F 6530 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Eighth Semester

Branch : Mechanical Engineering / Automobile Engineering

PRODUCTION ENGINEERING (MU)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. What is shear angle?
2. Give the favourable conditions for continuous chip formation.
3. Define Machinability.
4. Explain Taylor's tool life equation.
5. What are the advantages of Powder metallurgy?
6. Explain 'Sintering'.
7. What are the properties of ceramics?
8. What is jiggering process of ceramics?
9. What are the drawbacks of unconventional machining methods?
10. Describe the process of ECM.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Differentiate between Oblique and Orthogonal cutting with the help of sketches. Explain their significance.

Or

(b) Derive an expression for finding out the relation between coefficient of friction and cutting force in metal cutting.

12. (a) Explain various tool wear mechanisms with sketches.

Or

(b) Describe the desirable properties of cutting fluids. Mention the names of common cutting fluids.

13. (a) Explain any *three* methods of manufacturing powders.

Or

(b) Write a note on the following processes with respect to powder metallurgy :

(i) Sizing ; (ii) Infiltration ; and (iii) Impregnation.

14. (a) Describe the steps for processing ceramics.

Or

(b) What is glass? Write about the finishing operations done on glass.

15. (a) What is Rapid prototyping? Where is it used? Describe the steps involved in Rapid prototyping.

Or

(b) Draw the schematic of Electro Discharge Machining. Describe the components of EDM machines and explain the metal removal mechanism.

(5 × 12 = 60 marks)

F 6538 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Eighth Semester

Branch : Mechanical Engineering

AUTOMOBILE ENGINEERING (M)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. Distinguish between SI and CI engines.
2. What are the advantages of using a thermostat in a cooling system ?
3. What are the advantages of an overdrive ?
4. Explain the construction and working of a fuel pump.
5. What do you understand by the terms toe-in and toe-out ?
6. Explain the terms "camber" and "caster".
7. Sketch the layout of an airbrake system.
8. Distinguish between tubed and tubeless construction of tyres.
9. Explain the purpose of wheel alignment and wheel balancing.
10. Draw a simple circuit for magnetoignition system.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

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

Or

12. (a) With a simple sketch explain the construction and working of a simple carburetor.

    (b) Describe how the plunger pump operates with a neat diagram.

13. (a) Explain the construction and working of a centrifugal clutch.

    (b) What are the advantages of a semi-centrifugal clutch ?

Or

14. (a) Discuss in detail the construction and operation of a differential.

    (b) Distinguish between semi-floating and fully-floating rear axles.

Turn over

15. (a) Discuss in detail the Ackerman steering mechanism.

    (b) Describe different types of steering linkages.

Or

16. What is the purpose of independent suspension ? Explain various methods to achieve the same in front axle.

17. (a) Discuss in detail various factors considered for the design of tyre treads.

    (b) What are the essential differences between mechanical brakes and hydraulic brakes ?

Or

18. (a) Sketch the layout of a C air air-conditioning system.

    (b) Make a list of common brake troubles and their possible causes.

19. (a) Draw a simple circuit for an automobile starting system.

    (b) Enumerate the factors which affect the battery life.

Or

20. Write short notes on :

    (i) Bendix drive.

    (ii) Automotive head lamp systems.

(5 × 12 = 60 weightage)

F 6576 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Eighth Semester

Branch : Mechanical Engineering

AEROSPACE ENGINEERING (Elective II) (M)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Differentiate between troposphere and stratosphere.
2. Write down the Bernoullis equation for compressible flow and explain the terms.
3. Differentiate between profile drag and induced drag.
4. What is meant by Horse shoe vortex ?
5. What are the advantages and disadvantages of Ramjet engine ?
6. Explain the working of Turbofan engine.
7. Explain what is meant by Gliding flight.
8. Explain range and endurance of aeroplanes.
9. Write short notes on closed circuit wind tunnel.
10. Write short notes on Gyrocompass.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Write Euler's hydrodynamic equations. What are the assumptions made in these equations ? Derive Bernoullis equation from Eulers equation for compressible flow.

Or

12. If the conditions of the standard atmosphere at the mean sea level is given by :

$\phi_0 = 1.013$ bar, $T_0 = 288$ K, $\mu_0 = 1.79 \times 10^{-5}$ kg/ms. Determine pressure, temperature, density and viscosity at attitudes of 10,000 m and 20000 m.

Turn over

13. Explain the following terms as applied to an aerofoil :–

(a) Chord and chord length. (b) Span.

(c) Aspect ratio. (d) Camber.

