

G 584

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Mechanical Engineering/Automobile Engineering

ELECTRICAL TECHNOLOGY (MU)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. State the different methods of cooling of transformers.
2. Describe how torque is developed in a d.c. motor.
3. "An induction motor can be considered as a generalized transformer." Explain.
4. Explain, why a synchronous motor has no starting torque.
5. Explain the dynamic breaking of d.c. motor.
6. Explain the various features of traction drives.
7. State and explain Barkhausen criteria for oscillators.
8. Draw a positive clamper and explain its working with the help of sinewave input.
9. Distinguish between Latching current and Holding current of SCR.
10. List the different types of power diodes and explain their salient features.

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each full question carries 12 marks.

11. (a) Describe the Swinburne's test for DC machines. (6 marks)
- (b) A d.c. shunt motor takes 50 A on full-load from 250 V mains. Its speed is to be raised by 40 % by weakening of the field flux. If the torque at the increased speed is 20 % more than that at the initial speed, find the percentage change in field flux. Take armature resistance as 0.5 Ω.

(6 marks)

Or

Turn over

12. Open-circuit and short-circuit tests on a 5 kVA, 200/40 V, 50 Hz, 1-phase transformer gave the following observations :

OC test : 200 V, 1A, 100 W on l.v. side

SC test : 15 V, 10A, 85 W, with primary shorted.

- (a) Draw the equivalent circuit referred to primary and label the values. (6 marks)
- (b) Calculate the approximate regulation of the transformer of 0.8 p.f. lagging, and leading. (6 marks)
13. (a) With a neat sketch, explain the operation of direct on line starter used for an induction motor. (6 marks)
- (b) The no-load excitation of an alternator required to give rated voltage is 100 A. In a short circuit test with full-load current flowing in the armature the field excitation was 80 A. Determine the approximate excitation that will be required to give full-load current at 0.8 p.f. lag and at the rated terminal voltage. (6 marks)

Or

14. (a) Draw, and explain the torque-slip characteristics of three-phase induction motor, showing clearly the starting torque, maximum torque, and normal operating region. (6 marks)
- (b) Explain the different types of excitation schemes used for a synchronous machine. (6 marks)
15. (a) State and explain the functions of various converters employed in an electric drive. (6 marks)
- (b) What are the main factors which decide the choice of electrical drive for a given application? (6 marks)

Or

16. Explain dynamic braking operation of 25 kV a.c. traction drive using thyristor converter fed d.c. motors.
17. Draw the circuit diagram of RC coupled potential divider bias CE amplifier and explain the function of each component.

Or

18. With a block diagram, explain the working of a CRO, highlighting the functions of each electrode in the CRT. Explain how a sine wave display is produced.
19. (a) Sketch the complete characteristics of SCR and explain the features. (7 marks)
- (b) Compare and contrast induction heating and dielectric heating. (5 marks)

Or

20. With a neat block diagram, describe the resistance welding. Explain the features of different timers used.

[5 × 12 = 60 marks]

G 566

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Mechanical Engineering/Automobile Engineering

MACHINE TOOLS (M,U)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer all questions.
Each question carries 4 marks.*

1. Distinguish between boring and reaming.
2. What is a duplicating lathe ?
3. Differentiate between internal broaching and external broaching.
4. Discuss the significant machining parameters for a shaping machine.
5. Why grinding is known as a 'semifinishing operation' ?
6. Write a note on gear errors.
7. Differentiate between CNC and DNC.
8. What do you mean by a tool magazine ?
9. Define responsive manufacturing.
10. What are the advantages of CIM over conventional manufacturing.

(10 × 4 = 40 marks)

Part B

*Answer all questions.
Each question carries 12 marks.*

11. Explain different drilling methods, tools used and the machines for these operations. (12 marks)

Or

12. Sketch and explain the significant differences between a turret and capstan lathe. Discuss how a component can be machined first in a turret lathe and then in a capstan lathe.

(12 marks)

Turn over

13. Explain :

(a) Shaping of V-blocks.

(4 marks)

(b) Planing of guide gibs.

(4 marks)

(c) Slotting of keyways.

(4 marks)

Or

14. Explain the different milling cutters used in a milling machine. Discuss the specifications of cutters used in certain machining conditions.

(12 marks)

15. Discuss the various methods of gear cutting. Explain the gear generating machines.

(12 marks)

Or

16. Explain :

(a) Ultrasonic impact grinding.

(6 marks)

(b) Grinding of shafts.

(6 marks)

17. Explain the classification of CNC controllers and CNC programming techniques.

(12 marks)

Or

18. Discuss the construction, working and processing parameters of a Swiss type automatic screw machine.

(12 marks)

19. Define flexible manufacturing system. Discuss the different FMS layouts.

(12 marks)

Or

20. Explain the steps in PCB manufacturing. Discuss the productivity and quality issues in manufacture of ICs.

(12 marks)

[5 × 12 = 60 marks]

G 546

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Mechanical Engineering

THEORY OF MACHINES—I (M)

(Old Scheme/Supplementary/Mercy Chance)

[Prior to 2010 admissions]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. What are the techniques for estimating efficiency of a machine ?
2. Discuss any *one* inversion of a double slider crank mechanism.
3. Distinguish between type synthesis and number synthesis.
4. What are the criteria for selection of precision points ?
5. Briefly discuss the application of any one quick return mechanism.
6. Sketch and explain the working of a pantograph.
7. What is the application of a dynamometer in load test of IC engines ?
8. Compare the performance of a single plate and multiple plate clutch.
9. Define and explain contact ratio of a gearing.
10. Discuss the importance of helix angle in a helical gearing.

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each full question carries 12 marks.

11. With neat diagrams, explain any three spatial mechanisms. Discuss their features and analytical treatment.

Or

Turn over

12. Derive expressions for the :

- (i) Displacement. (ii) Angular displacement.
(iii) Velocity. (iv) Acceleration of a slider crank chain.

Discuss its application to engines.

(12 marks)

13. Discuss the procedure for synthesis of linkages. Explain all the steps involved in overlay method.

Or

14. Discuss any three methods of approximate kinematic synthesis. What is the change in the procedure if exact synthesis method is to be used ?

(12 marks)

15. Explain the crank and slotted lever quick return mechanism, with line diagrams. Discuss the application of this mechanism to a shaper.

Or

16. Derive the velocity and acceleration equation in a Hooke's joint. Discuss all the applications of a Hooke's joint.

(12 marks)

17. What are the different types of clutches ? Derive the equations governing the braking action in a centrifugal clutch.

