This question paper contains 4 printed pages.

3278 *Your Roll No.....*

B. Tech. (M) / IV **J**

Paper EME–405 (ELECTIVE – II)

TOOL ENGINEERING

Time : 3 hours *Maximum Marks* : 70

(Write your Roll No. on the top immediately on receipt of this question paper.)

Answer all questions.
Assume suitable missing data, if any.

1. (*a*) How is the size of a single point tool designated?

   (*b*) What is the major purpose of the helical flute of a twist drill?

   (*c*) What provisions are made for adjustment of mechanical chip breakers to meet the demands of different conditions?

   (*d*) Why is it necessary to know "tooth load" on a broach?

   (*e*) What materials are used in the manufacture of milling cutters? Discuss their relative advantages.

   (*f*) What do you understand by clearance between Punch and Die?

   (*g*) Explain the difference between Punching and Blanking. 14

P. T. O.

2. (*a*) Explain the importance and functions of different tool angles and other parameters associated with the geometry of a single point cutting tool. 7

(*b*) What are the common methods of chip breaking and what are the means used for the same? 7

Or

(*a*) Considering the basic qualities of a tool materials compare the following:

(*i*) Cast Alloy Steels and Carbides

(*i*) Abrasives and Diamonds. 7

(*b*) Discuss different types of tool wear. 7

3. Design a HSS single point cutting tool for rough turning.

(*i*) In orthogonal cutting the feed is 1·50 mm/rev and chip thickness after cutting is 1·75 mm and shear force is 3000 N. The tool has a rake angle of 7° and coefficient of friction is 0·8.

(*ii*) Where overhang is 1·5 times the height and bending stress is 200 N/mm^2, Young's modulus is 200 kN/mm^2.

(*iii*) If mechanical chip breaker height is 1·5 mm and radius of curvature of the chip is to be 17 mm.

Preferred size 20×12, 25×16, 32×20, 40×25 14

Or

Give a systematic procedure for designing a flat form tool. Explain each step with an example.

Discuss the applications of form tools. 14

4. (*a*) Considering the design of a milling cutter, explain how you will design the following elements:

(*i*) Outside diameter of cutter

(*ii*) Arbour design

(*iii*) Number of teeth in the cutter. 7

(*b*) How is the size of a broaching machine specified?

Calculate the effective or cutting length and the number of teeth of a broach to be used for cutting a keyway 6 mm wide, 3 mm deep in a boss 50 mm long. Allow per tooth rise 0·0875 mm. 7

Or

(*a*) Make a neat sketch of a twist drill and show various angles. 7

(*b*) (*i*) Distinguish between relief, primary and secondary clearance angles on cutter tooth. What is the purpose of each in milling cutter? Discuss.

(*ii*) Why is it important that the diameter of a face milling cutter be wider than the work piece? 7

5. (*a*) Explain the following:

(*i*) Causes of an abnormal die wear

(*ii*) Plastic deformation in bending

(*iii*) Neutral plane in bending. 7

(*b*) A steel washer of 30 mm outer diameter and 20 mm inside diameter is to be made from 1·25 mm thick sheet. If the shear stress of the material is 380 N/mm^2, calculate the following:

(*i*) Force required to produce the washer if both punches operate at the same time with no shear. What will be stripping force?

(*ii*) Force required if only one punch operates at a time.

(*iii*) Force needed if the punch has a shear of 1·2 mm and penetration is 50%. 7

Or

(*a*) What is a die? Make a neat sketch of a die and discuss the various parts. 7

(*b*) A shell of diameter 75 mm and height 200 mm is to be drawn. How many drawing operations would be necessary if there were no annealing operations, intervening? Assume reductions of 50, 40, 30% etc. for each chawing without annealing. 7

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3284 *Your Roll No.....*

B.Tech.(E) / I ... J

Paper IV EEE-104 - NETWORKS
(EEE - 104)

Time : 3 hours *Maximum Marks :70*

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any five questions.
Assume suitable missing data, if any
All questions carry equal marks.

1. a) In the circuit of Fig. 1, determine the current through the 5Ω registor using Thevenin's theorem. *(7 + 7)*

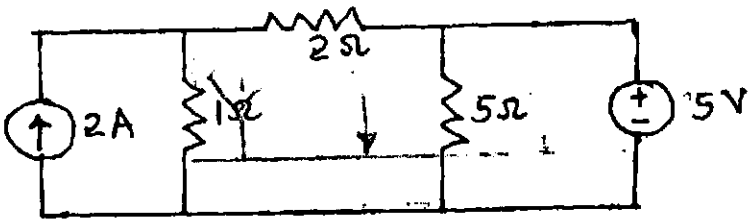

Fig. 1

b) Find the current in the 5Ω resistor for the circuit shown in Fig. 2. Use Norton's theorem.

