FACULTY OF ENGINEERING

B.E. 2/4 (Civil) I – Semester (Old) Examination, December 2015

Subject: Surveying – I

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

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

PART – A (25 Marks)

1 What is Topographic surveying?
2 The distance measured between two points on a sloping ground is 400 mts. Find the correction to be applied and the horizontal distance if the difference in elevation between the two points is 40 mts.
3 What are Isogonic and Agonic lines?
4 Differentiate between true bearing and whole circle bearing.
5 What are the different types of plane tables? Give the uses and dimensions of each.
6 Draw a neat sketch of Indian pattern clinometer and label the component parts.
7 What is plus sight?
8 What is Hypsometry?
9 What is a contour? Enlist two properties of contours.
10 Explain the direct method of contouring.

PART – B (50 Marks)

11 a) Write a note about the different types of tapes.   3
   b) To continue a survey line AB past an obstacle, a 210 mt long line BC was set out perpendicular to AB, and from C angles BCD and BCE were set out at 45° and 30° respectively. Determine the lengths which must be chained off along CD and CE in order that ED may be in line with AB produced. Also determine the obstructed length.   7

12 The following bearings were observed in running a compass traverse. Find the correct fore and back bearings and the true bearings of the lines, given that the magnetic declination is 1°45' west.   10

Line	Fore Bearing	Back bearing
AB	66°15'	244°00'
BC	129°45'	313°00'
CD	218°30'	37°30'
DA	306°45'	126°45'

13 a) Define two point problem.   3
   b) Explain the graphical method of solving three point problem.   7

14 In a preliminary survey, a line of levels was run from a bench mark of R.L 454.650 mts and the following readings were obtained:
Back sights – 2.545, 3.865, 2.670 and 1.125.
Fore sights – 1.365, 2.945 and 1.885.
From the last position of the instrument, five pegs at 25 mts intervals are to be set out on a uniformly rising gradient of 1 in 45. The first peg is to have an R.L of 455.110 mts. Work out the staff readings required for setting the tops of the pegs on the given gradient and enter them in a level book page. Work out the R.L's by rise and fall method. Apply the usual checks.   10

15 Calculate the volume of earthwork using Simpson's rule and trapezoidal rule for the embankment for which the cross-sectional areas at 20 mts intervals are as follows: 10

Distance (mts)	0	20	40	60	80	100	120
Cross-sectional area (m^2	42	64	72	16	18	26	11

16 a) A base line is measured with a steel tape. It is approximately 1000 mts long. Calculate the correct length of the baseline at M.S.L. when the pull at the standardization equals 15 kg. The pull applied is 23 kg, cross-sectional area of the tape is 0.0645 cm^2, E = 2.11 x 10^6 kg/cm^2, temperatures T_m and T_o are 35°C and 15°C respectively. The difference of level between the two ends of the base line is 2.0 m. The radius of earth ; R = 6400 kms. Also, elevation of baseline above M.S.L. is 1000 and $r = 12 \times 10^{-6}$. 7

b) Enumerate the permanent adjustments of Prismatic Compass. 3

17 Write short notes on the following : 10
   a) Adjustment of closing error graphically by Bowditch method
   b) Plane Table Contouring
   c) Hand signals to be made for taking observations white performing leveling work.

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FACULTY OF ENGINEERING

B.E. 2/4 (Civil) I - Semester (New) (Main) Examination, December 2015

Subject : Surveying - I

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

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

PART – A (25 Marks)

1	State the principles of surveying.	2
2	Who is Follower and Leader?	2
3	What are the different types of survey stations? Discuss them in brief.	3
4	Define the terms : Bearing and Index sketch.	2
5	Write about Dip of Magnetic needle.	2
6	Differentiate between plane table survey and compass survey.	3
7	What is sensitiveness of bubble?	2
8	What is Bench mark? What are different types of Bench marks?	3
9	Define : Contour, contour map and contour interval.	3
10	Calculate the volume of earthwork in an embankment for which the crossectional areas at 20m interval are as follows : Use a) End Area formula b) Prismoidal formula	3

Distance	0	20	40	60	80	100	120
Crossectional area (m^2)	42	64	72	16	18	26	11

PART – B (50 Marks)

11 a) What is a well conditioned triangle? Why is it necessary to use well conditioned triangle. 3

b) The area of the plan of an old survey plotted to a scale of 20m to 1 cm measures now as 125.6 sq.cm as found by planimeter. The plan is found to have shrunk, so that a line originally 10 cm long now measures 9.6 cm only. There was also a note on the plan that the 20m chain used was 6 cm too short. Find the true area of the field. 7

12 a) Differentiate between the following : i) Quadrental bearing and Whole Circle bearing ii) Isogonic lines and Agonic lines iii) Magnetic meridian and true meridian. 5

b) The following are the bearings of the lines of traverse ABCDEA, with the compass of an area where local attraction was suspected. Find the correct bearings of lines. 5