Or

18. Explain :

- (i) Epicyclic train.
(ii) Pony brake.

(6 + 6 = 12 marks)

19. Explain the adverse effects of interference of gears. Explain the phenomenon and compare this effect in :

- (i) Spur ; and (ii) Helical gears.

Or

20. Discuss the forces acting in different parts of a gear in :

- (i) Bevel gear. (ii) Hypoid gear.
(iii) Spiral gear.

Suggest a method for controlling these forces to avoid damage of the gear.

(12 marks)

[5 × 12 = 60 marks]

G 537

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Automobile Engineering/Mechanical Engineering/Production Engineering
AU 010 406/ME 010 406/PE 010 406—ELECTRICAL TECHNOLOGY (AU, ME, PE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Mention the importance of critical field resistance in DC Generators.
2. Define voltage regulation of the transformer.
3. Draw the power slip characteristics of three-phase Induction Motor.
4. What is meant by plugging ?
5. List the advantages of resistance heating.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Discuss the effect of magnetic saturation on the external characteristics of a DC shunt Generator.
7. Explain the principle and operation of single-phase transformer.
8. Derive the EMF equation of three-phase alternators.
9. Explain the block diagram of an electric drive. Also mention its advantages and disadvantages.
10. Explain the working of high-frequency heating.

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each question carries 12 marks.

11. A 4-pole DC compound generator has armature, series field and shunt field resistance of 1 Ω , 0.5 Ω and 100 respectively. The generator delivers 4 kW at a terminal voltage of 20V. Allowing 1V per brush per contact drop, calculate for both short shunt and long shunt connections, (i) The generated EMF and (ii) the flux per pole if the armature has 200 lap connected conductors and is driven at 750 r.p.m.

Or

Turn over

12. Discuss the load characteristics of DC series and compound generators.
13. Two identical 15 kW, 250 V, 1000 r.p.m. d.c. series motors are connected in series to a 250 V d.c. supply. They drive the same shaft through reduction gearing 3:1 and 4:1 respectively. If the total torque on the shaft is 630 N.m. calculate the speed of the shaft, the voltage across the each motor, and the current from the supply. Neglect losses, and assume magnetic circuit to be unsaturated.

Or

14. Explain the procedure for predetermining the voltage regulation Of the transformer from OC and SC tests.
15. Explain the working principle of Synchronous motor. Also discuss with the neat diagram for the effect of changing field excitation on synchronous motor.

Or

16. Discuss the double revolving field theory of plain single-phase induction motor. Also derive the expression for mechanical power developed.
17. Explain the various methods of braking techniques used for Industrial Drives.

Or

18. Discuss the selection of motors for : (i) Textile Mill and (ii) Hoists.
19. Explain the two transistor analogy of silicon controlled rectifier. Also discuss the VI characteristics.

Or

20. Explain the method of Induction heating and describe coreless type Induction furnace.

(5 × 12 = 60 marks)

G 556

(Pages : 3)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Mechanical Engineering

HYDRAULIC MACHINES (M)

(Old Scheme—Supplementary/Mercy chance)

[Prior to 2010 Admissions]

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer all questions.
Each question carries 4 marks.*

1. Briefly explain the principle of similitude.
2. Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.
3. Define specific speed of a turbine.
4. Write a note on selection of turbines.
5. What do you mean by 'net positive suction head' ?
6. How will you classify impellers of a centrifugal pump ?
7. Briefly explain the principle of self-priming pump.
8. Define and explain slip in a reciprocating pump.
9. Differentiate between rotary axial and rotary radial piston pumps.
10. Discuss the effect of surface texture on the performance of the pump.

(10 × 4 = 40 marks)

Part B

*Answer all questions.
Each question carries 12 marks.*

11. A jet of water of diameter 50 mm, having a velocity of 20 m/s strikes a curved vane which is moving with a velocity of 10 m/s in the direction of the jet. The jet leaves the vane at an angle of 60° to the direction of motion of vane at outlet. Determine :

Turn over

- (a) The force exerted by the jet on the vane in the direction of motion.
 (b) Work done per second by the jet.

(12 marks)

Or

12. A small ship is fitted with jets of total area 0.65 m^2 . The velocity through the jet is 9 m/s and speed of the ship is 18 kmph in sea water. The efficiencies of the engine and pump are 85% and 65% respectively. If the water is taken amid-ships, determine the propelling force and the overall efficiency, assuming the pipe losses to be 10% of the kinetic energy of the jets.

(12 marks)

13. Discuss the constructional features and performance characteristics of a Francis turbine. How is it different from a Kaplan turbine ?

(12 marks)

Or

14. A Pelton wheel is to be designed for the following specifications :—

Shaft power = $11,772 \text{ kW}$;Head = 380 m ; speed = 750 r.p.m. Overall efficiency = 86% ; jet diameter is not to exceed one-sixth of wheel diameter.

Determine :—

- (a) The wheel diameter.
 (b) The number of jets required.
 (c) Diameter of the jet.

(12 marks)

15. Prove that the manometric head of a centrifugal pump running at speed N and giving a discharge Q may be written as :

$$H_{\text{mano}} = AN^2 + BNQ + CQ^2 \text{ where } A, B \text{ and } C \text{ are constants.}$$

(12 marks)

Or

16. Derive an expression for minimum speed for starting a centrifugal pump. (12 marks)

17. Explain all the aspects of condition monitoring of different pumps. (12 marks)

Or

18. Discuss the effect of vapour pressure on lifting of liquid in positive displacement pumps. (12 marks)

19. Write short notes on :—

(i) Rotary axial piston pump. (6 marks)

(ii) Hydraulic capstan. (6 marks)

Or

20. Find the efficiency of a hydraulic crane, which is supplied 300 litres of water under a pressure of 60 N/cm^2 for lifting a weight of 12 kN through a height of 11 m .