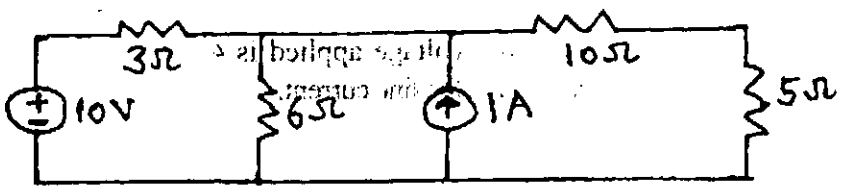

Fig. 2

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2 a) Find V_1 and V_2 in Fig.3 (7 + 7)

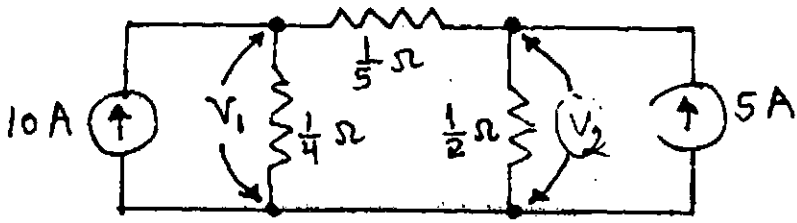

Fig. 3

b) Find V in the circuit of Fig. 4. Also obtain the numerical value of the dependent source.

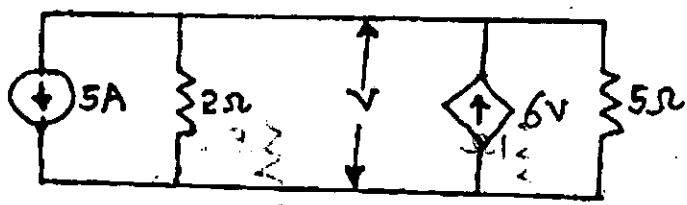

Fig. 4

3 a) Discuss the advantages of three phase system over single phase systems. (7 + 7)

b) A balanced 3 Phase load draws 8KW at a lagging p.f. of 0.8. If the line voltage applied is 440V, find the complex power and the line current.

4 a) Derive the resonance frequency of a parallel resonating circuit where a coil is connected across a a.c. voltage source of variable frequency. Also discuss the properties of resonace of parallel LRC circuit. (7 + 7)

b) A coil has a resistance of 20Ω and inductance of 80mH and is connected in series with a 100pF capacitor. Determine at resonance, the circuit impedance and also find the resonant frequency. If supply to the circuit is a 50V source, find also the circuit current and voltage across the capacitor.

5 a) Assuming $v_i(t) = tu(t)$, find i(t) in the RC circuit of Fig. 5. *(7 + 7)*

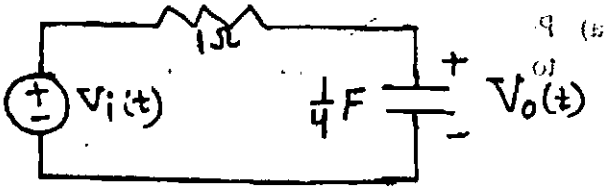

Fig. 5

b) State initial and final value theorem. The current through a circuit element is $\left(\frac{4S^2}{S+7}\right)$ Find the current in time domain as $S \rightarrow 0$ and $S \rightarrow \infty$.

6 a) Find the open circuit parameter of the two port network shown in Fig. 6 *(7 + 7)*

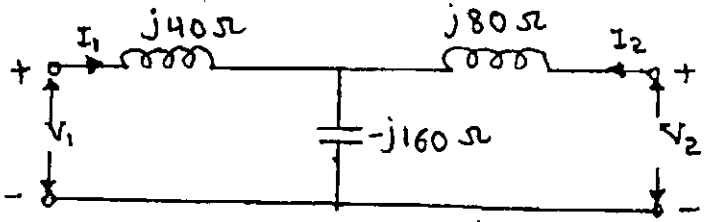

Fig. 6

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b) Explain and derive ABCD parameters of a two port network.

7 a) Express Z - parameters in terms of Y - parameters. *(7 + 7)*

b) A RL series circuit is energized by a voltage $v_i(t) = tu(t)$, find i(t). Find i(t). Assume R = 2Ω, L = 1 H.

8 a) Prove that the power transfer from a dc source network to a resistive network is maximum when the internal resistance of the dc source network is equal to the load resistance. *(7 + 7)*

b) Discuss the constant - K band stop and constant - K band pass filters.