Line	Fore bearing	Back bearing
AB	191^{0}45'	13^{0}0'
BC	39^{0}30'	222^{0}30'
CD	22^{0}15'	200^{0}30'
DE	242^{0}45'	62^{0}45'
EA	330^{0}15'	147^{0}45'

13 What is two-point problem and how it is solved? Explain in detail. 10

14 a) A man at a position 10m above mean sea level observes peak of a hill. The distance between man and hill is 80km. Find the height of the hill. 5

   b) The following staff readings were recorded in leveling operation 1.185, 2.605, 1.925, 2.305, 1.155, 0.864, 1.105, 1.685, 1.215, 1.545 and 0.605. A is the B.M of R.L 185.685m. Find the R.L's of the other points of H.I methods. The first reading was taken at point A and the instrument was shifted after the readings 2.604, 0.864 and 1.215. 5

15 a) State the characteristics of a contour. 3

   b) A railway embankment is 12m wide. The ground is leveled in the direction of transverse to the central line. Calculate the volume contained in a 100m length by Trapezoidal rule and Prismoidal rule. If the side slope is 1.5:1. The central height at 20m interval are 3.7, 2.6, 4.0, 3.4, 2.8, 3.0 and 2.2m respectively.

16 a) The following are the observations made during the testing of a Dumpy Level.

Instrument At	Staff Reading At		Remark
	A	B	
A	1.725	2.245	RL of A = 450.0m
B	2.145	3.045	

Distance between A and B = 200 m

   Is the instrument in adjustment. To what reading should the line of collimation be adjusted when the instrument is at B. Find the R.L of B. 5

   b) Explain with a neat sketch the principle and use of an optical square and open cross staff. 5

17 Write short notes on : 10
   a) Types of chains used in surveying
   b) Differentiate between Prismatic and Surveyor's compass
   c) Contour, gradient, uses of contour maps, limitations of Trapezoidal and Simpsons rule.

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FACULTY OF ENGINEERING
B.E. 2/4 (EE/Inst.) I – Semester (Old) Examination, December 2015

Subject: Electronic Engineering – I

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

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

PART – A (25 Marks)

1. Determine the ac resistance for a semiconductor diode having a forward bias of 200mV and reverse saturation current of 1µA at room temperature.   3
2. Draw the circuit of bridge rectifier and explain its advantages over other rectifiers.   3
3. Define   and   for a transistor and derive the relation between them.   3
4. What is operating point? Explain its physical significance.   3
5. Compare JFET and MOSFET.   2
6. How does TRIAC differs from an SCR.   2
7. Draw any one of the low frequency BJT amplifier circuit.   2
8. State Millers theorem.   2
9. What is the effect of emitter bypass capacitor on low frequency response with respect to multistage amplifier?   3
10. Why are coupling capacitors not required in transformer coupled amplifier?   2

PART – B (50 Marks)

11 a) Draw the circuit of half wave PN junction diode rectifier and explain the operation with relevant sketches. Obtain an expression for the ripple factor and efficiency of the same circuit.   7
   b) Explain about the temperature dependence of PN diodes.   3

12 a) Give the difference between ac and dc load line. Derive the load line equation of a BJT in common emitter configuration.   5
   b) A transistor has its h-parameters given by 1K ,50, 2.5x10^{-4} and 25µA/V in common emitter configuration using a load resistance of 5K   and a source resistance of 1K .Calculate A_V, A_{VS}, A_I, A_{IS} ,,R_i, and R_o.   5

13 a) Draw the structure with of a JFET and explain its principle of operation with neat diagrams along the V-I characteristics. Define pinch-off voltage and mark it on the characteristics.   6
   b) Draw and explain V-I characteristics of UJT.   4

14 a) What are the different methods of cascading used in multistage amplifiers? What is the effect of cascading on voltage gain and bandwidth?   5
   b) Discuss the difference amplifier in detail with circuit diagram.   5

15 a) Derive an expression for the upper cut-off frequency for RC coupled transistor amplifier with a neat circuit diagram.   6
   b) Discuss the various types of distortions in the amplifier.   4

16 a) A bridge rectifier is supplying a load of 200mA at 30V.It uses a pi-section filter with a choke of 0.5H and two capacitors each of 80 µF. Assume supply frequency of 50Hz.Find (i)The input rms voltage of secondary of the transformer. (ii) The percentage ripple in the output.   7
   b) Draw the input and output characteristics of BJT in common Base configuration.   3

17 Write short notes on any of two of the following: 10
   a) SCR b) CC amplifier c) Step response of an amplifier.

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FACULTY OF ENGINEERING

B.E. 2/4 (EEE / Inst.) I – Semester (New) (Main) Examination, December 2015

Subject: Electronic Engineering – I

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

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

PART – A (25 Marks)