Or

14. Derive by dimensional analysis the fundamental relationship between thrust and the relevant basic parameters for motion of an airplane propelling in a viscous compressible fluid.

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

Or

16. Explain the working of a Ramjet engine. Discuss its advantages and disadvantages.

17. A jet aeroplane has the following particulars W = 441440 N, S = 110 m^2, CL_{max} = 1.75. The speed at touchdown is 1.16 times stalling speed. Calculate the landing run if the effect of brakes is to produce an average declaration of 2.13 m/s^2.

Or

18. An aeroplane weighing 20 Tonnes and having an optimum CL/CD ratio of 15 is loaded 700 kg/m length of span. Induced drag of the plane is 10% greater than that of the elliptic loading of the aerofoils. The propeller has an efficiency of 75% at 260 km/hr. Calculate the aerodynamic efficiency.

19. Give a layout of a closed circuit wind tunnel and explain its working. Explain how forces and moments on a prototype can be estimated by testing a model in a wind tunnel.

Or

20. Write short notes on the following :

(a) Supersonic wind tunnes.

(b) Gyrocompass.

(c) Altimeter.

(5 × 12 = 60 marks)

F 6610 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Eighth Semester

Branch : Mechanical Engineering

MANAGEMENT INFORMATION SYSTEMS (Elective III) [M]

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Describe the business dimension of information.
2. What is meant by an integrated system ?
3. What are the support elements for the business model ?
4. What is meant by user view of database ?
5. Describe some common methods of communication.
6. Explain the importance of bandwidth in communication.
7. What is meant by systems design ?
8. Explain the role of PERT in Information System Management.
9. What is the significance of Reliability in MIS ?
10. Discuss the new developments in the architecture of MIS.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) What are the characteristics of MIS ? Explain with important features.

Or

(b) Describe the interactions of various levels of management in an organisation. How does these interactions influence the MIS ?

12. (a) Write notes on (i) Data Dictionary ; (ii) Data independence ; and (iii) File structure.

Or

(b) What are the technical aspects of DBMS ? Explain with examples.

Turn over

Module III

13. (a) Compare centralised and Decentralised data processing.

Or

(b) Describe the architecture of distributed data processing with block diagrams.

14. (a) Explain application development cycle of MIS.

Or

(b) Explain the data security and privacy issues of MIS.

15. (a) What are the key developmental areas of MIS ? Explain.

Or

(b) Discuss the issues of "File Protection" in MIS. Explain with application areas in Banking sector.

(5 × 12 = 60 marks)

F 6611 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Eighth Semester

Mechanical Engineering

CRYOGENICS—(Elective III) (M)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Approved charts and tables are permitted.

Part A

Each question carries 4 *marks.*

1. List the main process for the production of Ions temperatures.
2. What is immersion temperature ?
3. What is magnetic cooling ? – Discuss.
4. Explain Superconductivity.
5. Comment on cryogenic fluid transfer systems.
6. What is the difference between ortho hydrogen and Para hydrogen ? What is the composition of the above two at normal boiling point of hydrogen ?
7. Write short notes on cryogenic insulating materials.
8. Discuss on Meissner effect.
9. Explain adiabatic demagnetisation.
10. Compare Gifford Mc-Mohan and solvay refrigeration systems.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Make a detailed note on present areas involving cryogenic applications.

Or

12. Explain Joule-Thomson effect. Show that an ideal gas would not experience a temperature change on undergoing an expansion through an expansion valve.

Turn over

13. Explain the effect of low temperature on any two mechanical properties of engineering materials with graphs.

Or

14. Compare type I and type II superconductors.

15. Explain the working of simple Linde-Hampson liquefaction system.

Or

16. Show that COP of a carnot refrigerator is same as that of an ideal magnetic refrigerator.

17. Explain the working of Philips refrigeration system.

Or

18. Explain the functioning of Joule-Thomson Refrigeration system.

19. Write short note on :

    (a) Cryogenics in space technology.

    (b) Cryogenics in Biology and Medicine.

Or

20. Explain the construction details of a Cryogenic fluid storage vessel.

(5 × 12 = 60 marks)

F 6612 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Eighth Semester

Branch : Mechanical Engineering

TOTAL QUALITY MANAGEMENT (Elective III) [M]

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. List four common barriers to team progress.
2. What are the benefits of employee involvement ?
3. What is PDSA cycle ?
4. Describe the concept of six-sigma.
5. What are the control limits in $\overline{X}$ chart ?
6. Give the uses of QFD.
7. Describe Kamban.
8. Quality circle is a small group activity. Justify.
9. List out the barriers to TQM implementation.
10. What is meant by top management commitment ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) What are the characteristics of quality leaders ? What are the duties of quality council in an organization ?

