F 3708
(Pages : 2)

Reg. No. ME

Name

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Eighth Semester

Branch : Mechanical Engineering

AUTOMOBILE ENGINEERING (M)

(Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Part A

1. Describe the working of a simple carburettor with a neat sketch.

2. What are the reasons for using multi-cylinder engines?

3. What is a torque converter? How does it work?

4. Differentiate between live and dead axle.

5. Define and explain the terms: (i) Camber angle, and (ii) toe-in.

6. List the advantages and disadvantages of disc brakes in comparison with drum brakes.

7. What are the loads that the rear axle has to withstand?

8. Enlist the major components used in automobile air-conditioning system.

9. What is wheel balancing? Why it is required?

10. State the function of a starter. What causes the starting motor armature to rotate?

(10 × 4 = 40 marks)

Part B

1. (a) Explain the classification of automobile engines. (8 marks)

   (b) Distinguish between SI and CI engines. (4 marks)

Or

2. (a) What are the resistances for the motion of the vehicle? Explain. (6 marks)

   (b) Enlist the components of a cooling system and state their function. (6 marks)

3. Explain the working of sliding mesh and synchromesh gear boxes with neat sketch. (12 marks)

Or

Turn over

4. Describe clearly the constructional details and operation of various rear axle drives. Illustrate your answer with neat and simple sketches. **(12 marks)**

5. (a) Discuss the common types of steering gear. What are the essential difference between them? **(8 marks)**

   (b) Describe the working of Macpherson strut type suspension. **(4 marks)**

Or

6. Write short notes on:

   (i) Ackerman linkage.

   (ii) Power steering   **(6 + 6 = 12 marks)**

7. Explain the construction and working of (i) hydraulic brake (ii) power brake systems with neat sketch. **(12 marks)**

Or

8. (a) Describe in detail constructional features of the tubed and the tubeless tyres. Discuss also their merits and demerits. **(6 marks)**

   (b) Discuss briefly about chassis construction. **(6 marks)**

9. Write short notes on :-

   (a) Electronic ignition system.

   (b) Fuel injection control.

   (c) Wheel balancing.   **(4 + 4 + 4 = 12 marks)**

Or

10. Write short notes on :

    (a) Automobile lighting.

    (b) Bendix drive.   **(6 + 6 = 12 marks)**

    [5 × 12 = 60 marks]

F 3728

Reg. No...

Name...

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Eighth Semester

Branch : Mechanical Engineering

MACHINE DESIGN AND DRAWING—II (M)

(Supplementary)

Time : Three Hours

Maximum : 100 Marks

*Answer any **two** questions from Part A and Part B.*
Use of design data book is permitted.
Assume missing data suitably.

Part A

1. (a) What is meant by the Lewi's tooth load ? Derive the same.   (5 marks)

    (b) A 35 kW is to be transmitted at 450 r.p.m. to a shaft with gear ratio 4 : 1 using 20° full depth involute spur gear drive. Pinion is made of heat treated C.S. with σ_t = 200 MPa. and gear with high grade C.I. with σ_t = 60 MPa, module is 10 mm. Design the pair and check it for wear and dynamic tooth load kW = 4.25 N/mm.², C = 63 kN/mm.

                                            (20 marks)

2. (a) Explain the concept of wear strength and further state the method of checking the design of gear for wear strength.

                                            (5 marks)

    (b) A pair of helical gears have 20° steel teeth in daimetral plane and helix angle is 45°. The power to be transmitted is 20 kW. The pinion rotates at 5000 r.p.m. and has 30 teeth. The gear ratio is 5. The material of gears is cast steel with safe bending stress of 110 MPa. B.H.N of the material is 250. Design the gear using Lewi's equation and check it for wear strength.

                                            (20 marks)

3. (a) How the bevel gears are classified ? Expain with neat sketches.   (5 marks)

    (b) A pair of straight teeth bevel gears is used for transmitting 7.5 kW at 900 r.p.m. of pinion. Pinion has 20 teeth and module at the outer radius of 5 mm. Find the face width and check it for wear and dynamic load. Gear ratio 3 : 1.

                                            (20 marks)

4. (a) Write short notes on the following :—

       (i) Lead and pitch.

       (ii) Diameter factor.

                                              (5 marks)

    (b) Design a worm and worm gear drive for a speed reduction by 30. Worm rotates at 600 r.p.m. and transmits 35 kW.

                                              (20 marks)

                                             [2 × 25 = 50 marks]

Part B

5. (a) Explain the following terms as applied to journal bearings :—

   (i)   Bearing characteristic number.