1 State advantages and disadvantages of Bridge Rectifier Circuit.   3
2 Briefly explain effect of temperature on diode characteristics.   2
3 Define three types of stability factors and explain.   3
4 Explain how you will obtain graphically hybrid parameters of a transistor.   3
5 What is Zener breakdown and avalanche breakdown?   2
6 Draw the small signal equivalent model of JFET.   3
7 State and prove Miller's theorem.   3
8 Compare Depletion versus Enhancement MOSFET's.   2
9 Obtain relationship between alpha, beta and gamma.   2
10 Compare LED and LCD.   2

PART – B (50 Marks)

11 a) Explain why zener diode is used as Voltage Regulator.   5
    b) Draw and explain V-I characteristics of p-n junction diode.   5

12 a) A full wave rectifier uses a diode with forward resistance of 1 ohm. The transformer secondary is centre tapped with output of 10-0-10 V rms; and has resistance of 5 ohms for each half section. Calculate No load DC Voltage; DC output voltage at 100 mA and % regulation at 100 mA.   7
    b) What is Varactor diode?   3

13 a) Explain operation of Common Base configuration of BJT to obtain input and output characteristics?   5
    b) What is thermal runaway in BJT? How can it be addressed?   5

14 a) Draw and explain h-parameter small signal model of CB configuration of BJT.   5
    b) Explain the principle of operation of Traic.   5

15 a) Show that for a JFET $I_D = I_{DSS} [1 - V_{GS} / V_{PINCH}]^2$.   5
    b) Compare BJT versus JFET.   5

16 a) Draw the equivalent circuit and characteristics of UJT? Explain its operation.   5
    b) Draw the circuit diagram of SCR and explain its principle for obtaining characteristics?   5

17 Write short notes on the following: 10
    a) Cathode Ray Oscilloscope
    b) Bias compensation technique of BJT
    c) Biasing of JFET

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FACULTY OF ENGINEERING

B.E. 2/4 (ECE) I - Semester (Old) Examination, December 2015

Subject : Electrical Technology

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

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

PART – A (25 Marks)

1	Different types of losses in DC motors.	2
2	Draw the characteristics of DC motors.	3
3	Two wattmeter method is used to measure the power absorbed by a 3- induction motor. The wattmeter readings are 12.5kW and -4.8 kW. Find i) power absorbed by the m/c ii) leading power factor iii) reactive power taken by the load.	3
4	Define voltage regulation of alternator.	2
5	Derive emf equation of the transformer.	3
6	Draw the circuit of stepup and stepdown auto transform.	2
7	An 6-pole, 50 Hz, 3 phase induction motor has a rotor emf frequence of 2Hz. Calculate slip and speed.	3
8	Why single phase induction motor are not self starting?	2
9	What are the advantage of high voltage transmission?	3
10	Advantage and disadvantage of hydro electric power plant.	2

PART – B (50 Marks)

11 a) The armature winding of a 4-pole, 250 Dc shunt motor lap connected. There are 120 slots, each slot containing 8 conductors. The flux per pole is 20 mwb and current taken by the motor is 25A. The resistance of armature and field circuit are 0.1 and 125 respectively. Calculate i) Gross torque   ii) useful torque iii) efficiency. If the rotational losses of 810W.   10

12 a) Draw Star-Delta connection of a 3- sptom and drew line and phase voltage for both star and delta conned.   5

   b) Determine voltage regulation by the synchronous impedance method of alternator.   5

13 a) Draw the phase diagram of practical transformer (capacitive on <u>ON LOAD</u>.   3

   b) A 10 KVA 200/400V, 50 Hz, 1 transformer give the following test result
   OC test (HV winding open) 200V 1.3A 120W
   SC test (LV winding short) 22 V   30A   200W
   Find the parameter as referred to LV side.   7

14 a) Explain about power stages in 3 inductor motor.   4

   b) Draw the slip-torque characteristic of 3 induction motor.   2

   c) Explain about capacitor start-1 induction motor.   4

15 Explain about thermal power station with neat diagram.   10

16 a) Derive the torque equation of DC motor.   5

   b) Explain about Auto-transformer starter in 3 induction motor.   5

17 a) Explain about using of copper in single phase auto transformer.   5

   b) Explain about regulation and efficiency of transmission line.   5

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FACULTY OF ENGINEERING
B.E. 2/4 (ECE) I – Semester (New) (Main) Examination, December 2015

Subject: Electrical Technology

Time: 3 Hours   Max.Marks: 75

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

PART – A (25 Marks)