Or

(b) Explain the customer perception of quality. Describe the role of feedback in customer satisfaction.

12. (a) What is "Juran Trilogy" ? What is its significance ? Explain.

Or

(b) Describe the principles of customer/supplier relations. Explain the components of relationship development.

Turn over

13. (a) Write notes on the following :

(i) Fishbone diagrams.

(ii) Check sheet.

(iii) Ishikava diagram.

Or

(b) What is meant by FMEA ? Describe the FMEA documentation.

14. (a) What is '5S' principle ? Explain its application in Total Quality Control.

Or

(b) What are the benefits and limitations of JIT ? Describe the implementation details of JIT systems.

15. (a) With the help of examples, discuss the TQM of Indian industries.

Or

(b) What are the barriers of TQM in Indian industries ? Suggest some methods to resolve the same.

(5 × 12 = 60 marks)

F 6550 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

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. State the advantages of better Production Planning and control.
2. Define sales forecasting ? Explain its importance.
3. State the principles of Sound Production Control System ?
4. Describe the term (MPS) Master Production Schedule ?
5. What is Sequencing ? Explain. Give an example of sequencing problem from your daily life ?
6. Explain the four elements that characterize a sequencing problem.
7. State the Objectives of Purchasing.
8. Write short note on (ERP) Enterprises Resource Planning ?
9. Define the term CPM and PERT. State their objectives.
10. What are the basic objectives of Job Scheduling ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Briefly explain the functions of Production Planning and Control.

Or

(b) Name the various methods of sales forecasting. Describe any *two* of them with their advantages and limitations ?

(12 marks)

Turn over

12. (a) Write the various types of Production Systems and explain the Production System suitable for Job Work ?

Or

(b) Briefly describe the Problems in implementing MRP system ?

(12 marks)

13. (a) Determine the optimal sequence of jobs that minimizes the total elapsed time based on the following Information. Processing time on machine is in hours and no passing is allowed .

Job	...	1	2	3	4	5	6
Machine A	...	9	4	8	3	6	2
Machine B	...	4	5	6	3	2	7
Machine C	...	9	8	7	10	11	10

Or

(b) Solve the following sequencing problem, given an Optimal Solution when Passing is not allowed :

Machine		*Job*				
		A	B	C	D	E
M_1	...	10	12	8	15	16
M_2	...	3	2	4	1	5
M_3	...	5	6	4	7	3
M_4	...	14	7	12	8	10

(12 marks)

14. (a) Explain the Influence of IT for a ERP System ?

Or

(b) State the duties, functions and responsibilities of a purchasing department ?

(12 marks)

15. (a) What is a Scheduling Problem ? Explain and illustrate.

Or

(b) The following table gives data on normal time and cost and crash time and cost for a Project :

Activity		*Normal*		*Crash*	
		Time (days)	*Cost (Rs.)*	*Time (days)*	*Cost (Rs.)*
1—2	...	6	60	4	100
1—3	...	4	60	2	200
2—4	...	5	50	3	150
2—5	...	3	45	1	65
3—4	...	6	90	4	200
4—6	...	8	80	4	300
5—6	...	4	40	2	100
6—7	...	3	45	2	80

Find the minimum total time of Project after crash and the Corresponding cost, taking into consideration the minimum Crash Cost.

(5 × 12 = 60 marks)

F 6560 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

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 data book is permitted.
Missing data may be assumed.

Part A

1. (a) What is pressure angle of gear tooth ? (5 marks)

(b) A pair of spur gear transmitting 7.5 kW power at 1000 r.p.m. from an electric motor. The starting torque is twice the rated torque. Gear ratio is 2.5. Both gears are made of steel with strength of 450 N/mm^2. Design the drive.

(20 marks)

2. (a) How is axial thrust in helical gears overcome ? (5 marks)

(b) A pair of helical gears with pinnions 26 teeth and gear 100 teeth. Supplies power at 5 kW at 2,000 r.p.m. of pinnion. Both gears are made of hardened steel with allowable stress of 660 N/mm^2. Design the drive and check for wear load.

(20 marks)

3. (a) What is back cone in case of bevel gear ? (5 marks)

(b) A pair of straight bevel gears mounted on shafts that are intersecting at right angles transmitting 12.5 kW power at 1440 r.p.m. The starting torque of motor is 150% of the rated torque. Both gears are made of steel with allowable stress 750 N/mm^2. Gear ratio = 2.5. Design the drive.

