G 5471 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Branch : Mechanical Engineering/Production Engineering

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

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Write down impulse momentum equation.
2. Classify hydraulic turbines according to direction of flow and give examples.
3. Classify pumps and give examples for each.
4. What is meant by dimensional homogenity ?
5. What is meant by slip ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Derive an expression for work done by a jet on a fixed vertical flat plate, Plate is stationary.
7. Draw inlet and outlet velocity triangle for a impulse reaction turbine with radial flow entry.
8. Draw the characteristics curve for a centrifugal pump and make comment on it.
9. Write down the steps involved in Rayleigh's method.
10. Briefly explain the working of a self priming pump.

(5 × 5 = 25 marks)

Part C

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

11. A jet of water moving at 30 m/s impinges on a symmetrical curved vane shaped to deflect the jet through 130°. If the vane is moving at 5 m/s, find the angle of the jet so that there is no shock at inlet. Also determine the absolute velocity of exit in magnitude and direction and work done /second.

Or

12. Derive an expression for work done and efficiency of a jet striking an unsymmetrical moving curved vane tangentially at one of the tips.

13. (a) Derive Euler's turbine equation.

    (b) Determine the power given by the jet of water to the runner of a Pelton turbine which is having a tangential velocity as 20 m/s. The net head on the turbine is 60 m. and the discharge through the nozzle is 0.1 m^3/s. The jet is deflected through an angle of 170°. Take $C_v = 0.95$.

Or

14. With neat figure, explain the working of a oil pressure governor used for governing Pelton turbine.

15. Find the rise in pressure in the impeller of a centrifugal pump through which water is flowing at a rate of 20 l/s. The internal and external diameters of the impeller are 20 cm. and 35 cm. respectively. The width of the impeller at inlet and outlet are 1.6 cm. and 0.8 cm. The pump is running at 1500 r.p.m. The water enters the impeller radially at inlet and impeller vane angle at outlet is 30°. Neglect losses through the impeller.

Or

16. A multistage pump has three impellers 45 cm. in diameter and 2.5 cm. wide at outlet. The vanes are curved back at the outlet to an angle of 50° and reduce the circumferential area by 10 %. The manometric efficiency is 90 % and overall efficiency is 85 %. Determine the head generated by the pump when running at 1500 r.p.m. delivery 60 l/s. What should be the shaft power needed ?

17. (a) State Buckingham's π theorem.

    (b) The drag force exerted by a flowing fluid on a solid body depends upon the length of the body 'L' velocity of flow 'V', density of fluid 'ρ' and viscosity μ. Find an expression for drag force using Buckingham's π theorem.

Or

18. The ratio of lengths of a sub-marine and its model is 30 : 1. The speed of the submarine (prototype) is 25 m/s. The model is to be tested in a wind tunnel. Find the speed of air in wind tunnel. Also determine the ratio of the drag between the model and its prototype. Take the value of kinematic viscosities for sea water and air as 0.015 stokes and 0.02 stokes respectively. The density for sea water and air is given as 1030 $kg./m.^3$ and 1.24 $kg./m.^3$ respectively.

19. The cylinder bore diameter of a single acting reciprocating pump is 160 mm. and its stroke length is 200 mm. The pump runs at 200 r.p.m. and lifts water through a height of 35 m. The delivery pipe is 22 m. long and 100 mm. in diameter. Find the theoretical discharge and theoretical power required to run the pump. If the actual discharge is 4.2 l/s find the percentage slip. Also determine the acceleration head at the beginning and middle of the delivery stroke.

Or

20. Explain the working of following with neat figure :

    (a) Hydraulic accumulator.
    (b) Fluid coupling.
    (c) Hydraulic cranes.
    (d) Hydraulic press.