1 What do you understand by commutation in DC machines.   2
2 A 250 V DC shunt motor draws 51 A and has field and armature resistance of 250Ω
   and 0.2Ω respectively. Find the back emf.   3
3 Write the equation for the torque developed in DC motor.   3
4 The reading of two wattmeters of 3-phase power measurement are 50 W and 100 W
   respectively. Calculate power factor.   2
5 Derive emf equation of alternator.   3
6 Mention the different types of alternators.   2
7 Why transformer rating is in KVA?   2
8 If iron and copper losses at half load are 100 W and 200 W respectively, the full load
   iron and copper losses are _____.   3
9 Define the terms slip and synchronous speed.   2
10 Write about power stages in induction motor.   3

PART – B (50 Marks)

11 a) Explain the various speed control methods of DC shunt motor.   6
   b) Derive the emf equation of DC machine.   4

12 a) Derive the relationship between line and phase quantity of voltage and current in
      star and delta connected system. Draw the phasor diagram.   5
   b) Three coils each consists of resistance 40Ω and reactance 30Ω are connected (i)
      in Star (ii) in Delta to a 400 V, 3ϕ supply. Find the line current, and total power in
      each case.   5

13 a) A 550 V, 55 K VA, 1w phase alternator has an effective armature resistance of 0.2Ω
      and a synchronous reactance of 2.25Ω. Calculate the voltage regulations at full
      load, 0.8 pf leading.   5
   b) Write about armature reaction in alternator.   5

14 a) Explain how the efficiency of a transformer may be estimated from the open circuit
      and short circuit test.   5
   b) Discuss the principle of operation and application of single phase auto transformer. 5

15 a) Explain the principle of rotating magnetic field and hence prove it is of constant
      magnitude and rotating at synchronous speed.   5
   b) Explain about shaded pole induction motor.   5

16 a) Write about operation of fluorescent lamp.   5
   b) Explain the principle and operation of DC generator.   5

17 a) Write about starting method of squirrel cage induction motor.   5
   b) Explain the various losses in transformer and maximum efficiency condition in
      transformer.   5

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FACULTY OF ENGINEERING

B.E. 2/4 (M/P/AE) I – Semester (Old) Examination, December 2015

Subject: Machine Drawing

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

Note: **Answer all questions from Part – A and Part – B. Assume any missing data suitably and mention clearly.**

PART – A (25 Marks)

1 Explain with help of neat sketches, the difference between first angle projection and third angle projection.   5

2 Draw the front view and top view as shown in Figure 1.   5

3 Draw neat and dimensioned sketches of any five forms of bolts showing clearly the method used for preventing rotation in each case.   5

4 Sketch in two views of a protected type flanged coupling for 80 mm diameter mild steel shafts.   5

5 Sketch in two views of a knuckle joint for connecting two 40 mm diameter rods. Give all important dimensions.   5

PART – B (50 Marks)