(20 marks)

Turn over

4. (a) Why heat dissipation is important consideration in worm gear drive ? (5 marks)

(b) A pair of worm gear is designated as 1/52/10/8. The worm rotates at 1000 r.p.m. Determine coefficient of friction and efficiency of the worm gears.

(20 marks)

[2 × 25 = 50 marks]

Part B

5. (a) What is bearing characteristic number as applied to journal bearing ? (5 marks)

(b) The radial load acting on a ball-bearing is 2500 N for the first five revolutions and reduces to 1500 N for the next 10 revolutions. The load variation is repeats it self. The expected life of bearing is 20 million revolutions. Determine dynamic load carrying capacity of the bearing.

(20 marks)

6. A ball-bearing subjected to radial load of 3000 N is expected to have a satisfactory life of 10,000 hours at 720 r.p.m. with a reliability of 95%. Calculate the dynamic load carrying capacity of the bearing. If there are four such bearings each with a reliability of 95% in a system, what is the reliability of the complete system ?

(25 marks)

7. Following data is given for a 360° hydrodynamic bearing :

Radial load	=	10 kN
Journal speed	=	1440 r.p.m.
Unit bearing pressure	=	1000 kPa.
Clearance ratio $\left(\frac{r}{c}\right)$	=	800
Viscosity of lubricant	=	30 mPa S

Assuming that the total heat generated in the bearing is carried by the total oil flow in the bearing. Calculate :

(i) Dimensions of bearing. (ii) Coefficient of friction.

(iii) Power lost in friction. (iv) Total flow of oil.

(v) Side leakage. (vi) Temperature rise.

(25 marks)

8. Selcct a pump impeller for the following requirements :

Discharge	=	50 litres/second
Specific speed	=	1000 r.p.m.
Suction lift	=	2.5 m
Delivery lift	=	9.5 m
Length of suction pipe total	=	8 m
Length of delivery pipe	=	50 m

(25 marks)

[2 × 25 = 50 marks]

F 6577 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

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. Define a Project. Identify the important characteristics of project.
2. Name and describe the various types of project.
3. Define the term CPM and PERT. State their objectives.
4. Define the terms (a) Crash time ; (b) Normal cost.
5. State the objectives of long term forecasting ?
6. Name the various methods of forecasting. Explain any one of them.
7. How does risk planning serve to increase risk taking behaviour ?
8. What are the advantages and limitations of simulation models ?
9. Write short note on daily report ?
10. Describe how resources can be assigned to each activities in M.S. Project ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Briefly explain project feasibility ?

Or

12. Explain the process of project management ?

(12 marks)

Turn over

13. The following data pertains to some network, compress the project to the least. Possible duration and estimate the crashing cost :

Activities	T_n	T_c	*Cost slope*
1 – 2	3	2	700
1 – 3	7	4	200
2 – 3	5	3	100
2 – 4	8	6	200
3 – 4	4	2	400

Or

14. Table below gives the schedule of welding activities in an assembly shop :

Activity no	0 – 1	1 – 2	0 – 3	2 – 5	3 – 4	4 – 5	5 – 6
Duration (days)	2	4	2	1	2	5	3

(a) Draw the network diagram.

(b) Calculate EST, LST, EFT, LFT, and floats.

(c) Mark the critical path and final total project duration.

(12 marks)

15. The sales of a company, in millions of rupees are given

Year	2001	2002	2003	2004	2005	2006	2007	2008
Sale	82	80	90	92	83	94	99	92

using the principle of least squares, fit a straight line trend equation to the above data. Show that the sum of deviations in equal to zero. Also determine the sum of squares of deviations. Forecast the sales for the years 2009 and 2010 show the data and trend line graphically.

Or

16. The demand for an item is observed for 15 month and recorded below :

Month	1	2	3	4	5	6	7	8
Demand	280	288	266	295	302	310	303	328
Month	9	10	11	12	13	14	15	
Demand	309	315	320	332	310	308	320	

Calculate (i) 3 monthly ; and (ii) 4 monthly averages. What is the forecast for month 16 for each one ?

(12 marks)

17. What is Monte Carlo simulation ? Why it is called so ?

Or

18. Think of a project you are familiar with and problems the project encountered list some ways that risk could have been reduced in the project and explain each of them.

(12 marks)

19. What are the advantages and limitations of MS. Project software when we compare it with other software for the similar purpose.

Or

20. Explain why we require various reports for a single project. Explain the general elements in a report.

(12 marks)

[5 × 12 = 60 marks]