[5 × 12 = 60 marks]

B.TECH. DEGREE EXAMINATION, MAY 2014**Fourth Semester****ENGINEERING MATHEMATICS—III (CMELRPTANSUF)**

(Old Scheme—Supplementary/Mercy Chance—Prior to 2010 admissions)

Time : Three Hours

Maximum : 100 Marks

*Answer all questions.**Each full question carries 20 marks.**Use of Statistical tables is permitted.*

1. (a) Solve $x^2 \frac{dy}{dx} = 3x^2 - 2xy + 1$. (5 marks)

(b) Solve $(D^3 + 1)y = \sin(2x + 3)$. (7 marks)

(c) Solve $(3x + 2)^2 \frac{d^2y}{dx^2} + 3(3x + 2) \frac{dy}{dx} - 36y = 3x^2 + 4x + 1$. (8 marks)

Or

2. (a) Solve $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = \log x \sin(\log x)$. (8 marks)

(b) By method of variation of parameters solve $y'' - 2y' + 2y = e^x \tan x$. (7 marks)

(c) Solve $\frac{d^2y}{dx^2} + y = \operatorname{cosec} x$. (5 marks)

3. (a) From the p.d.e. by eliminating the arbitrary function from $z = f(x + it) + g(x - it)$. (5 marks)

(b) Solve $px - qz = z^2 + (x + y)^2$. (7 marks)

(c) A string is stretched and fastened to two points l apart motion is started by displacing the string in the form $y = a \sin \frac{\pi x}{l}$ from which it is released at time $t = 0$. Show that the displacement of any point at a distance x from one end at time t is given by $y(x, t) = a \sin \frac{\pi x}{l} \cos \frac{\pi ct}{l}$. (8 marks)

Or

Turn over

4. (a) A rod of length l with insulated sides is initially at a uniform temperature u_0 its ends are suddenly cooled to 0°C and are kept at that temperature. Find the temperature function $u(x,t)$.

(8 marks)

(b) Solve $\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial x \partial y} - \frac{6\partial^2 z}{\partial y^2} = 0$.

(5 marks)

(c) Solve $(p^2 + q^2)y = qz$.

(7 marks)

5. (a) Using Fourier sine integral show that :

$$\int_0^{\infty} \frac{1 - \cos \pi \lambda}{\lambda} \sin x \lambda \, d\lambda = \begin{cases} \frac{\pi}{2}, & 0 < x < \pi \\ 0, & x > \pi \end{cases}$$

(8 marks)

- (b) Find the Fourier transform of $f(x) = \begin{cases} 1 - x^2, & \text{of } |x| < 1 \\ 0, & |x| > 1 \end{cases}$ and use it to evaluate

$$\int_0^{\infty} \frac{x \cos x - \sin x}{x^3} \cos\left(\frac{x}{2}\right) dx$$

(12 marks)

Or

6. (a) Find the Fourier cosine transform of e^{-x^2} .

(8 marks)

(b) Using Parseval's identity show that $\int_0^{\infty} \frac{x^2 dx}{(1+x^2)^2} = \frac{\pi}{4}$.

(12 marks)

7. (a) Out of 800 families with four children each how many families would you expect to have

(i) 2 boys and 2 girls. (ii) Atleast one boy.

(iii) No girl. (iv) Atleast 2 girls.

Assume equal probabilities for boys and girls.

(10 marks)

- (b) Derive the mean and variance of Poisson distribution.

(10 marks)

Or

8. (a) Fit a binomial distribution to the following data :

$x:$	0	1	2	3	4	5
	2	14	20	34	22	8

(12 marks)

- (b) In a normal distribution 31% of the items are under 45 and 8% and over 64. Find the mean and standard deviation of the distribution.

(8 marks)

9. (a) The following figures refer to observations in live independent samples :

Sample I : 25 30 28 34 27 20 13 32 22 38

Sample II : 40 34 22 20 31 40 30 23 36 17

Analyse whether the samples have been drawn from the populations of equal mean.

(12 marks)

- (b) A coin was tossed 400 times and returned heads 216 times. Test the hypothesis that the coin is unbiased.

(8 marks)

Or

10. (a) Two independent samples of sizes 7 and 6 had the following values :

Sample A : 28 30 32 33 31 29 34

Sample B : 29 30 30 24 27 28

Examine whether the samples have been drawn from normal populations having the same variance.

(12 marks)

- (b) A sample of 20 items has been 42 units and S.D. 5 units. Test the hypothesis that it is a random sample from a normal population with mean 45 units.

(8 marks)

[5 × 20 = 100 marks]

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Automobile Engineering/Mechanical Engineering/Production Engineering

AU 010 405/ ME 010 405/ PE 010 405—MACHINE DRAWING (AU, ME, PE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Missing dimensions, if any may be assumed.

Drawing sheets are to be supplied.

- I. (a) With suitable example discuss the different types of fits and their selection.
- (b) With neat sketch explain conventional representation of welded joint. (10 marks)

II. Answer (a) or (b)

(a) A Strap Joint with Gib and Cotter is shown in Fig. 1. Draw to a suitable scale :

- (i) The elevation with top half in section.
- (ii) End view.