6 Assemble all parts of the lathe tail stock as shown in Figure 2 and draw

   i) Its sectional front view   25

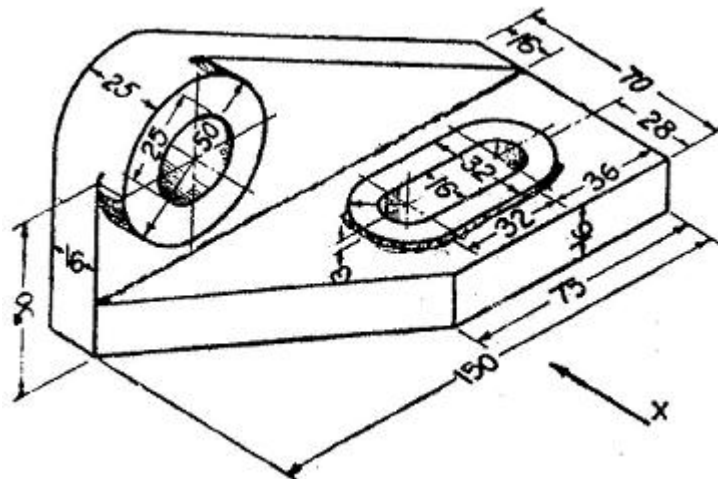   ii) Sectional right side view with the section plane passing through the clamping bolt.   25
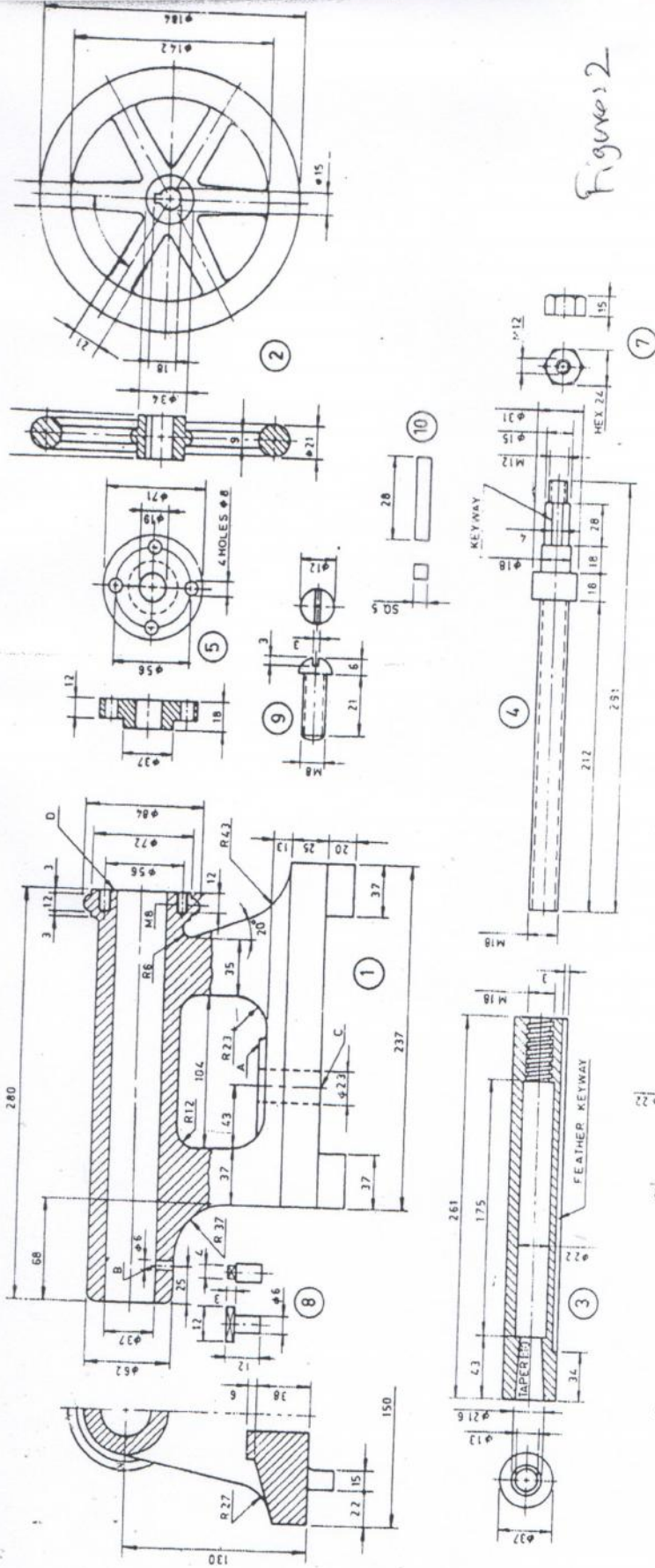

Figure – 1

…2

Figure: 2

Part List

Part No.	Name	Material	Quantity
1	Tail-stock body	C.I.	1
2	Hand wheel	C.I.	1
3	Barrel	C.I.	1
4	Spindle	M.S.	1
5	Spindle bearing	C.I.	1
6	Centre	Cast steel	1
7	Nut	M.S.	1
8	Feather	M.S.	1
8	Feather	M.S.	1
9	Set screw	M.S.	4
10	Key	M.S.	1

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FACULTY OF ENGINEERING

B.E. 2/4 (M/P/AE) I – Semester (New) (Main) Examination, December 2015

Subject: Machine Drawing

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

Note: **Answer all questions from Part-A and Part-B is compulsory.**

PART – A (5x5 = 25 Marks)

1 Sketch the orthographic projections of an hexagonal headed bolt (2 views) of size M20 and mention the proportional dimensions.

2 Sketch the front view and side view of a socket and spigot type of cotter joint to connect two rods of dia 25 mm and show all the proportional dimensions.

3 Sketch front view and top view of a single riveted single strap butt joint to connect two plates of 9 mm thickness and find other proportional dimensions like dia of rivets, margin, pitch, cross pitch and diagonal pitch.

4 Sketch a pin type flexible coupling to connect two shafts of diameter 40 mm. Mention all the dimensions by using suitable proportions.

5 For the isometric view shown in Fig. 1 below, draw the sectional front view, side view from the right and top view.
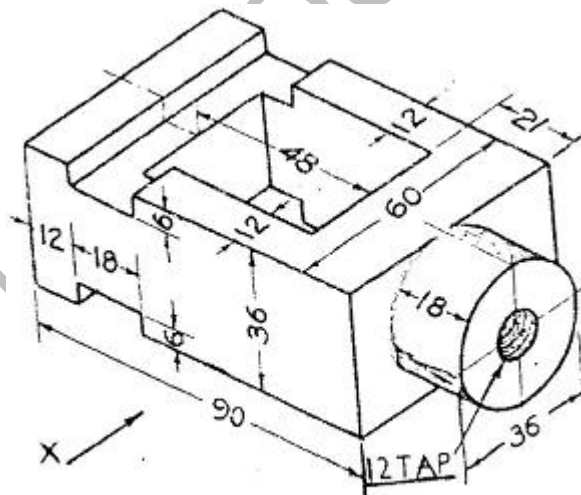

FIG·1·

PART – B (50 Marks)

6 Parts of a stuffing box are shown below in Fig. 2. Assemble all the parts and draw.

  a) Sectional front view (30 m)

  b) Top view (10 m)

  c) Side view (10 m)

using first angle projection method.
The particulars of parts are shown in Table – 1.

