CO3	BL4	1.1.1
	b	Prove that $\nabla\cdot\hat{r}=\frac{2}{r}$	6	CO4	BL4	1.1.1
	c	If $u=\left(1-2xy+y^2\right)^{-1/2}$, Prove that $\frac{\partial}{\partial x}\left[(1-x^2)\frac{\partial u}{\partial x}\right]+\frac{\partial}{\partial y}\left[y^2\frac{\partial u}{\partial y}\right]=0$	8	CO2	BL3	1.1.2
5	a	If $\tan(x+iy)=\sin(u+iv)$, Prove that $\frac{\sin 2x}{\sinh 2y}=\frac{\tan u}{\tanh v}$	6	CO3	BL5	1.1.3
	b	Find n^{th} derivative of $y=\frac{x^2-x+1}{(x+1)^2(3x-2)}$	6	CO1	BL3	1.1.1
	c	Find the rate of change of xyz at $(1,-1,2)$ in the direction of normal to the surface $x^2y+y^2z+yz^2=3$ at $(1,1,1)$	8	CO4	BL4	1.1.1

END SEMESTER EXAMINATION JUNE 2022

6	a	If $\tan\left(\frac{\pi}{4}+iy\right)=re^{i\theta}$, Show that (i) $r=1$ (ii) $\tan\theta=\sinh 2y$ (iii) $\tanh y=\tan\frac{\theta}{2}$	6	CO3	BL5	1.1.1
	b	Evaluate $\lim_{x\to 0}\ \frac{\sin x.\sin^{-1}x-x^2}{x^6}$	6	CO2	BL3	1.1.2
	c	Expand $\log\left[\tan\left(x+\frac{\pi}{4}\right)\right]$ in positive powers of x (up to x^5)	8	CO2	BL4	1.1.3
7	a	Find the constants a and b so that the surface $ax^2-byz=(a+2)x$ will be orthogonal to the surface $4x^2y+z^3=4$ at $(1,-1,2)$	6	CO4	BL4	1.2.1
	b	Find the maximum and minimum values of the function $f(x,y)=x-2y+5z$ on the circle $x^2+y^2+z^2=30$, using the method of Lagrange's multipliers	6	CO2	BL1	1.3.2
	c	Prove that $\sin^{-1}\left(e^{i\theta}\right)=\cos^{-1}\left(\sqrt{\sin\theta}\right)+i\log\left(\sqrt{\sin\theta}+\sqrt{1+\sin\theta}\right)$	8	CO3	BL2	1.1.3

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S. Y. B. Tech (Civil) Sem III 7/3/22

RE- EXAMINATION MARCH 2022

Program: CIVIL **Duration: 03 Hours**

Course Code: BS-BTC301 **Maximum Points:100**

Course Name: ENGINEERING MATHEMATICS-III **Semester: III**

- **Attempt any five out of seven questions**
- **Use of scientific calculator is allowed.**

QNO.	QUESTION	POINTS	CO	BL	PI
QI a)	Test the analyticity of the function $w = \sin z$ and hence derive that: $\frac{d}{dz}(\sin z) = \cos z$	06	2	2	1.1.1
QI b)	Express the matrix $A = \begin{bmatrix} 1+i & 2 & 5-5i \\ 2i & 2+i & 4+2i \\ -1+i & -4 & 7 \end{bmatrix}$ as the sum of Hermitian matrix and skew – Hermitian matrix.	06	2	3	2.1.3
QI c)	Using convolution theorem evaluate $L^{-1}\left\{\frac{s}{(s^2+4)(s^2+1)}\right\}$	08	1	1	2.1.4
QII a)	Using Laplace Transform Evaluate $\int_0^\infty \frac{\cos 6t - \cos 4t}{t} dt$	06	1	2	1.1.2
QII b)	Determine values of P, Q, R when $\begin{bmatrix} 0 & 2Q & R \\ P & Q & -R \\ P & -Q & R \end{bmatrix}$ is orthogonal	06	3	2	2.1.3
QII c)	Find the eigen values and eigenvectors of the matrix $A = \begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$	08	3	3	2.1.4

