

G 1846

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Eighth Semester

Branch : Mechanical Engineering

AUTOMOBILE ENGINEERING (M)

(Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

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

1. Explain the working of a multipoint fuel injection system.
2. What are the advantages of using a thermostat in a cooling system ?
3. With a neat sketch, explain the working of a plunger pump.
4. Explain the construction and working of a fluid coupling.
5. What do you understand by the terms toe-in and toe-out ?
6. With a neat sketch, explain the working and construction of Macpherson strut assembly.
7. Sketch the layout of an air brake system.
8. What are the advantages and disadvantages of a hydraulic brake system ?
9. Explain the purpose of engine tuning and wheel balancing.
10. Draw a simple circuit for magneto ignition system.

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

1. With simple sketches, explain the different types of cooling systems.

Or

2. (a) What is the purpose of pressurizing a liquid cooled system ? How is it accomplished ?
(b) How does the marine diesel engines cooling system differ from one used in an automotive system ?

Turn over

3. (a) What are the advantages of a semi-centrifugal clutch ?
 (b) How does a conical-spring clutch differs from a coil-spring clutch ?

Or

4. (a) Discuss in detail the construction and operation of a differential.
 (b) What are the desirable features of planetary gears for transmitting power ?

5. (a) Differentiate clearly between functions of spring and a shock absorber.
 (b) What is the caster angle ? How does caster help to produce directional stability ?

Or

6. (a) What is the function of a vehicle suspension system ?
 (b) Describe the different types of steering linkages.

7. (a) Explain the functions of drum and brake lining in the brake mechanism.
 (b) What are the essential differences between mechanical brakes and hydraulic brakes ?

Or

8. (a) Explain the importance of maintaining tyre pressure in an automobile.
 (b) Make a list of common brake troubles and their possible causes.

9. (a) Draw a simple circuit for an automobile starting system.
 (b) Describe the functions of an alternator with the help of a diagram.

Or

10. Write short notes on :

- (a) Wheel balancing.
 (b) Automotive head lamp systems.

(5 × 12 = 60 marks)

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Eighth Semester

Branch : Mechanical Engineering

MACHINE DESIGN AND DRAWING—II (M)

(Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer any two questions from Part A and Part B.

Design Data Book is permitted.

Missing data may be assumed.

Part A

1. (a) Compare the performance of spur and helical gears. (5 marks)
- (b) Design a pair of spur gears for transmitting 63 kW at 1200 r.p.m. of pinion using cast steel with safe static bending stress of 110 MPa, $K_V = 3/(3 + V)$, Gear ratio 2.5 : 1. BHN for pinion is 300. The teeth are 20° full depth involute. Find the permissible error so that the design is safe for dynamic load. (20 marks)
2. (a) Explain how and why Lewis equation is modified in case of helical teeth. (5 marks)
- (b) Two parallel shafts are connected by helical gears with 20° full depth teeth and helix angle of 15°. The material for both gears is formed steel with safe static stress 140 MPa. The power to be transmitted 40 kW at 1,400 r.p.m. of pinion. Design the gear with Lewis equation and check for wear strength. Use BHN = 250. Gear ratio 4.5 : 1. (20 marks)
3. (a) Compare bevel gear with helical gear. (5 marks)
- (b) Two shafts intersecting at an angle of 90° are connected by a pair of bevel gears with a gear ratio 2.5 : 1. The module of 20° full depth involute teeth at outer radius is 5 mm. and number of teeth on pinion is 30. If 10 kW is transmitted at 400 r.p.m. of pinion, determine the tangential force at the mean radius, the axial thrust on the pinion and gear. B = 67 mm. (20 marks)
4. (a) Why is heat dissipation a very important aspect of worm and worm gear ? (5 marks)
- (b) Design a worm and worm gear drive for a speed reduction by 25. Pinion (worm) rotates at 600 r.p.m. and transmits 35 kW. (20 marks)

[2 × 25 = 50 marks]

Turn over

Part B

5. (a) Differentiate between (i) thick film and thin film lubrication, (ii) hydrostatic and hydrodynamic bearings. (5 marks)
- (b) A ball-bearing is subjected to a radial load 2 kN and axial thrust of 1 kN. It rotates at 4,000 r.p.m. It is to work 50 hours/week for one year. Design a ball-bearing if the diameter of the spindle is 40 mm. (20 marks)
6. A journal bearing 160 mm long and 45 mm dia. supports a radial load of 8,000 N. The shaft speed is 160 r.p.m. oil used is SAE 60 at 25° C inlet temperature. Using clearance ratio 600, find the rise in temperature, maximum films pressure and minimum film thickness. (25 marks)
7. Load on 100 mm. full bearing is 9,000 N. Speed 320 r.p.m. $L/D = 1$, $C/D = 0.0011$, operating temperature 65° C. $h_0 = 0.022$ mm. Select the oil and calculate its friction loss, hydrodynamic oil flow through the bearing, the amount of oil leakage, the temperature rise and maximum pressure. (25 marks)