..2

Table – 1

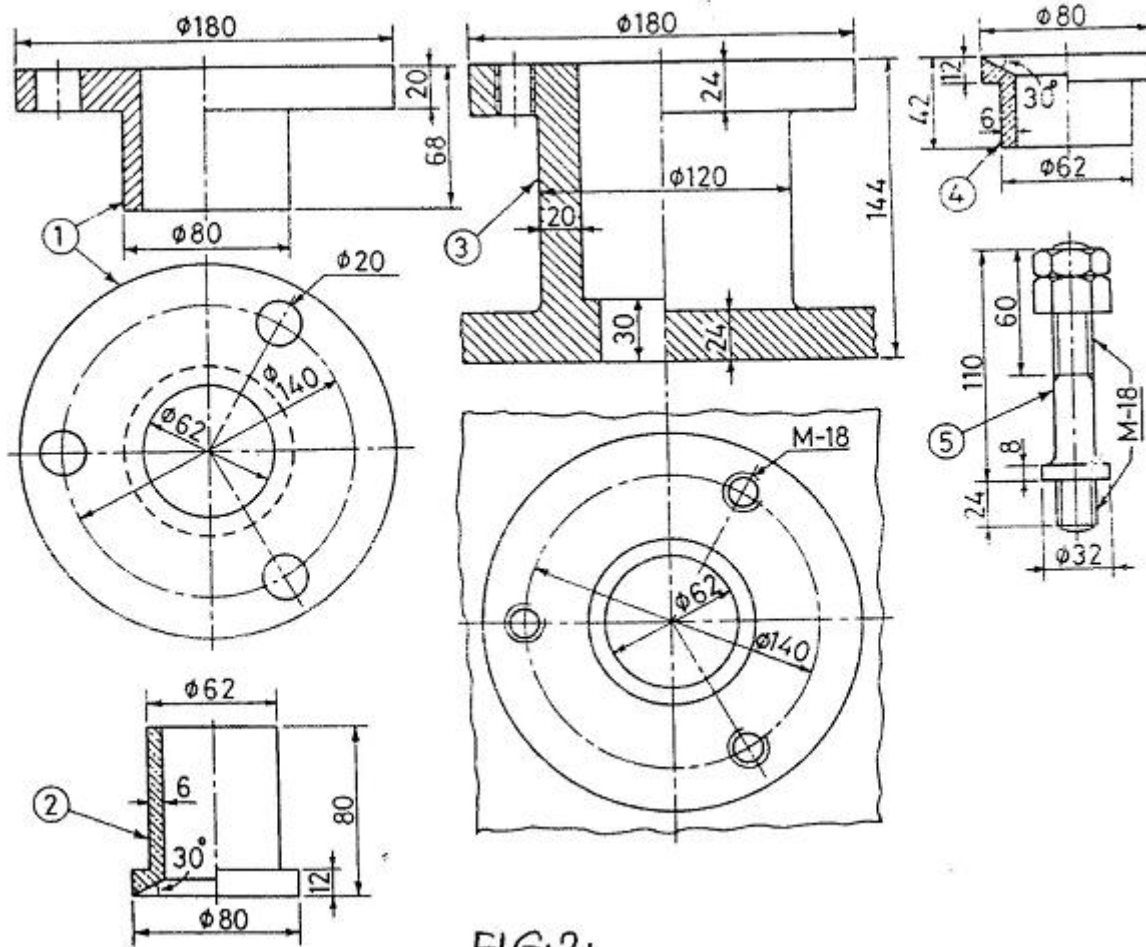| No.	Name of part	No. off	Material	Remarks
1	Gland	1	C.I.	
2	Gland bush	1	Brass	
3	Stuffing box	1	C.I.	
4	Neck bush	1	Brass	
5	Studs and nuts	3	C-30	Equally spaced at 120°.

FIG. 2.