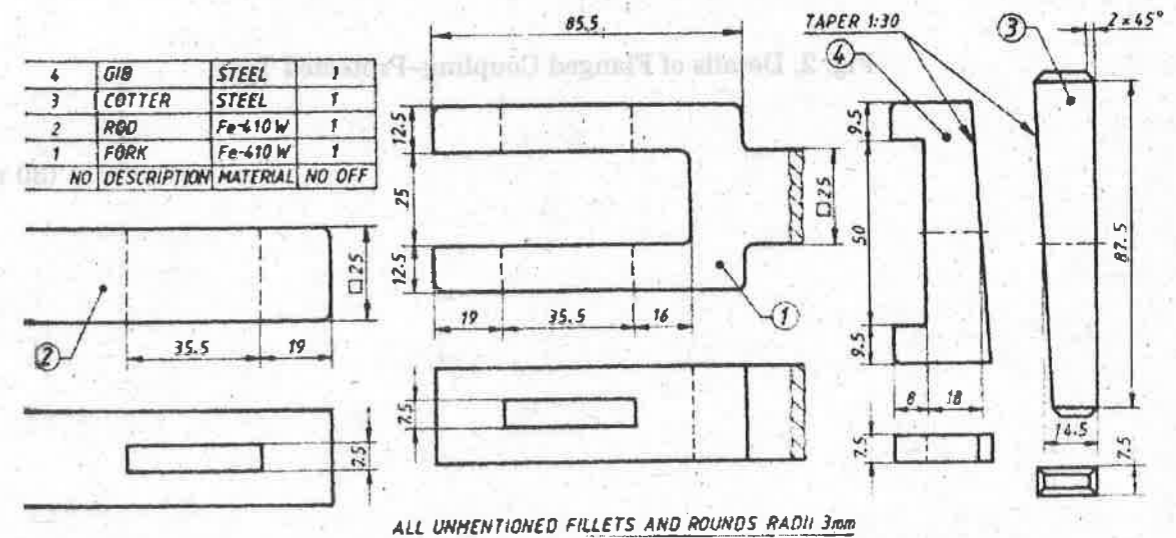
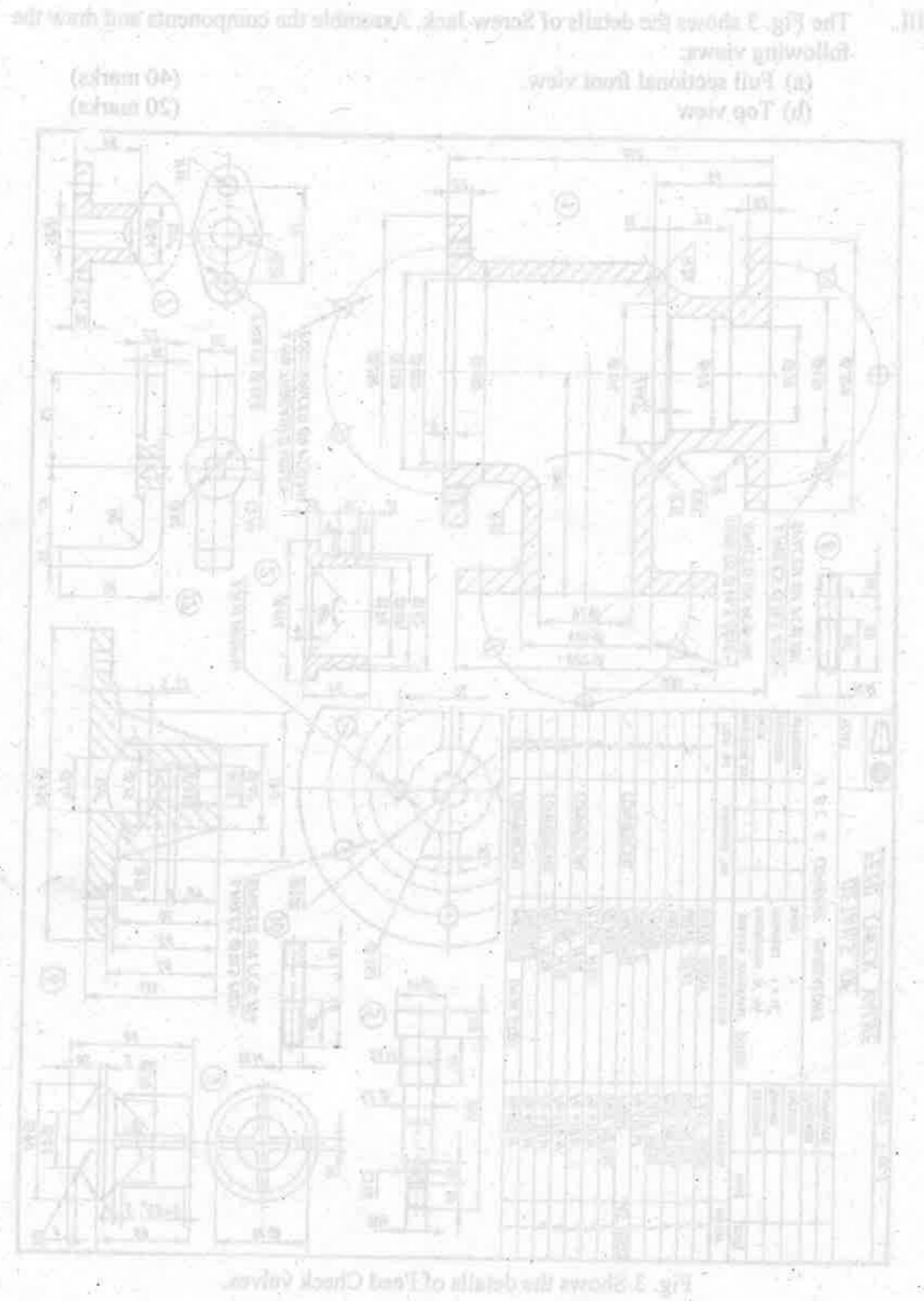


Fig. 1. Details of Strap Joint with Gib and Cotter

(30 marks)

Turn over



(b) A Flanged Coupling-Protected Type is shown in Fig. 2. Draw to a suitable scale :

- (i) The elevation with top half in section.
- (ii) End view.

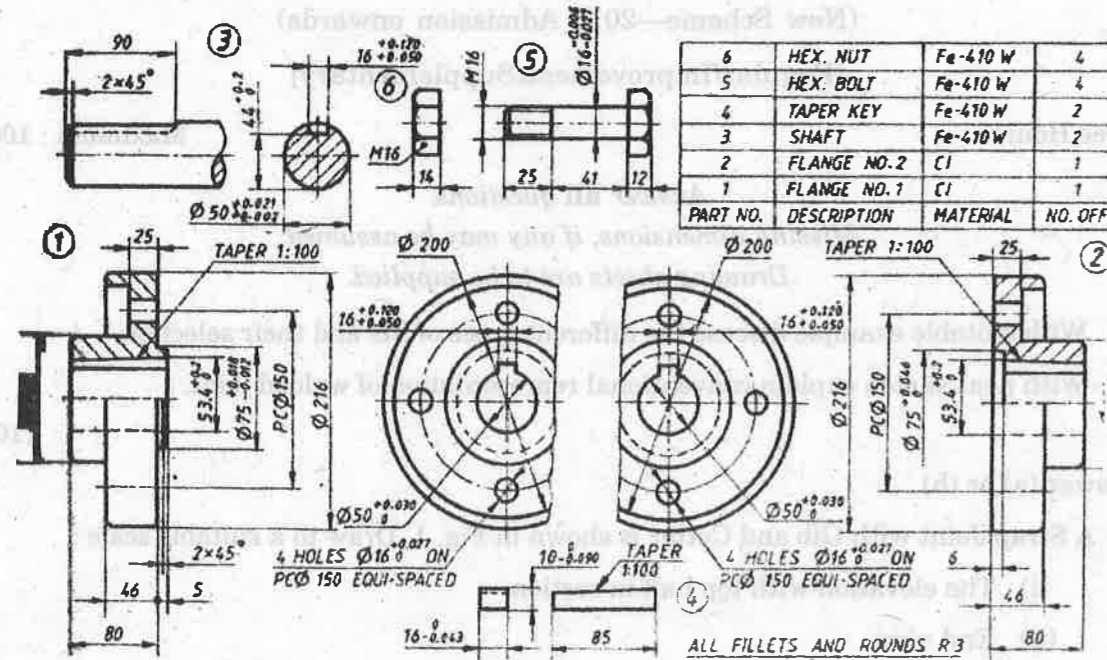


Fig. 2. Details of Flanged Coupling-Protected Type

(30 marks)

