

PART-A

(5 x 2 = 10 Marks)

Note: (i) Answer any FIVE questions out of which question No.8 is compulsory.
(ii) All questions carry equal marks.

- 1 State Faradays Laws.
- 2 Write the applications of DC series motor.
- 3 What are the losses in a transformer?
- 4 Define frequency.
- 5 Give the applications of stepper motor.
- 6 What is energy Conservation?
- 7 What are the advantages of SMPS?
- 8 List the types of switches.

PART-B

(5 x 3 = 15 Marks)

Note: (i) Answer any FIVE questions out of which question No. 16 is compulsory.
(ii) All questions carry equal marks.

- 9 Define i) Magnetic flux ii) Flux density
- 10 A resistance of R ohm is connected in series with a parallel circuit consisting of two resistances of 12Ω and 8Ω respectively. The total power dissipated in the circuit is 70 watts when the applied voltage is 20 V. Find the value of R.
- 11 Briefly explain the principle of operation of Universal motor.
- 12 Write short notes on IC voltage regulators.
- 13 Write the Boolean expression, truth table and symbol of the i) OR ii) AND iii) NOT gates
- 14 What is fixed and Modular PLC?
- 15 Explain in brief about Limit switch.
- 16 What are the causes of Electrical accidents?

PART-C

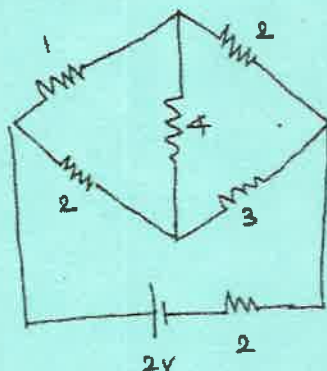
(5 x 10 = 50 Marks)

Note: (i) Answer all the questions choosing either sub-division (A) or sub-division (B) of each question.

(ii) All divisions carry equal marks.

17 A

10



Determine the current flowing in the 4Ω resistor using Kirchhoff's law.

(OR)

B With a neat diagram explain the construction and working of DC Generator.

10

18 A With a neat diagram explain the construction and working of DOL starter.

10

(OR)

B Explain the various methods of speed control of three phase induction motor with the relevant diagram.

10

- 19 A i) Explain the construction of PMDC motor. 5
ii) Give the comparison between Individual drives and Group drives. 5
(OR)
B With a neat diagram explain the working of single stepping and half stepping stepper motor drive. 10
- 20 A With a block diagram explain the working of ON-line UPS. 10
(OR)
B Draw the circuit diagram, wave form and explain the working of Half wave rectifier with and with out filter. 10
- 21 A i) With a neat diagram explain the working of float switch. 5
ii) With a neat diagram explain the working of pressure switch. 5
(OR)
B i) Briefly explain the different types of photo electric sensors. 5
ii) With a neat diagram explain the working of ELCB. 5
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THIAGARAJAR POLYTECHNIC COLLEGE, SALEM

(Autonomous)

Reg. No.

April 2019 Examinations

DIPLOMA IN PRODUCTION ENGINEERING

Design of Machine Elements

Year/Sem: II / IV (EVEN-II)

Max. Marks : 75

Time : 3 hr.

Notes:

1. Answer all the questions, choosing either (A) or (B) of each question.
2. All questions carry equal marks
3. PSG Design data book/any other design data book approved by the Chairman, autonomous examinations are permitted.

1. A) List the various factors that affecting the selection of materials. 15

(OR)

- B) A gas tank consists of a cylindrical shell of 2 m inner diameter. It is enclosed by Hemispherical shells by means of butt welding as shown below. The thickness of shell and hemispherical cover is 10 mm, the allowable tensile strength of the weld material is 85 MPa. Calculate the allowable Internal pressure to which the tank may be subjected, if the efficiency of weld joint is 85%. 15



2. A) A pair of railway wagon wheel carries a load of 50 KN on each axle box, achieving a distance of 100 mm outside the wheel base. the gauge of rails is 1.4 m. Find the diameter of the axle between the wheels, if the permissible stress is 100 Mpa. 15

(OR)

B) Explain various types of keys with sketches.

3. A) Design a Flat belt drive using basic equations to transmit 22.5 KW at 740 rpm to an aluminum Rolling machine. The speed ratio is 3. The distance between pulleys is 3 m. Diameter of the Rolling machine pulley is 1.2 m. 15

(OR)

B) Compare Flat & V-belts with neat sketches. Also list various Belt materials. 15

4. A) How the Bearings are classified? Explain with neat sketches. 15

(OR)

B) A 3 KN load is supported by a journal bearing of 75 mm diameter, 75 mm long. The diametrical clearance is 0.05 mm and lubrication oil pressure is 0.0207 p-a-s viscosity at operating temperature. Determine the maximum speed of rotation of bearing, when it is capable of dispersing 80 watts by heat transfer. 15

5. A) What are the types of levers? Sketch a Hand lever. 15

(OR)

B) Design a spur gear drive to connect an electric motor to a reciprocating pump both being mounted on same bed. Speed of motors is 24 rev/sec and speed reduction is 10:1. The motor power is 36.8 KW. The gears have 20° pressure angle. The minimum number of teeth on the pinion is 24. Use Lewis & Buckingham equations. 15

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April 2019 Examinations

DIPLOMA IN PRODUCTION ENGINEERING

Thermodynamics and Automobile Technology

Year/Sem: II / IV (EVEN-II)

Max. Marks : 75

Time : 3 hr.