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FACULTY OF ENGINEERING

B.E 2/4 (AE) I-Semester (New) (Main) Examination, December 2015

Subject: Automotive Engineering Drawing

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

Note: Answer all questions from Part-A and Part-B
Assume any missing data suitably and mention clearly

PART – A

1 Explain the following, indicating the symbol to be used in each case:
   a) First angle projection
   b) Third angle projection   5

2 Draw the front view and top view of figure.1.   5

3 State different types of sunk keys and sketch the sunk key with gib head 5

4 Sketch a Universal coupling.   5

5 Draw two views of the single riveted, double strap butt joint by taking thickness as
   10 mm and diameter as 20 mm.   5
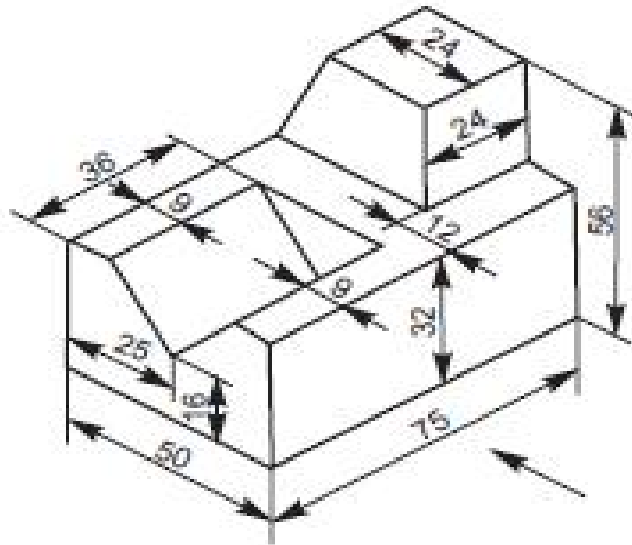
Figure 1   (All dimensions are in millimeters)

...2.

PART – B

6 Assemble all the components shown in figure. 2 to form Screw Jack and draw
a) Top view 10
  b) Side view   20
  c) Full sectional front view   20
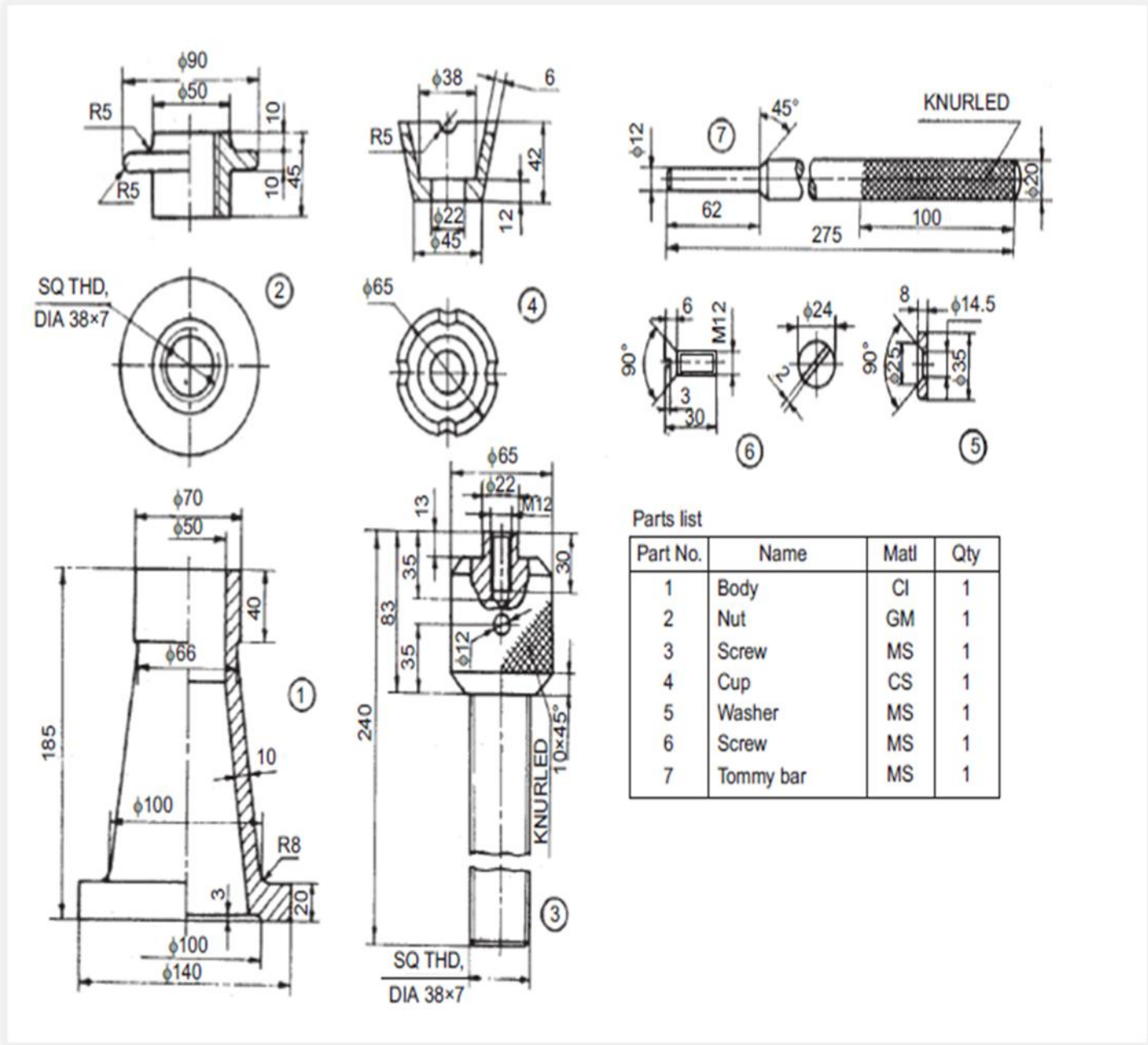
Figure 2 (All dimensions are in millimeters)