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RE- EXAMINATION MARCH 2022

QIII a)	Evaluate : L $\{t\sin 2t\cosh t\}$	06	1	2	1.1.2
QIII b)	Evaluate: $L^{-1}\left\{\frac{s}{(s+1)(s^2+4)}\right\}$	06	1	2	1.1.2
QIII c)	Find the characteristic equation of the matrix $A=\begin{bmatrix}2&1&1\\0&1&0\\1&1&2\end{bmatrix}$. Verify Cayley – Hamilton theorem and hence evaluate the matrix equation. $A^8-5A^7+7A^6-3A^5+A^4-5A^3-8A^2+2A-I$	08	3	1	2.1.4
QIV a)	Find the bilinear transformation which maps z = 2, 1, 0 onto w = 1, 0, i	06	2	3	2.3.1
QIV b)	Find the rank of $\begin{bmatrix}2&3&-1&-1\\1&-1&-2&-4\\3&1&3&-2\\6&3&0&-7\end{bmatrix}$	06	3	2	1.1.3
QIV c)	Find L $\left[\frac{d}{dt}\left(\frac{1-\cos 2t}{t}\right)\right]$	08	1	1	2.3.4
QV a)	Given $f(t)=\begin{cases}t+1, & 0\le t\le 2\\ 3, & t>2\end{cases}$ find L$[f(t)]$, L $[f'(t)]$	06	1	1	2.3.1
QV b)	Find Laplace transforms of $f(t)=\begin{cases}1, 0\le t<a\\ -1, a<t<2a\end{cases}$ where f(t) is a periodic function with period 2a	06	1	2	1.1.2
QV c)	Find the analytic function whose real part is $u=e^x(x\cos y-y\sin y)$	08	2	2	2.3.4

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RE- EXAMINATION MARCH 2022

QVI a)	Find the image of $\|z-3i\|=3$ under the mapping $w=\frac{1}{z}$.	06	2	1	1.1.3
QVI b)	Find P and Q such that P F Q is in normal form hence find rank of F $F=\begin{bmatrix}2&1&4\\3&2&2\\7&4&10\\1&0&6\end{bmatrix}$	06	3	3	2.1.4
QVI c)	Solve $y''+y=t$ Given $y(0)=1$ $y'(0)=-2$	08	1	1	1.1.1
QVIIa)	Find the image of the circle $\|z-1\|=1$ in the complex plane under the mapping $w=\frac{1}{z}$.	06	2	3	2.1.3
QVIIb)	Evaluate: $L^{-1}\left\{\tan^{-1}\left(\frac{2}{s^2}\right)\right\}$	06	1	2	1.1.2
QVIIc)	Test for consistency and solve: $5x+3y+7z=4, 3x+26y+2z=9, 7x+2y+10z=5$	08	3	2	2.3.4

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End Semester Re-Examination 2022

8/3/22

S.Y. B.Tech (Civil) Sem III

Program: B. Tech. Civil Engineering **Duration: 3 hrs.**

Course Code: PE-BTC303 **Maximum Points: 100**

Course Name: Basics of Surveying **Semester: III**

Notes:

1. There are **TOTAL FIVE MAIN** questions, each of **20 points**.
2. **ALL MAIN QUESTIONS** are compulsory.
3. Write **answer to each question on a new page.**
4. Answers to be accompanied with **appropriate sketches/facts & figures/table or chart/graph/diagram/flowchart** wherever necessary or required.
5. Assume suitable data wherever needed and state it clearly.

Q.No.	Questions	Points	CO	BL	PI
1.A	**Answer the following:** 1. Which of the following cannot be done with the help of theodolite in surveying? a) Measuring horizontal distances b) Prolonging survey lines c) Laying off horizontal angles d) Locating points on lines 2. Pick up the correct statement from the following : a) the eyepiece plays no part in defining the line of sight b) the diaphragm plays no part in defining the line of sight c) the optical centre of the objective plays no part in defining the line of sight d) none of these. 3. In levelling operation a) If second reading is more than first, it represents a rise b) If first reading is more than second, it represents a rise c) If first reading is less than second, it represents a fall d) (D) Both (b) and (c) 4. Bowditch rule is applied to a) An open traverse for graphical adjustment b) A closed traverse for adjustment of closing error c) Determine the effect of local attraction d) None of the above 5. The difference of levels between two stations A and B is to be determined. For best results, the instrument station should be a) Equidistant from A and B b) Closer to the higher station c) Closer to the lower station d) As far as possible from the line AB 6. Which of the following is not a natural error in compass surveying? a) Local attraction due to the proximity of local attraction	10	1	1	