PART-A**(5 x 2 = 10 Marks)****Note: (i) Answer any FIVE questions out of which question No.8 is compulsory.****(ii) All questions carry equal marks.**

- 1 State first law of thermodynamics.
- 2 What do you mean by calorific value of a fuel?
- 3 What do you mean by clutch bleeding?
- 4 Define the term camber in steering geometry.
- 5 What do you mean by battery rating?
- 6 List the firing order for four cylinders and six cylinders I.C. engines.
- 7 Define Knocking.
- 8 List any two alternative fuels used in I.C. engines.

PART-B**(5 x 3 = 15 Marks)****Note: (i) Answer any FIVE questions out of which question No. 16 is compulsory.****(ii) All questions carry equal marks.**

- 9 Compare Otto cycle and Diesel cycle on any three aspects.
- 10 What do you mean by qualitative and quantitative governing?
- 11 Explain the working principle of fluid coupling.
- 12 Explain the working principle of telescopic shock absorber.
- 13 Explain the working of an electronic ignition system circuit.
- 14 List any six major components of an I.C. engine along with its material and manufacturing method.
- 15 What do you mean by turbo charging and super charging?
- 16 Explain about BS-III norms.

PART-C**(5 x 10 = 50 Marks)****Note: (i) Answer all the questions choosing either sub-division (A) or sub-division (B) of each question.****(ii) All divisions carry equal marks.**

- 17 A Explain the working principle of a four stroke Diesel cycle engine with a neat sketch. 10
(OR)
- B Explain the working of a pressure lubrication system with neat schematic diagram. 10
- 18 A Explain the working principle of Solex carburetor with a neat line sketch. 10
(OR)
- B Explain the working principle of MPFI and CRDI system with a neat schematic diagram. 10
- 19 A Explain the working principle of single plate clutch with neat sketch. 10
(OR)
- B Explain the working of a synchromesh gear box with neat schematic diagram. 10
- 20 A Explain the working principle of hydraulic braking system with neat schematic diagram. 10
(OR)
- B Explain the working principle of power steering system and ABS. 10
- 21 A Explain the concepts of any two methods of reducing the formation of pollutants in an I.C. engine. 10
(OR)
- B Explain the concept of hybrid vehicle system along with neat schematic diagram and its advantages. 10

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Reg. No.

April 2019 Examinations

DIPLOMA IN PRODUCTION ENGINEERING

Engineering Metallurgy

Year/Sem: II / IV (EVEN-II)

Max. Marks : 75

Time : 3 hr.

PART-A**(5 x 2 = 10 Marks)****Note: (i) Answer any FIVE questions out of which question No.8 is compulsory.****(ii) All questions carry equal marks.**

- 1 Define Space lattice.
- 2 Define Atomic radius.
- 3 List the properties of wrought iron.
- 4 What is metal matrix composites?
- 5 What is notch sensitivity?
- 6 Differentiate destructive and non-destructive testing.
- 7 What are the factors affecting corrosion?
- 8 Expand PVD and CVD.

PART-B**(5 x 3 = 15 Marks)****Note: (i) Answer any FIVE questions out of which question No. 16 is compulsory.****(ii) All questions carry equal marks.**

- 9 List out seven basic crystal systems.
- 10 Draw the crystal structure for HCP.
- 11 Draw the phase diagram for eutectoid system and write its equation.
- 12 Explain about abrasives.
- 13 Explain scleroscope test.
- 14 Draw creep curve and explain.
- 15 Explain about coating and surface treatments.
- 16 Explain about Thermal spraying process.

PART-C**(5 x 10 = 50 Marks)****Note: (i) Answer all the questions choosing either sub-division (A) or sub-division (B) of each question.****(ii) All divisions carry equal marks.**

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|----|---|--|----|
| 17 | A | Explain co-ordination number for SC, BCC and FCC structure. | 10 |
| | | (OR) | |
| | B | Classify various types of bonds in solids and explain any two with neat sketch. | 10 |
| 18 | A | Compare cast iron, wrought iron, mild steel and hard steel. | 10 |
| | | (OR) | |
| | B | Explain the composition, properties and uses of High Speed Steel and Stainless Steel. | 10 |
| 19 | A | Explain various types of bearing bronzes. | 10 |
| | | (OR) | |
| | B | Explain the following cutting tool materials.
a) HSS b) Stellites c) Cemented carbide | 10 |
| 20 | A | Explain ductile and brittle fracture with its Stress-Strain diagram. | 10 |
| | | (OR) | |
| | B | Explain radiography test with neat sketch. | 10 |
| 21 | A | List out the types of corrosion? and explain any two types. | 10 |
| | | (OR) | |
| | B | Explain Electro polishing and photo etching with neat sketch. | 10 |