III. The Fig. 3 shows the details of Screw Jack. Assemble the components and draw the following views:

- (a) Full sectional front view. (40 marks)
- (b) Top view (20 marks)

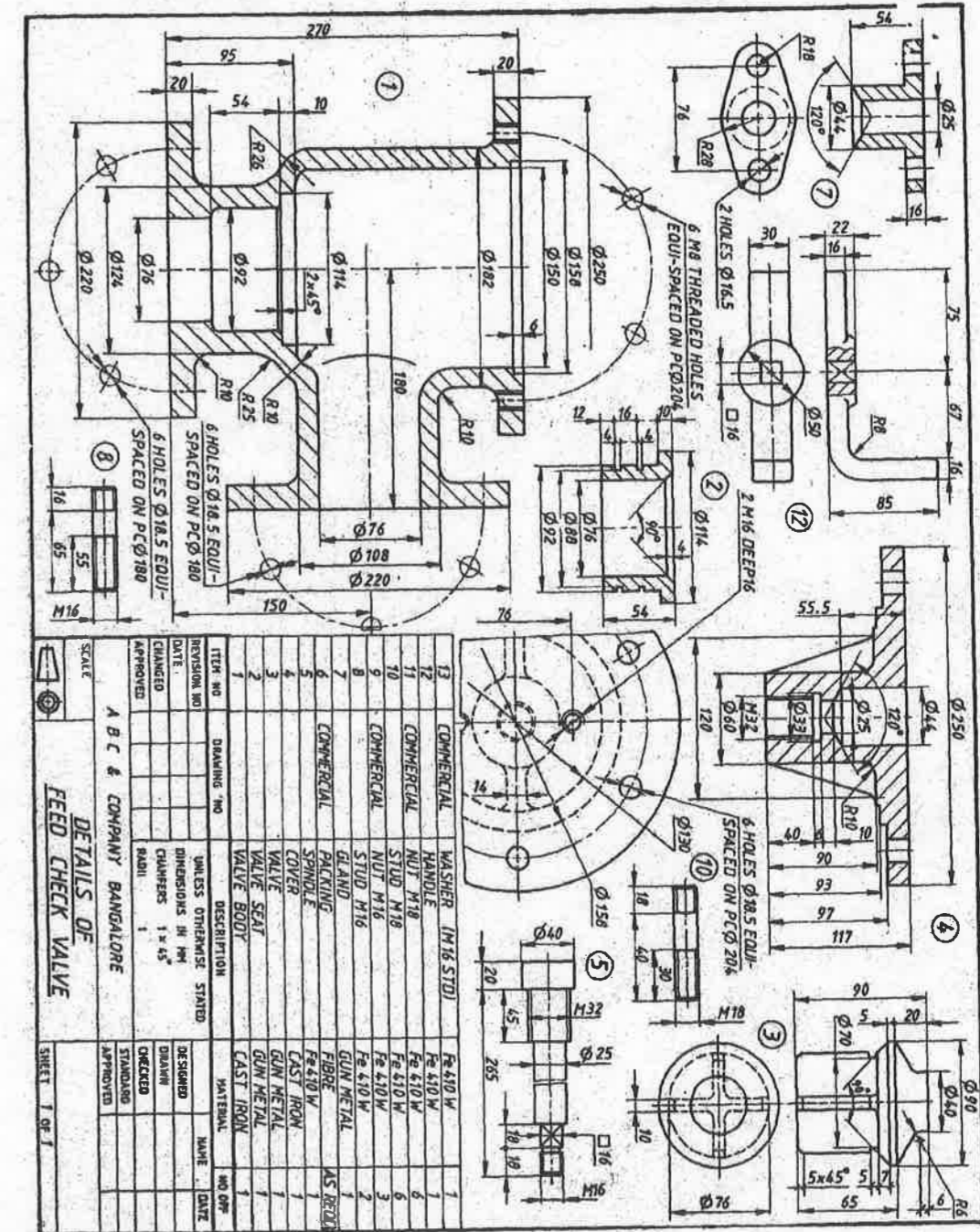


Fig. 3 Shows the details of Feed Check valves.

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Mechanical Engineering/Production Engineering

ME 010 403/PE 010 403—HYDRAULIC MACHINES (ME, PE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Maximum : 100 Marks

Time : Three Hours

Part A

Answer all questions.
Each question carries 3 marks.

1. Differentiate between: Laminar and Turbulent flow.
2. What is meant by Impulse turbine ?
3. What is the function of the Impeller in a centrifugal pump ?
4. What factors affecting cavitation in pump ?
5. What is meant by self-priming pump ?

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. Define Newtonian and Non-Newtonian fluids.
7. Compare pelton wheel and Kaplan turbines in all aspects.
8. How pumps are selected with performance curves ? Explain.
9. What are the factors affecting cavitation in turbines ?
10. What are uses of air vessels in pumps ?

(5 × 5 = 25 marks)

Part C

Answer all questions.
Each question carries 12 marks.

11. A uniform flow of 12 m³ /s occurs in a long rectangular channel of 5 m width and depth of flow of 1.50 m. A flat hump is to be built at a certain section. Assuming a loss of head equal to the upstream velocity head, compute minimum height of the hump to provide a critical flow.

Or

Turn over

12. A square plate weighing 110 N and of uniform thickness and 30 cm edge is hung so that horizontal jet 3 cm diameter and having a velocity of 12 m/s impinges on the plate. The center line of the jet is 15 cm below the upper edge of the plate, and when the plate is vertical, the jet strikes the plate normally and at its center. Find what force must be applied at the lower edge of the plate in order to keep plate vertical. If the plate is allowed to swing freely, find the inclination to vertical which the plate will assume under the action of jet.
13. (a) Tests were conducted on a Francis turbine of 0.8 m diameter under a head of 9 m. The turbine developed 115 kW running at 240 r.p.m. and consuming 1.2 m³/sec. If the same turbine is operated under a head of 16 m predict its new speed, discharge and power.
- (b) What are the requirements of a governor in hydropower Installation ?

(6 + 6 = 12 marks)

Or

14. Design a Pelton wheel for the following data :—

- (a) Gross head available = 170 m
- (b) Losses in penstock = 10% of gross head
- (c) Power to be developed = 600 kW.
- (d) Speed of the wheel = 360 r.p.m.
- (e) Overall efficiency = 86%

Assume any missing data suitably.

15. (a) If a centrifugal pump does not deliver any water when started, what may be the probable causes and how can they be remedied ?
- (b) The impeller of a centrifugal pump is 35 cm outside diameter and 17.5 cm internal diameter. The vane angles of the impeller at inlet and outlet are 30° and 25° respectively. The pump runs at 1400 r.p.m. The velocity of flow through the impeller is constant. Find the work done by the impeller per second per kg of water.