	forces b) Pivot being bent c) Magnetic changes in the atmosphere due to clouds and Strom's d) Variation in declination 7. Detailed plotting in plane table surveying is generally done by a) Radiation b) Traversing c) Resection d) All of the above 8. In levelling operation a) When the instrument is being shifted, the staff must not be moved b) When the staff is being carried forward, the instrument must remain stationary c) Both (a) and (b) d) Neither (a) nor (b) 9. The bearings of the lines AB and BC are 146° 30' and 68° 30'. The included angle ABC is a) 102° b) 78° c) 45° d) None of these 10. The most reliable method of plotting a theodolite traverse, is a) by consecutive co-ordinates of each station b) by independent co-ordinates of each station c) by plotting included angles and scaling off each traverse leg d) by the tangent method of plotting.				
1.B	1. Define: Azimuth and Trunnion axis 2. Classify Surveying on the basis of instruments used. 3. Differentiate between line of collimation and height of instrument 4. Write in short: GTS and temporary benchmark 5. With neat sketch define Closed traverse and Open traverse.	**10**	**1**	**1**	
2.A	The following bearings were observed at a place where local attraction was suspected. State which stations were affected and by how much. Determine the corrected bearings.	**10**	**2**	**3**	
2.B	Describe the temporary adjustments of a level in a field.	**10**	**3**	**1**	
3.A	Write short notes on: a) Whole circle bearing and Reduced bearing b) Bowditch rule	**10**	**3**	**1**	

Line	Fore bearing (FB)	Back bearing (BB)
AB	48°25'	230°00'
BC	177°45'	356°00'
CD	104°15'	284°55'
DE	165°15'	345°15'
EA	259°30'	79°00'

3.B	When would you recommend Profile levelling? Describe the procedure of taking and recording readings during a profile levelling.	**10**	**3**	**3**	
4.A	The following consecutive readings were taken with a level and a 4-metre levelling staff on a continuously sloping ground at common intervals of 15m: 0.915, 1.255, 1.725, 3.055, 1.025, 2.625, 2.935, 3.155, 0.575, 1.505, 2.165 The instrument was shifted after the fourth and eighth readings. The chainage and Reduced level (RL) of the first point was 180m and 18.315m respectively. Prepare a field book (2). Determine the RLs of all points (5). Apply usual checks (2). Draw the longitudinal section (3). Determine the gradient between the first and the last point (3).	**15**	**2**	**3**	
4.B	State different methods of plane table surveying. Describe the method of intersection.	**5**	**2**	**3**	
5.A	The following offsets (in metres) were taken at 30m intervals from a survey line to an irregular boundary line: 0, 7.4, 5.6, 6.3, 6.9, 7.5, 8.3, 0 Calculate the area enclosed between the survey line, the irregular boundary line and the first and the last offsets by the trapezoidal rule and Simpson's rule.	**10**	**2**	**3**	
5.B	Stations P and Q are 200m apart on the right bank of a river flowing from east to west. A tree on the left bank is observed from P and Q. The bearings of the tree are 20° and 330° respectively as observed clockwise w.r.t the north. Find the width of the river.	**10**	**2**	**3**	

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10/3/22

RE- EXAMINATION-MARCH -2022

Program: Civil Engineering S.Y. B.Tech (Civil) Sem III **Duration: 3 hrs.**

Course Code: ES-BTC-304 **Maximum Points: 100**

Course Name: Building Drawing with CAD **Semester: III**

Notes:

1. **All questions are compulsory**
2. **Illustrate answer with neat sketches wherever required.**
3. **Make suitable assumptions where necessary and state them clearly.**

Q.No.	Questions	Marks	BL	CO	PO	PI Code
1.	Draw to a suitable scale ground floor plan of G+1 storey bungalow for an Doctor in a site of the data given below. 1. Plot size: 20M x 24M. 2. Road is on southern side parallel to 18 M direction 3. Wind direction is S-SW-W & climatic zone is hot and humid. 4. Requirements of Doctor a. Clinic b. Master bed room c. Living room d. Children bed room e. Kitchen cum dining room f. Guest bed room g. Staircase/bath/WC/store/verandah are to be provided	20	1	1-3	1	1.3.1
2	A. Draw to a suitable scale line plan of first floor for Q.1. B. State: Built up area, carpet area, super built up area, FSI for Q.1.	20	2	1	1	1.3.1
3	A. Draw to a suitable scale line plan of Bank building in a site given 20 M X 30 M B. Draw to a suitable scale Terrace plan of first floor for Q.1.	20	3	3	1,2	1.3.1/ 2.1.3
4	A. Explain the duties & responsibilities of Contractor/Builder & buyer under Real estate regulation act, 2016. B. Explain how privacy and circulation is to be maintained in a planning of residential building.	20	2	2	1	1.3.1
5	A. Draw to a suitable scale Site plan for Q.1. B. Explain how to fix a height of building and byelaws for open space in group housing.	20	3	3	1,2	1.3.1/ 2.1.3