(4 × 3 = 12 marks)

[5 × 12 = 60 marks]

G 5477 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Branch : Automobile Engineering / Mechanical Engineering

AU 010 404 / ME 010 404 – MANUFACTURING PROCESS [AU, ME]

(New Scheme – 2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. What are composite molds? Why are they used?
2. What is Thermit welding?
3. Define Roll gap, Neutral point and Draft.
4. Explain the factors involved in precision forging.
5. What do you mean by bulging dies?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain the difference between true centrifugal and semi-centrifugal casting.
7. What is the purpose of flux?
8. Explain the factors that contribute to spreading in flat rolling.
9. Explain the orbital forging and how it differs from conventional forging.
10. Explain the different types of die cutting.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. What are the benefits and drawbacks to heating the molds in investment casting before pouring in the molten metal ?

Or

12. How are the hollow parts with various cavities made by die casting ? Are cores used ? If so, explain.

13. Explain the process of Gas-Tungsten arc welding process with the help of a suitable sketch.

Or

14. Explain the transferred and non-transferred plasma arc welding process with necessary sketches.

15. Explain the Thread rolling process with a schematic illustration. When use forming tap for this process ?

Or

16. Describe the importance of controlling rolling speeds, roll gaps, temperature and other process variables in a tandem rolling operation.

17. Where will you use impression die and closed die forging ? Explain these process with schematic illustrations .

Or

18. What are the commonly used forging machines? Write a short note on the use of any *two* important machines.

19. Explain the Shear spinning and Tube spinning operations with suitable schematic illustrations.

Or

20. Write short notes on the following :

    (a) Forming limit diagram.

    (b) Shearing dies.

(5 × 12 = 60 marks)

G 5489 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Branch : Automobile/Mechanical/Production/Chemical/Naval-Architecture and Ship Building Engineering

AU 010 405/ME 010 405/PE 010 405/CH 010 405/ST 010 405—MACHINE DRAWING
[AU, ME, PE, CH, ST]

[New Scheme—2010 Admission onwards]

(Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*
Missing dimensions, if any, may be assumed.
Drawing sheets will be supplied.

1. Answer any *two* of the following :

   (a) Explain about the limits and tolerances of machine parts ?

   (b) Explain about the types of fits and their selections ?

   (c) Show an off-set section in two parallel planes with an example ?

   (2 × 7.5 = 15 marks)

2. Answer (a) *or* (b) :

   (a) Draw half sectional front view and side view of a rigid flange coupling to connect two shafts of 30 mm diameter ?

   (25 marks)

   Or

   (b) Draw plan and sectional elevation of double riveted zig-zag lap joint to join two plates of 10 mm thickness.