(6 + 6 = 12 marks)

Or

16. (a) Define a centrifugal pump. Explain the working of a single stage centrifugal pump.
- (b) The water is to be pumped out of a deep well under a total head of 90 m. A number of identical pumps of design speed 1000 r.p.m. and specific speed 900 r.p.m. with a rated capacity of 150 lps are available. How many pumps will be required and how should they be connected ?

(6 + 6 = 12 marks)

17. A jet of water having a velocity of 20 m/sec strikes a curved vane, which is moving with a velocity of 10 m/sec. The jet makes an angle of 20° with the direction of motion of vane at inlet and leaves at an angle of 130° to the direction of motion of the vane at outlet. Calculate :
- (a) Vane angles, so that the water enters and leaves the vane without shock.
- (b) Work done per second per unit weight of water striking the vane.

(6 + 6 = 12 marks)

18. (a) Explain with suitable example about the collapse of bubble theory.
- (b) How we can prevent cavitation damage in pumps and turbines ? Explain.

(6 + 6 = 12 marks)

19. With neat sketch explain the working principle of following pumps :—

- (a) Reciprocation pump and
- (b) Jet pump.

(6 + 6 = 12 marks)

Or

20. With neat sketch explain the working principle of following pumps :—

- (a) Gear pump and
- (b) Vane pump.

(6 + 6 = 12 marks)

[5 × 12 = 60 marks]

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

EN 010 402—PRINCIPLES OF MANAGEMENT

(Common to AI, AV, EC, EI, IC, IT, ME, MT, PO and PE Branches)

[New Scheme—2010 Admission onwards—Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 3 marks.

1. Define MBO.
2. What is Trade union ?
3. What is CPM and PERT ?
4. State the types of Capital.
5. Define the principles of Marketing.

(5 × 3 = 15 marks)

Part B

Answer any five questions.
Each question carries 5 marks.

6. What do you understand by organizational chart ? Explain the basis of it.
7. What are the basic steps in planning the system in Personnel management ?
8. Explain briefly the product life cycle.
9. What are the elements of cost ? Explain.
10. Explain briefly various steps to promote Sales of a product.
11. What is meant by market research ? Explain.
12. What is meant by quality circle ?

(5 × 5 = 25 marks)

Turn over

Normal cost estimates		Crash cost estimates		Activity (i-j)
Normal (Weeks)	Normal (Cost)	Crash (Weeks)	Crash (Cost)	
10	10	7	2	A (1-2)
10	10	8	8	B (1-3)
20	20	3	4	C (2-4)
7	7	1	1	D (2-4)
8	8	1	2	E (3-4)
10	10	8	8	F (4-5)
12	12	2	0	G (5-6)

Part C

Answer all questions.
Each full question carries 12 marks.

13. What are the different types of organization structure used in industries? Explain in details.

Or

14. What are the various functions of management? Explain in details.

15. Discuss in details how industries will recruit and select manpower?

Or

16. Write short notes on the following :

- Quality circle functions.
- Industrial disputes.

(6 + 6 = 12 marks)

17. Consider the details of a distance network as shown below :

Arc	Distance
1 - 2	8
1 - 3	5
1 - 4	7
1 - 5	16
2 - 3	15
2 - 6	3
2 - 7	4
3 - 4	5

Arc	Distance
3 - 6	6
4 - 5	8
4 - 6	12
5 - 8	7
6 - 8	9
6 - 9	15
7 - 9	12
8 - 9	6

- Construct the distance network.
- Find the shortest path from Node 1 to Node 9, using Dijkstra's algorithm.

(6 + 6 = 12 marks)

Or

18. The following tables provide cost and time estimates for a seven activity projects.

Activity (i - j)	Time estimate		Direct cost estimates (Rs.1000)	
	Normal (weeks)	Crash (weeks)	Normal (Rs.)	Crash (Rs.)
A (1-2)	2	1	10	15
B (1-3)	8	5	15	21
C (2-4)	4	3	20	24
D (3-4)	1	1	7	7
E (3-5)	2	1	8	15
F (4-6)	5	3	10	16
G (5-6)	6	2	12	36

You are required to :

- Draw the activity network of the project.
- Using the above information crash the activity step-by-step until all paths are critical.

19. What are the fixed capital and working capital? Explain various factors affecting working capital.

Or

20. What is the component of cost of a product? Explain in details.

21. Explain the different methods of sales forecasting used in industries.

Or

22. Write short note on the following :

- Sale promotion.
- Channel of distribution.

(6 + 6 = 12 marks)

[5 × 12 = 60 marks]

20. (a) Given :

Day	: Mon	Tue	Wed	Thu	Fri	Sat	Sun
f	: 16	8	12	11	6	14	14

(No. of accidents)

Is there any reason to doubt that the accident is equally likely to occur on any day of the week? (6 marks)

(b) A machine produced 20 defective units in a sample of 400. After overhauling the machine, it produced 10 defective units in a hatch of 300. Has the machine improved due to overhauling? (6 marks)

[5 × 12 = 60 marks]

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

EN 010 401—ENGINEERING MATHEMATICS—III

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

(Common to all Branches)

Maximum : 100 Marks

Time : Three Hours

Part A

Answer all questions. Each question carries 3 marks.

1. If $f(x) = \begin{cases} kx & , 0 \leq x \leq \frac{l}{2} \\ k(l-x) & , \frac{l}{2} \leq x \leq l \end{cases}$

find a_0 .

2. Show that the Fourier Cosine transform of Fourier Cosine transform of a given function is itself.

3. Solve : $a(p+q) = z$.

4. Find the distribution function from $f(x) = \begin{cases} c(3+2x) & , 0 < x < 2 \\ 0 & , \text{otherwise} \end{cases}$

5. What are type-I and type-II errors ?

(5 × 3 = 15 marks)

Part B

Answer all questions. Each question carries 5 marks.

6. Write the Fourier Series for $f(x) = \begin{cases} 1-x & , -\pi < x < 0 \\ 1+x & , 0 < x < \pi \end{cases}$

7. Find the finite Fourier Cosine transform of $f(x) = \frac{\pi}{3} - x + \frac{x^2}{2\pi}$

Turn over

8. Solve : $\left(\frac{y^2 z}{x}\right)^p + xzq = y^2$.

9. Fit a binomial distribution for :

x	: 0	1	2	3	4
f	: 5	29	36	25	5

10. Write the application of ψ^2 -test.

(5 × 5 = 25 marks)

Part C

Answer all questions.
Each question carries 12 marks.