   (ii) Bearing modulus.

   (5 marks)

   (b) A 150 mm. diameter shaft supporting a load of 10 kW has a speed of 1500 r.p.m. The shaft runs in a bearing whose length is 1.5 times the shaft diameter. The diametral clearance of the bearing is 0.0015 mm. The absolute viscosity of the oil at the operating temperature is 11 centipoise. Check whether hydrodynamic lubrication will prevail or not. Find the power loss, heat generated and heat dissipated.

   (20 marks)

6. Design a journal bearing for a generator to the following specifications :

   Load on the journal = 1200 kgf.

   Diameter of the journal = 75 mm.

   Speed of the journal = 1400 r.p.m.

   (25 marks)

7. Select a suitable antifriction bearing for the following requirements :—

   Radial lead on bearings = 5000 N.

   Thrust load = 3000 N.

   Speed of shaft = 1000 r.p.m.

   Expected life = 10,000 hours.

   (25 marks)

8. A ball bearing for a drilling machine spindle is rotating at 3000 r.p.m. It is subjected to a radial load of 2000 N and an axial thrust of 1000 N. It is to work 45 hours/week for one year. Design a suitable ball bearing if the diameter of the spindle is 40 mm.

   (25 marks)

   [2 × 25 = 50 marks]

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Name...

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Eighth Semester

Mechanical Engineering

AEROSPACE ENGINEERING (Elective—II) (M)

(Supplementary)

Time : Three Hours   Maximum : 100 Marks

Property tables are permitted.
Answer **all** *questions.*

Part A

Each question carries 4 marks.

1. Write down the Navier–stokes equation for an incompressible flow.

2. What is International standard atmosphere ?

3. Write down the significance of Reynolds number.

4. Define Aero dynamic center.

5. What is after – burning in turbojet engines ?

6. Define propulsive efficiency.

7. What do you mean by stalling ?

8. Define Maximum Range of Air planes.

9. What is the Importance of Gryo compass ?

10. Describe any *four* important properties of the solid propellants desired for rocket propulsion.

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. (a) Derive the unsteady flow continuity equation for a control volume

$$\int_{cv} \frac{\partial \rho}{\partial t}\, dv = \int_{in} \rho c_n dA - \int_{out} \rho c_n dA\,.$$

Hence show that for one-dimensional steady flow ρAC = constant.

(8 marks)

Turn over

(b) Write down the adiabatic steady flow energy equation.

(4 marks)

Or

12. (a) Define the term stagnation and Dynamic Pressure.

(4 marks)

(b) Ambient air at an altitude of 5000 m above sea level enters the engine of an aircraft flying at 450 Kmph. If the air flow rate through the engine 'is' 25 ks/s. Determine the diameter of the inlet to the engine. State the assumptions used.

(8 marks)

13. Derive the laminar boundary layer equations.

(12 marks)

Or

14. (a) Discuss about the NACA numbering systems of an aerofoil.

(6 marks)

(b) Discuss about Pressure distribution of an aerofoil.

(6 marks)

15. Discuss the performance of a blade element.

(12 marks)

Or

16. Explain with the neat sketch of turbofan engine.

(12 marks)

17. Discuss in detail about ceiling and Fuel consumption.

(12 marks)

Or

18. Discuss in detail about Gliding and climbing.

12 marks)

19. Write short notes on :

(a) Supersonic wind funnel.

(6 marks)

(b) Closed type wind funnel.

(6 marks)

Or

20. (a) Discuss about climb meter.

(4 marks)

(b) The diameter of earth at the mean sea level is 12,683.2 km and the acceleration due to gravity 9.809 m/s^2, determine the values of the orbital and escape velocities of a rocket-propelled spacecraft at an altitude of 500 km.

(8 marks)

[5 × 12 = 60 marks]

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Eighth Semester

Branch : Mechanical Engineering

PROJECT MANAGEMENT (Elective II) (M)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What are some of the key environmental forces that have changed the way projects are managed? What has been the effect of these forces on the management of projects?

2. What is a project? What is the relevance of systems thinking to project management. ?

3. Would a good systems manager be a poor project manager? Or vice-versa?

4. What are the four characteristics that help different projects from other functions carried out in the daily operations of the organizations?

5. Describe Work Breakdown Structure (WBS), program, project, task, and subtask, and work package.

6. "The technical and socio-cultural dimensions of projects are two sides to a coin" Explain.