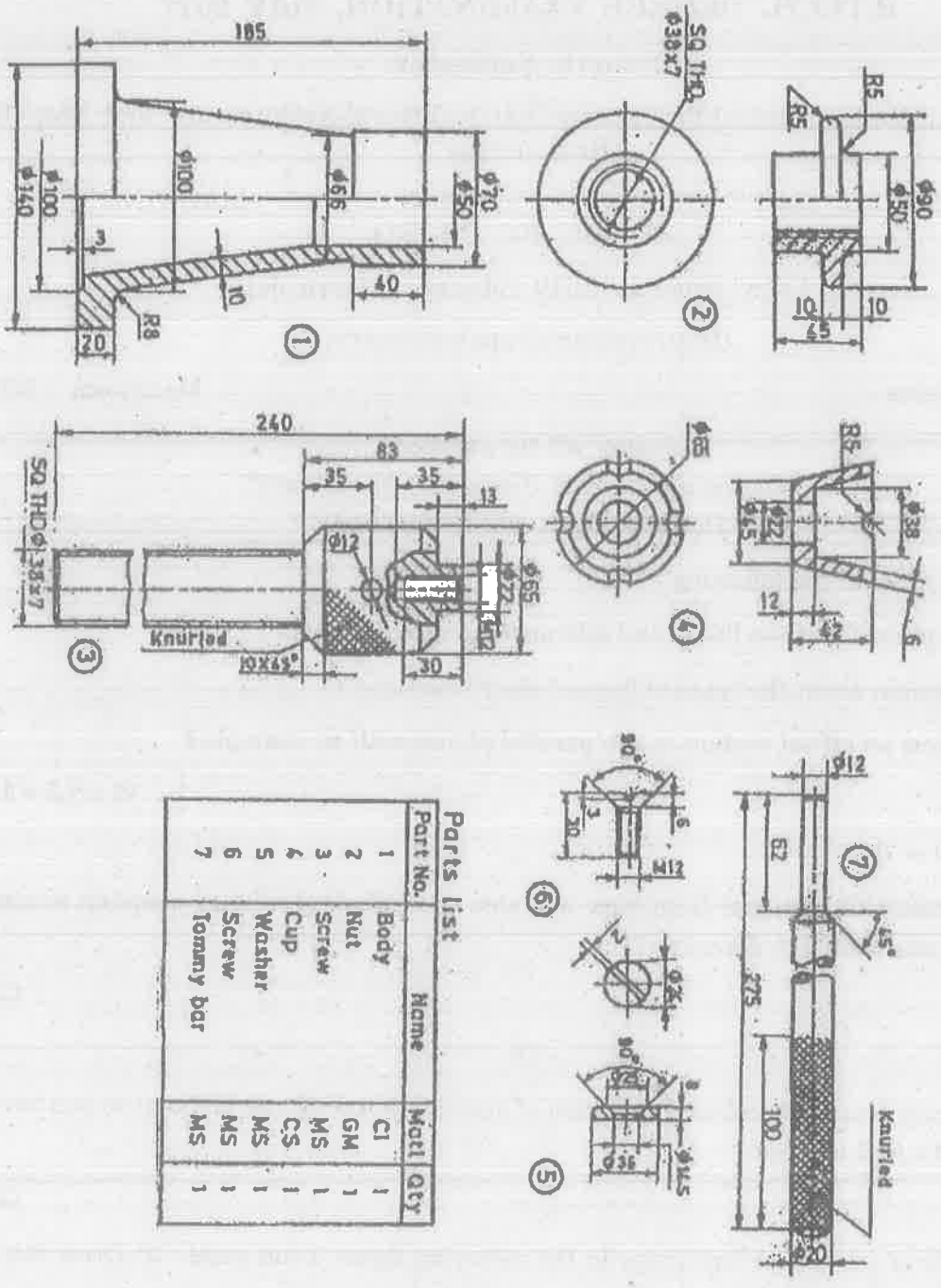
   (25 marks)

3. The details of screw jack are given in the following figure 1 (on page : 2) Draw the following assembled views :

   (a) Half sectional front view. (40 marks)

   (b) Side view. (20 marks)

Turn over



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

Figure 1. Screw Jack

G 5501 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Branch : Automobile/Mechanical/Production Engineering

AU 010 406 / ME 010 406 / PE 010 406 – ELECTRICAL TECHNOLOGY [AU, ME, PE]

(New Scheme – 2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

1. Draw the power flow diagram of D.C. generator.
2. What is meant by regulation of transformer?
3. Derive the e.m.f. operation of alternators.
4. What are the advantages of electric drive?
5. What is meant by dv/dt rating of SCR?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Discuss the conditions for self excitation in case of D.C. generator.
7. Draw the equivalent circuit of a single-phase transformer.
8. Discuss the method of starting of synchronous motor.
9. Compare individual drive and group drive.
10. Plot the V-I characteristics of SCR.

(5 × 5 = 25 marks)

Part C

Answer any **one** *question from each module.*
Each question carries 12 *marks.*

MODULE I

11. Explain the different types of losses in a DC machine and also draw the power flow diagram.

Or

12. Explain the load characteristics of DC Series and DC Shunt generator.

Turn over

MODULE II

13. Discuss about the speed control methods of DC motors.

Or

14. Discuss about the working principle of 3-phase transformer.

MODULE III

15. Discuss in detail about the production of rotating magnetic field of induction motor.

Or

16. Discuss about the different types of single-phase induction motor.

MODULE IV

17. Discuss about the different types of traction. Compare.

Or

18. (a) What is an electric drive?

    (b) Discuss about the electrification of track.

MODULE V

19. Discuss in detail about high frequency heating.

Or

20. With the help of diagram, explain the principle of operation of SCR.

[5 × 12 = 60 marks]