11. Obtain the Fourier Series for $f(x) = \begin{cases} l-x, & 0 < x \leq l \\ 0, & l \leq x < 2l \end{cases}$

Hence deduce that $1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots = \frac{\pi}{4}$ and $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{\pi^2}{8}$.

(12 marks)

Or

12. If $f(x) = lx - x^2$ in $(0, l)$, show that the half range, sine series for $f(x)$ is

$$\frac{8l^2}{\pi^3} \sum_{n=0}^{\infty} \frac{1}{(2n+1)^3} \sin \frac{(2n+1)\pi x}{l} \dots \text{ and deduce that } \frac{\pi^3}{3^2} = 1 - \frac{1}{3^3} + \frac{1}{5^3} - \dots$$

(12 marks)

13. Show that the Fourier transform of $f(x) = \begin{cases} a^2 - x^2 & \text{for } |x| \leq a \\ 0 & \text{for } |x| > a > 0 \end{cases}$

is $2\sqrt{\frac{2}{\pi}} \left(\frac{\sin as - as \cos as}{s^3} \right)$. Hence deduce that $\int_0^{\infty} \frac{\sin t - t \cos t}{t^3} dt = \frac{\pi}{4}$.

(12 marks)

Or

14. (i) Find the finite sine transform of $f(x) = x^3$. (6 marks)

(ii) Find the cosine transform of $f(x) = \begin{cases} \cos x, & 0 < x < a \\ 0, & x > a \end{cases}$ (6 marks)

15. (a) Solve : $r - 2s + t = \sin(2x + 3y)$. (6 marks)

(b) Solve : $(D^2 + D^{12})z = \cos mx \cos ny$. (6 marks)

Or

16. (a) Solve : $D(D + D' - 1)(D + 3D' - 2)z = x^2 - 4xy + 2y^2$. (9 marks)

(b) Solve : $r - s + p = 1$. (3 marks)

17. (a) If 15% of a normal population lies below the value 30 and 10% of the population lies above the value 42, calculate its Mean and Standard Deviation. (6 marks)

(b) Fit a Poisson Distribution to :

x	: 0	1	2	3	4
f	: 43	38	22	9	1

(6 marks)

Or

18. (a) Six coins are tossed once. Find the probability of obtaining heads.

(i) exactly 3 times.

(ii) atmost 3 times.

(iii) atleast 3 times.

(iv) atleast once.

(8 marks)

(b) Given : X is a Poisson variate with $P(X=2) = \frac{2}{3}P(X=1)$. Find $P(X=0)$ and $P(X \geq 2)$. (4 marks)

19. (a) Test for the difference of variances for :

Method 1 : 20 16 27 26 22 23

Method 2 : 27 33 42 32 35 34 38

(6 marks)

(b) The 9 items of a sample have 45, 47, 50, 52, 48, 47, 49, 53, 51. Does the mean of these values differ significantly from the assumed mean 47.5? (6 marks)

Or

Turn over

G 517

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Automobile Engineering/Mechanical Engineering

AU 010 404/ME 010 404—MANUFACTURING PROCESS (AU, ME)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. What are the main considerations for a good design of a casting ?
2. How does penetration vary for DCSP and DCRP welding ?
3. What is the role of lubrication during rolling ?
4. Why a forging is considered stronger than casting ?
5. What are the different types of dies used in press work ?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. What are shell molds ? Give their applications.
7. What is a welding position ? Discuss various welding positions with the help of neat sketches.
8. What is thread rolling ? How is it done ?
9. Explain different types of forging defects.
10. What is sheet metal spinning ? How is it done ?

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each question carries 12 marks.

11. What is centrifugal casting ? What are its specific applications? Mention the important characteristics of the process.

Or

12. What are the different types of gates ? Discuss them with sketches. Also point out their merits and demerits.

Turn over

13. Compare MIG and TIG welding in respect of their principle of working and field of application.

Or

14. Explain with neat sketches plasma arc welding. Give their industrial applications.

15. Name different types of rolling mills. Explain tandem rolling and planetary rolling.

Or

16. What are the main features of cold working ? Explain with neat sketches cold drawing of tubes and wires.

17. Explain with neat open die forging. Discuss the advantages and limitations.

Or

18. What is an isothermal forging ? Explain features of an impression die and closed die forging processes.

19. Explain the theory of shearing of metal. Discuss various types of shearing operations.

Or

20. What are the classifications of dies ? Explain operation of the compound dies and progressive dies.

(5 × 12 = 60 marks)

B.TECH. DEGREE EXAMINATION, MAY 2014

Fourth Semester

Branch : Mechanical Engineering

MACHINE DRAWING—II (M)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Four Hours