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Parts list

Part No.	Name	Matl	Qty
1	Body	CI	1
2	Nut	GM	1
3	Screw	MS	1
4	Cup	CS	1
5	Washer	MS	1
6	Screw	MS	1
7	Tommy bar	MS	1

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) I – Semester (Old) Examination, December 2015

Subject: Logic and Switching Theory

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

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

PART – A (25 Marks)

1 Convert the octal number $(326.5)_8$ in to decimal, binary and hexa decimal. (3)
2 Prove that $Y + \overline{X}Z + X\overline{Y} = X + Y + Z$. (2)
3 Represent the decimal numbers 694 and 835 in BCD and show the steps to form their sum. (3)
4 Distinguish between prime implicant and essential prime implicant. (2)
5 Design a half adder using NAND Gates. (3)
6 Distinguish between a decoder and demultiplexer. (2)
7 Distinguish between a combinational and sequential circuit. (2)
8 Draw the excitation table for a JK flip-flop and specify a method to convert JK flip-flop to D type flip-flop. (3)
9 Write a VHDL code for 4-to-1 multiplexer. (3)
10 List the properties of a symmetric function. (2)

PART – B (50 Marks)

11 a) Simplify the following Boolean function together with don't care conditions. d. (5)

     $F(x, y, z) = \Sigma m (0, 6, 8, 13, 14) + \Sigma d(2, 4, 10)$.

   b) Find the minterms of the following expression. (5)

     $F(X, Y, Z) = XY + XZ + \overline{X}YZ$

12 Simplify the function $F(w, x, y, z) = \Sigma d(0, 3, 5, 7, 8, 11, 15)$ using tabulation method and realize the function. (10)

13 a) Explain the concept of design hierarchy with suitable example. (5)
   b) Design a full subtractor. (5)

14 a) Design a 4x16 decoder using 3x8 decoders. (5)
   b) Explain about demultiplexer. (5)

15 a) Explain the Master – Slave Jk flip-flop with suitable diagram. (5)
   b) Determine whether the following function is symmetric or not (5)

     $F(A, B, C) = \Sigma(0, 3, 5, 6)$.

16 Design a synchronous sequential counter that follows the state sequence 0, 1, 3, 6, 7, 5, 4, 2 using n flip-flops. (10)

17 With short notes on:
   a) Shift register (5)
   b) Carry look ahead adder. (5)

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FACULTY OF ENGINEERING

B.E. 2/4 (CSE) I – Semester (New)(Main) Examination, December 2015

Subject: Logic and Switching Theory

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

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

PART – A (25 Marks)

1 Convert the number $(53.1575)_{10}$ to base 2 and base 8.   2

2 State and prove idempotent law.   2

3 Distinguish between prime implicant and essential prime implicant.   3

4 Design full adder circuit using two half adders and logic gate.   3

5 Define multiplexer with diagram.   2

6 What is logic simulation?   2

7 Derive the even-parity-generator truth table.   3

8 Determine the value of r.   3
     $(365)_r = (194)_{10}$

9 Define symmetric network.   2

10 Distinguish between synchronous and asynchronous sequential circuit.   3

PART – B (50 Marks)

11 Simplify the following function into sum-of-products and product-of-sum term.

     $F(A, B, C, D) = \Sigma m\ (2, 3, 5, 7, 8, 10, 12, 13)$.   10

12 a) Design a mod-8 counter with JK flip-flops.   5
   b) Explain about Shift Register.   5

13 Simplify using Quine-McCluskey method $f(w, x, y, z) = \Sigma m\ (1, 4, 6, 7, 8, 9, 10, 11, 15)$
   with the help of PI chart.   10

14 A sequential circuit has two D-type flip-flops, an input X and an output Y. It can be
   specified by the following equation: $D_A = Ax+Bx$, $D_B = A'x$, $Y = (A+B)x'$ 10
   a) Draw the logic diagram of circuit.
   b) Derive the state table and state diagram.

15 a) Design a 4-bit priority encoder circuit.   5
   b) Write a VHDL code for 2-to-4 Decoder.   5

16 Design a circuit for BCD to excess – 3 code.   10

17 Simplify the function using tabulation method   10

     $F(A, B, C, D)\ \Sigma m\ (1, 2, 3, 5, 7, 9, 10, 11, 13, 15)$

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