8. Select a suitable impeller for a centrifugal pump for the following requirement :—

- | | | |
|---------------|---|-----------------|
| Discharge | = | 800 l.p.m. |
| Speed | = | 1,800 r.p.m. |
| Suction lift | = | 4 m. of water |
| Delivery head | = | 25 m. of water. |

(25 marks)

[2 × 25 = 50 marks]

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Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Eighth Semester

Branch : Mechanical Engineering

AEROSPACE ENGINEERING (M) — (Elective II)

(Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

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

1. Differentiate between Troposphere and Stratosphere.
2. Explain the terms : Mach angle, Mach cone, Zone of action and Zone of silence in supersonic flow.
3. Explain the origin of Skin Friction drag and Induced drag.
4. What is meant by Horse Shoe Vortex ?
5. What are the assumptions involved in the derivation of thrust and efficiency of a propeller by momentum theory ?
6. Explain the working of Turbojet engine.
7. Explain what is meant by Gliding Flight.
8. Describe the various phases of landing.
9. With neat sketches, explain the working of a solid propellant rocket and mention its advantages over liquid propellant rocket.
10. Write short notes on Wind Tunnel testing.

(10 × 4 = 40 marks)

Part B

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

11. Derive expressions for variation of pressure temperature and density with altitude in troposphere and stratosphere.

Or

Turn over

12. Derive the momentum equation for a compressible fluid and deduce the Bernoulli's equation from the momentum equation. What assumptions are made in the derivations ?

13. Explain briefly the chief characteristic curves of an aerofoil.

Or

14. Explain the following terms as applied to an aerofoil :—

- | | |
|-----------------------------|-----------------------|
| (i) Chord and chord length. | (ii) Span. |
| (iii) Aspect ratio. | (iv) Camber. |
| (v) Dihedral. | (vi) Angle of attack. |

15. Derive expressions for thrust and efficiency of a propeller by momentum theory. Also plot its characteristics.

Or

16. (a) Explain the working of a Ram jet engine.

(b) What are the advantages and disadvantages of a Ram jet engine ?

17. Write short notes on the following :—

- (i) Aerobatics.
- (ii) Range and endurance.
- (iii) Circling flight and Banked flight.

Or

18. Prove that for a level flight and for a climbing flight of an aeroplane if the wings are at the same angle of attack

$$\frac{\text{Thrust horse power for climbing}}{\text{Thrust horse power for level flight}} = \left\{ 1 + \frac{L}{D} \tan \theta \right\} \cos \theta^{3/2}$$

where θ is the climbing angle.

19. Explain the different methods for flow visualisation in a wind tunnel.

Or

20. (a) Differentiate between indicated air speed and true air speed.

(b) What would be the indicated air speed if the pressure difference in the pitot and static head measured as 2.5 cm. of Hg at 20,000 feet altitude ? What would be the corresponding true air speed if the indicator is calibrated at the sea level condition ?

(5 × 12 = 60 marks)

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Eighth Semester

Branch—Mechanical Engineering

MANAGEMENT INFORMATION SYSTEMS (Elective – III) (M)

(Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. What is a business process ?
2. What are the steps in a system analysis process ?
3. Will information sharing always result in co-ordination between business processes ?
4. What five types of data are found in information systems ?
5. Describe some of the problems that often arise when information systems span two countries or are moved from one country to another.
6. What are the benefits and limitations of interactive marketing on the internet for a business ?
7. Explain reasons for using pilot implementations, acceptance testing, and post implementation audits.
8. How is it possible to combine features of different life cycle models into the approach for building any particular system ?
9. Discuss the future of MIS.
10. Describe intelligent buildings.

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each question carries 12 marks.

11. (a) Discuss the characteristics of MIS.

Or

(b) Describe the three basic levels of management decisions.
12. (a) State the advantages of DBMS. What four questions do you need to answer in order to create a database query ?

Or

Turn over

(b) What is the role of a DBMS in a business information system ?

13. (a) What can end user managers do about performance problems in the use of IT and the development and operation of information systems in a business ?

Or

(b) Describe the four alternative approaches for building systems and the main issues addressed by each.

14. (a) Describe the four phases any system goes through, and some of the common issues and problems that occur in each phase.

Or

(b) What are the different approaches for converting from a previous system to a new system ?

15. (a) Identify the various steps for system security and control.

Or

(b) What types of access controls are available to restrict access to you data ? What alternative security measures can be used to minimize security risks ?

(5 × 12 = 60 marks)

Part B

Answer all questions. Each question carries 12 marks.

11. (a) Discuss the characteristics of MIS.