7. Why would subcontractors for a Government project want their activities on the critical path? Under what conditions would they try to avoid being on the critical path?

8. Explain how NPV (Net present value) and IRR (Internal rate of return) methods deal with non-conventional cash flows.

9. Explain the major project management software's used in India.

10. What are the different types of measures of project risk?

(10 × 4 = 40 marks)

Part B

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

11. Do you need a forecasting system? Explain the different types of forecasting? How do you choose the best system?

Or

Turn over

12. Following data shows the actual sales of TV sets for six months and a starting forecast in January. Calculate the forecast for the remaining five months using simple exponential smoothing with smoothing constant alpha 0.2; also explain the significance of the smoothing constant.

Months:	January	February	March	April	May	June
Actual	100	94	106	80	68	64
Forecast	80	-	-	-	-	-

13. Explain why the payback method cannot be recommended as the method used by a company to assess potential investment project.

Or

14. A heavy machinery manufacturing company is considering the purchase of a machine and has found two machines which meet its specification. Each machine has an expected economic life of five years. Machine one would generate annual cash flows of $ 2,20,000 and would cost $ 5,80,000. Its scrap value at the end of five years would be $ 75,000. Machine two would generate annual cash flows of $ 5,20,000 and would costs $ 1,68,000. The scrap value of this machine at the end of five years is expected to be $ 3,01,000. The company uses straight line method of depreciation. Calculate the accounting rate of return for both machine one and machine two and state which machine you would recommend, giving reasons.

15. Write short notes on the following investment appraisal methods:

   (a)   Net present value method   (b)   Internal rate of return method

   (c)   Payback period method   (d)   Accounting rate of return method

Or

16. The following data represents a plan for one construction project:

Job. Number	Predecessor jobs	a	m	b
1	-	2	3	4
2	1	1	2	3
3	1	4	5	12
4	1	3	4	11
5	2	1	3	5
6	3	1	2	3
7	4	1	8	9
8	5,6	2	4	8
9	8	2	4	12
10	7	3	4	5
11	9,10	5	7	8

where, a, m, and b, are the optimistic, most-likely, and pessimistic times respectively.

Construct the appropriate network diagram, and indicate the critical path. What is the expected completion time for the project? What is the probability that the project will take more than 30 days to complete?

17. Can you envisage a project where the entire scheduling is dictated by resource availability? How will you modify this situation so as to permit a valid application of the PERT and CPM analysis techniques?

Or

18. Construct a Gantt chart for a product start-up project of your choice. Assume suitable data. Comment on the merits and demerits of the Gantt chart, you have constructed.

19. Explain how the Monte Carlo simulation is carried out in project risk analysis.

Or

20. Explain the salient features of decision trees. Support your answer with an example of your choice.

(5 × 12 = 60 marks)

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Reg. No..............................

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B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Eighth Semester

Branch : Mechanical Engineering

PRODUCTION PLANNING AND CONTROL (M)

(Supplementary)

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Part A

Each question carries 4 marks.

1. Distinguish between Production and Production system.
2. State the factors of production.
3. List the methods of sales fore casting.
4. What do you mean by the term "correlation" ?
5. List the informations required for effective production planning.
6. State the factors which affect process planning.
7. What are the main functions of the materials management.
8. When is Material Requirements Planning (MRP) needed ?
9. Give the main reasons for scheduling.
10. State the steps involved in network analysis.

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. Explain the steps in detail to arrive the accurate demand forecasting for an industry and what are the factors which will influence the demand in the market ?

Or

12. Define "Production Planning and Control" and explain the procedure for the same in detail.

13. What are the informations gathered during the process planning and how they are generated ?

Or

14. Describe the differences between the regeneration method and the net-change method for updating the MRP record.

15. Six jobs go first over Machine I and then over Machine II. The order of the completion of jobs has no significance. The following table gives the machine time in hours for six jobs and the two machines.

Job No.	:	1	2	3	4	5	6
Time on Machine A	:	5	9	4	7	8	6
Time on Machine B	:	7	4	8	3	9	5

Find the sequence of jobs that minimizes the total elapsed time to complete the jobs.

Or

Turn over

16. How do you find a sequence of processing of "*n*" jobs through "*m*" machines ?

17. Give the description of the supply chain as givne in ISO 9000 : 2000 and explain with examples.

Or

18. Explain how ERP systems contribute to Improved Inventory Management.

19. What is dispatching ? What are the factors which favour its decentralization ?

Or

20. Discuss the reasons why progress reporting is so important to both production control and planning group.

(5 × 12 = 60 marks)