Maximum : 100 Marks

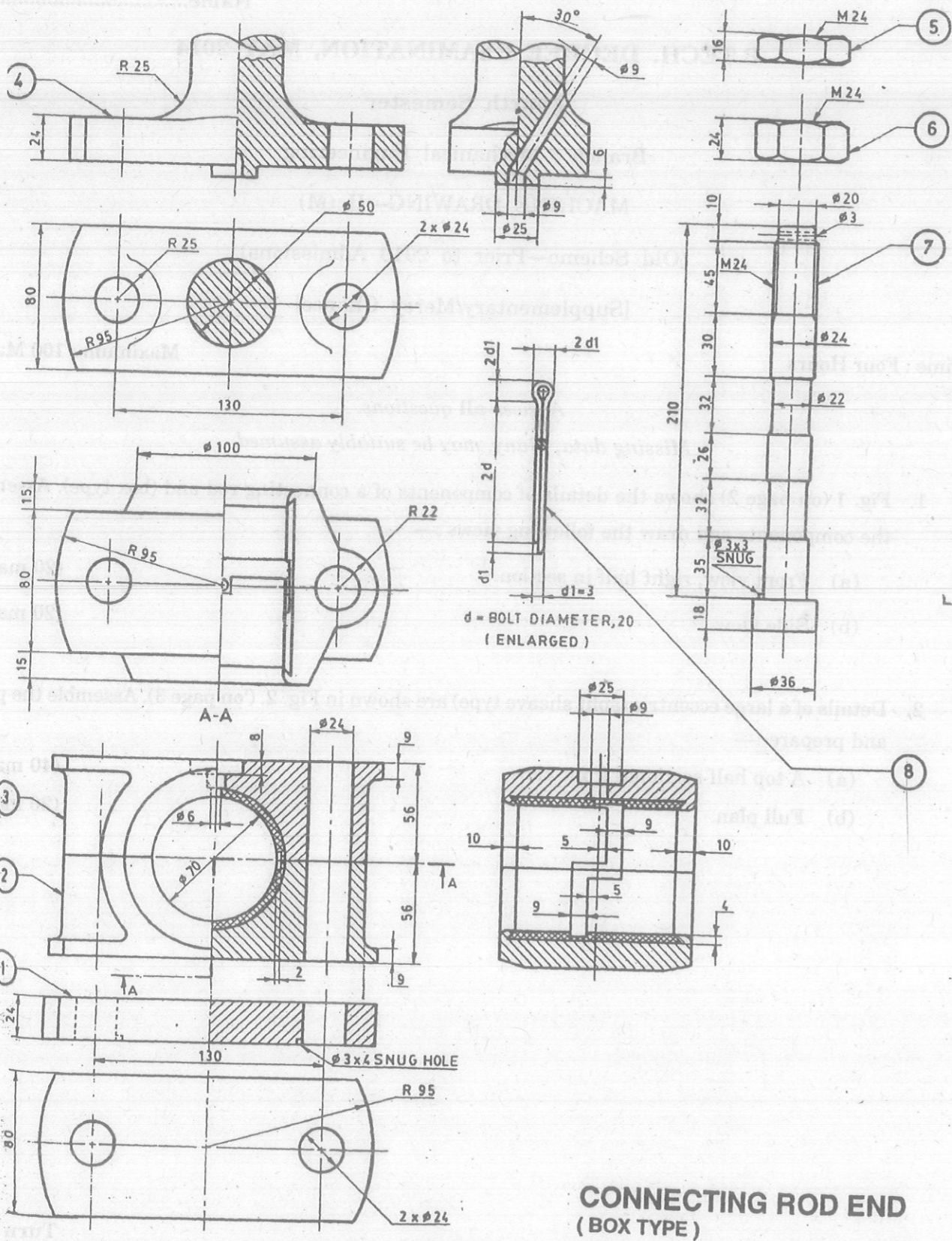
Answer all questions.

Missing data, if any, may be suitably assumed.

1. Fig. 1 (on page 2) shows the details of components of a connecting rod and (box type). Assemble the components and draw the following views :—
 - (a) Front view, right half in section. (20 marks)
 - (b) Side view. (20 marks)

2. Details of a large eccentric (split sheave type) are shown in Fig. 2. ('on page 3). Assemble the parts and prepare :—
 - (a) A top half-sectional front view. (40 marks)
 - (b) Full plan. (20 marks)

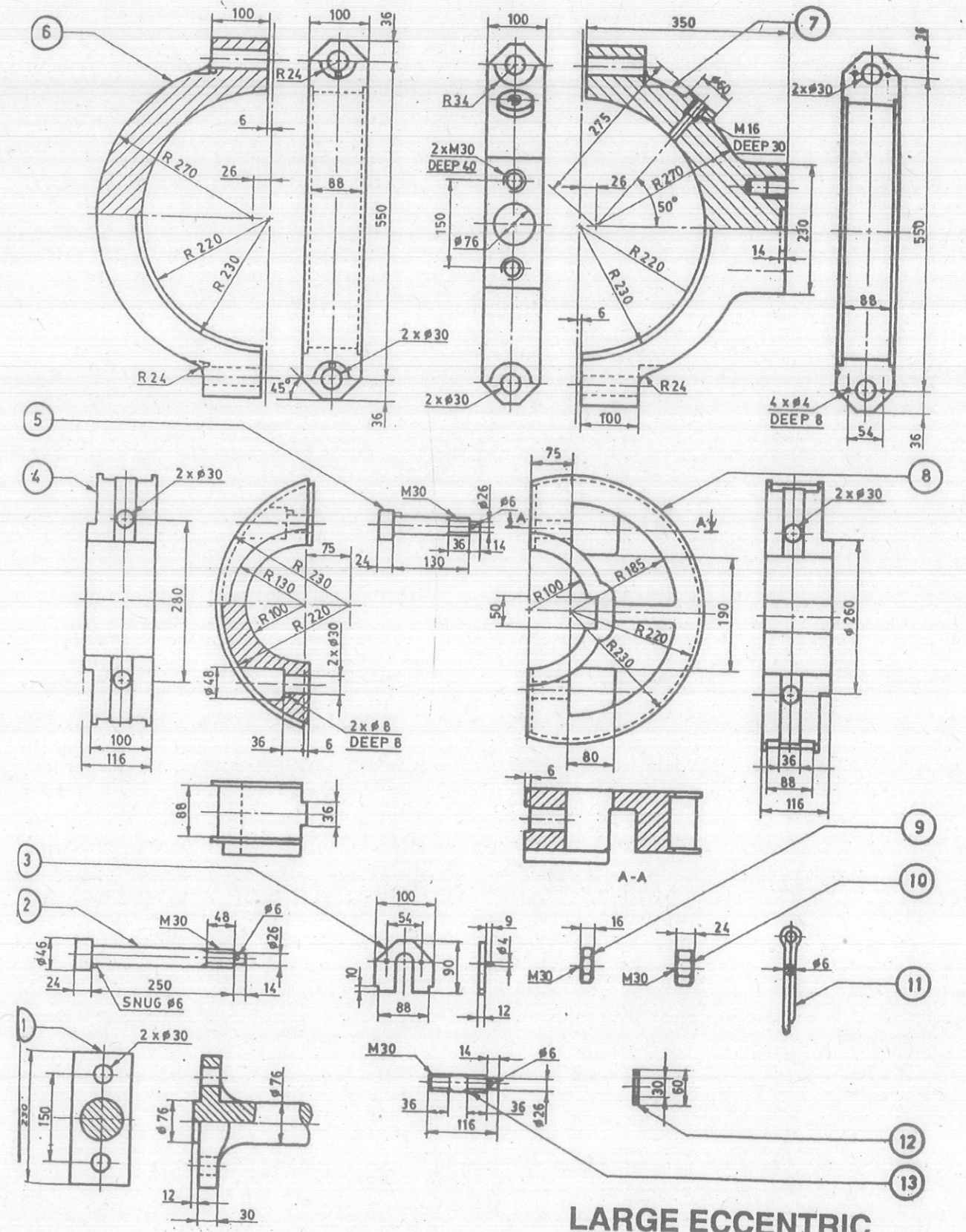
Turn over



d = BOLT DIAMETER, 20 (ENLARGED)

CONNECTING ROD END (BOX TYPE)

Fig. 1



LARGE ECCENTRIC (SPLIT SHEAVE TYPE)

Fig. 2