Or

(b) Describe the three basic levels of management decisions.

12. (a) State the advantages of DBMS. What four questions do you need to answer in order to create a database query ?

Or

Turn over

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Eighth Semester

Branch : Mechanical Engineering

TOTAL QUALITY MANAGEMENT (M) (Elective III)

(Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer **all** the questions.

Part A

Each question carries 4 marks.

1. Define Leadership in terms of internal customer and external customer.
2. Discuss the advantages of an empowered team.
3. Write a note on Kaizen.
4. Briefly explain on Supplier Rating.
5. Discuss briefly on cause effect diagram and its applications.
6. Write a note on the importance of sample size on determining the quality of a process.
7. Briefly explain the benefits of Total Quality Control.
8. Write notes on Poke-Yoke.
9. Explain on TQM framework.
10. Write a note on the obstacles in the implementation of TQM.

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. (a) Describe the Deming's philosophy on leadership.

Or

- (b) List and explain the most important factors that influence customer purchases.

Turn over

12. (a) Describe the various techniques to sustain continuous improvement.

Or

(b) Describe the various Quality Costs. How are quality costs measured and collected in an organization?

13. (a) Discuss in detail the stages of IMEA, and its documentation.

Or

(b) What is Process Capability Ratio? How do we measure the process capability of an off-centered process?

14. (a) Explain the basic philosophy, techniques and advantages of Quality Circle.

Or

(b) Describe in detail about KANBAN.

15. (a) Discuss in detail about the basic concepts of TQM.

Or

(b) Select a product or service and describe how the dimensions of quality influence its acceptance.

(5 × 12 = 60 marks)

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Eighth Semester

Branch : Mechanical Engineering/Automobile Engineering

PRODUCTION ENGINEERING (M U)

(Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. What are the factors that influence the type of chip produced in a metal cutting process ?
2. What are the effects of friction in machining process ?
3. Define tool life and state the factors affecting tool life.
4. What is HSS and what are its advantages ?
5. What is sintering process ?
6. What are advantages and limitations of powder metallurgy ?
7. What are the properties of titanium based super alloys ?
8. Describe the constituents of glass and their functions.
9. What is the importance of non-traditional machining ?
10. How is chemical machining different from electrochemical machining ?

(10 × 4 = 40 marks)

Part B

Answer any five questions.

Each question carries 15 marks.

11. Explain Merchant's circle diagram in an orthogonal metal cutting process and express the shearing force, frictional resistance and normal force in terms of cutting force and feed force.

(12 marks)

Or

12. With a neat sketch explain the geometry of a single point cutting tool.

(12 marks)

Turn over

13. (a) What is Taylor's tool life equation? Explain economic cutting speed. (8 marks)
- (b) What are the classifications of cutting fluids? (4 marks)
- Or
14. (a) What do you mean by machinability? Explain the method of determining machinability of a material and the factors affecting machinability. (8 marks)
- (b) What are the purposes served by cutting fluids? (4 marks)
15. Explain the procedure of manufacturing parts by powder metallurgy. (12 marks)
- Or
16. (a) What are impregnation and infiltration processes in powder metallurgy? (6 marks)
- (b) What are the desirable properties of metal powder? (6 marks)
17. What do you mean by smart materials? Explain their properties and applications. What are the four types of materials that are commonly added for actuators in smart materials? (12 marks)
- Or
18. Write notes on (i) slip casting (ii) pressure forming (iii) ceramic joining. (12 marks)
- Or
19. Distinguish between laser beam machining and electron beam machining. Give their field of application in the area of manufacturing. (12 marks)
- Or
20. (a) Explain EDM. What are its applications? (8 marks)
- (b) What is stereo lithography? (4 marks)
- [5 × 12 = 60 marks]

B.TECH. DEGREE EXAMINATION, MAY 2010**Eighth Semester**

Branch—Mechanical Engineering

PRODUCTION PLANNING AND CONTROL (M)

(Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part AAnswer **all** questions.

Each question carries 4 marks.

1. Define production planning and control. What are the three distinct stages in a production system ?
2. Discuss the importance of sales forecasting for production scheduling.
3. Why is capacity planning strategically important ?
4. What is a product structure file ? Draw a product structure diagram for a "Clip board".
5. What is scheduling ? Explain how scheduling function differs by type of process.
6. When should the following sequencing rules be used ? (a) SPT ; (b) Johnson's rule ; (c) FCFS ; (d) DDATE.
7. Discuss the role of inventory in supply chain management.
8. What are the functions IT can provide to improve supply chain management ?
9. Why is job shop scheduling so difficult ?
10. Differentiate between CPM and PERT ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. Explain the ten functions of production planning and control cycle.

Or

12. The demand data for a computer services organization is shown below. Compute a linear trend line and check if it is more accurate than exponential smoothing and adjusted exponential smoothing forecasts.

Take $\alpha = 0.5$ and $\beta = 0.30$.

Turn over

Period	Month	Demand
1	January	37
2	February	40
3	March	41
4	April	37
5	May	45
6	June	50
7	July	43
8	August	47
9	September	56
10	October	52
11	November	55
12	December	54

13. What is meant by Bill of materials ? What is modular Bills of material and in what situation it is used ?

Or

14. Explain the three major inputs to the MRP process.

15. A car service has five cars waiting to be washed and waxed. The time required (minutes) for each activity is shown in the table. In what order the cars be processed through ? When will the batch of cars be completed ? Use Johnson's rule.

Or

16. Consider a 3-machine and 5 job flow shop problem as shown in table.

Processing Time

Job	Machine 1	Machine 2	Machine 3
1	10	10	12
2	12	8	20
3	16	6	14
4	12	4	20
5	20	8	8

- Check whether Johnson's algorithm can be extended to this problem.
- If yes find the optimal sequence and corresponding make span.

17. What is materials requirements planning ? How does MRP differs from ERP ? Describe a production environment in which MRP is useful ?

Or

18. Explain the components of Integrated materials management.

19. What is the purpose of dispatch lists ? How are they usually constructed ?

Or

20. What is scheduling ? Describe the objectives of loading and scheduling. What are the factors affecting scheduling ?

[5 × 12 = 60 marks]

B.TECH. DEGREE EXAMINATION, MAY 2010**Eighth Semester**

Branch—Mechanical Engineering

PROJECT MANAGEMENT (Elective II) (M)

(Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 4 marks.

1. What is a project ? Which are the phases of project ?
2. Which are the elements of project management ?
3. Differentiate between CPM and PERT technique.
4. What do you mean by crashing in network analysis ?
5. Briefly explain on forecasting approach.
6. Explain the significances of time series analysis.
7. What are the salient features of risk in economic analysis ?
8. What are the different types of measurement of project risk ?
9. Briefly explain ABC analysis.
10. Differentiate between financial management and project management.

(10 × 4 = 40 marks)

Part B

Answer all questions.
Each question carries 12 marks.

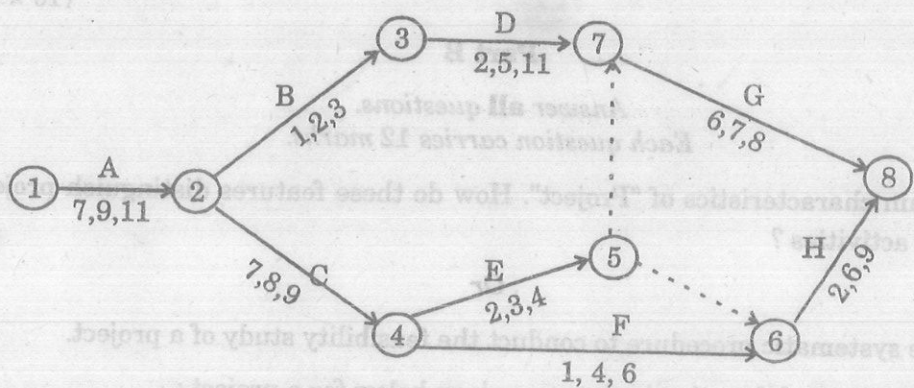
11. List the main characteristics of "Project". How do these features distinguish project from other non-project activities ?
- Or
12. Explain the systematic procedure to conduct the feasibility study of a project.
 13. Activity and expected duration in days are given below for a project :
 - (a) Draw the network.
 - (b) Obtain the maximum duration of the project.
 - (c) The critical path of the project.

Turn over

Activity	Duration (Days)
1-2	9
1-3	5
1-4	10
2-5	6
2-4	5
3-4	12
3-6	8
5-7	9
4-7	13
6-7	9
6-8	8
7-8	4

Or

14. For each of the network given below, given to t_m and t_p for each activity determine :
- t_e and V for each activity ;
 - TE and TL for each event ;
 - The critical path of the project network ; and
 - T_e and V_p for the project.



15. Describe various types of pattern and explain the pattern based forecast method.

Or

16. The sales particular of a car manufacturing company for twelve years is given below :

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Sales	2215	2080	2410	2105	1999	2077	2129	2317	2385	2409	2317	2294

- Fit a simple regression for the above data.
- Forecast the sales for the 13th year.

17. Explain how Monte Carlo simulation is carried out in project Risk Analysis ? What are the salient features in the above simulation.

Or

18. With suitable datas explain the different techniques adopted in the case of decision-making under risk.

19. Explain the various facilities and features available in MS software package.

Or

20. Explain the impact of computer in project management. Explain how a task problem may be solved using the software practice.

(5 × 12 = 60 marks)