B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Eighth Semester

Branch : Mechanical Engineering/Automobile Engineering

PRODUCTION ENGINEERING (MU)

(Supplementary/Mercy Chance)

Time : Three Hours   Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 marks.

1. Distinguish between Oblique cutting and Orthogonal cutting.
2. What is the effect of rake angle on surface finish ?
3. Define 'machinability index'.
4. What are the advantages of diamond as a cutting tool ?
5. What is the method of finding the shape of a metal powder ?
6. What do you mean by 'pre-sintering' ?
7. List the advantages of using super alloys.
8. Write a short note on applications of ceramics.
9. What are the techniques used in rapid prototyping ?
10. Why non-traditional machining processes have low material removal rate ?

(10 × 4 = 40 marks)

Part B

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

11. Draw the Merchants circle diagram and derive the velocity relationships.

Or

12. Explain the various mechanisms of chip formation in metal cutting.

13. With neat sketches, explain (i) flank wear and (ii) crater wear.

Or

14. Explain the types of tool materials and discuss their applications.

Turn over

15. Discuss the methods of generating metal powders in powder metallurgy.

Or

16. Write notes on :

    (i)   Hot pressing ;

    (ii) Surface treatment ; and

    (iii) Impregnation treatment.

17. What are 'smart materials' ? Discuss their properties and main applications.

Or

18. Explain with neat sketches, any three ceramic processing methods.

19. With a sketch, explain the methods in stereo lithography for generating complex features.

Or

20. Explain :

    (i)   Laser Beam Machining.   (4 marks)

    (ii) Abrasive Water Jet Machining.   (4 marks)

    (iii) LIGA process.   (4 marks)

[5 × 12 = 60 marks]

F 3248

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Reg. No. 2 cop ies

Name...........................

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Eighth Semester

Branch : Mechanical Engineering

AUTOMOBILE ENGINEERING (M)

(Supplementary/Mercy Chance)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 4 marks.

1. What are the main functions of a piston ?

2. Describe suitable materials used for the inlet and the exhaust valves of automobile engines.

3. What is an over drive ? What are its advantages ?

4. Explain the construction and working of a fluid coupling.

5. Explain the different types of steering linkages.

6. What do you understand by the terms 'Camber' and 'Castor' ?

7. Discuss the advantages and disadvantages of anti-lock braking system.

8. Sketch the sectional view of the tyre and indicate its various parts.

9. Describe the function of a condenser in the ignition system. Explain its construction details.

10. Describe the construction and working of starter motor for automobiles.

$(10 \times 4 = 40 \text{ marks})$

Part B

Answer all questions.
Each question carries 12 marks.

11. (a) Discuss the various design considerations for piston rings. What factors would you consider for selecting rings for an engine ?

   (b) What are the design criteria for a SI engine combustion chamber ?

Or

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

   (b) What is the purpose of pressurizing a liquid cooled system ? How is it accomplished ?

Turn over

13. (a) Explain the construction and working of a synchromesh gear box.

    (b) Explain the principle of automatic transmission.

Or

14. (a) What are the desirable features of planetary gears for transmitting power ?

    (b) How does a conical-spring clutch differ from a coil-spring clutch ?

15. (a) What is the purpose of independent suspension ? Explain various methods to achieve the same in front axle.

    (b) What are the advantages and disadvantages of air suspension system ?

Or

16. (a) Discuss in detail the Ackermann steering mechanism.

    (b) Sketch a steering linkage for a vehicle with independent suspension.

17. (a) Sketch the layout of an air brake system.

    (b) Discuss the advantages and disadvantages of hydraulic brake system.

Or

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

    (b) What are the advantages and disadvantages of power brake system.

19. (a) Discuss the advantages of electronic ignition system compared to conventional electrical ignition systems.

    (b) Discuss in detail the construction and use of an optical switch.

Or

20. (a) Discuss in detail various tests for ascertaining the fittness of a battery to be used in a vehicle.

    (b) Discuss the construction and principle of operation of an alternator in automobile charging system.

(5 × 12 = 60 marks)

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Name......................

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Eighth Semester

Branch : Mechanical Engineering

PRODUCTION PLANNING AND CONTROL (M)

(Supplementary/Mercy Chance)

Time : Three Hours   Maximum : 100 Marks

Answer all questions.

Part A

Each question carries 4 marks.

1. What are the advantages of PPC ?
2. What do you understand by the term forecasting ?
3. Define Routing.
4. Explain process planning with example.
5. Explain single dimension rule.
6. Brief multiple workstation scheduling.
7. Define SCM.
8. Write a note on Carousal Storage system.
9. Explain short term scheduling.
10. Explain the term PERT.

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. (a) Explain the internal and external factors affecting demand.

Or

   (b) (i) Compute a three week moving average forecast for the arrival of medical clinic patients in Week 4.

   The number of arrivals for the past 3 weeks were :

Week		Patients arrived
1	...	400
2	...	380
3	...	411

   (ii) If the actual number of patient arrivals in week 4 is 415, what is the forecast of Week 5 ?

Turn over

12. (a) Write a note on MRP explosion.

Or

(b) Explain the principles and procedures of production control.

13. (a) Explain the sequencing operation for a two station flow shop with suitable example.

Or

(b) With the help of following problem describe the algorithm for solving an *n* job-2 machine sequencing situation :

Job	J_1	J_2	J_3
Machine 1 (processing time - hours) ...	4	5	6
Machine 2 (processing time - hours) ...	7	3	6

14. (a) Sketch the building block of House of Supply Chain Management and explain.

Or

(b) Write a note on the strategies of the purchasing department. Choose a pen manufacturing company produces 1000 pieces per day.

15. (a) Explain the estimation of shop loads done in a production flow shop.

Or

(b) Explain duties, procedure and rules of despatching section in a company.

(5 × 12 = 60 marks)

F 3268

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Eighth Semester

Branch : Mechanical Engineering

MACHINE DESIGN AND DRAWING – II (M)

(Supplementary / Mercy Chance)

Time : Three Hours
Maximum : 100 Marks

*Answer any **two** questions from Part A and Part B.*
Design databook is permitted.
Missing data may be assumed.

Part A

1. (a) What is Lewis form factor? How does it vary with number of teeth on gear?

   (b) A pair of spur gear 20° full depth involute teeth is to be designed RPM of input shaft is 1000 and it receives 8 kW power. The speed of gear shaft is reduced to 250 r.p.m. Pinion and shaft are made of steel with σ_{gp} = 600 MPa. Service factor is 1.5 and factor of safety is 2.

   (5 + 20 = 25 marks)

2. (a) What are merits and demerits of helical gears over spur gears?

   (b) A pair of helical gears with speed ratio 2.6 is to be designed. Following data is given :

   Speed of pinion = 520 r.p.m.

   Power to be transmitted = 8 kW.

   Gear surfaces are heat treated to 400 B HN.

   Service factor = 1.5.

   Factor of safety = 2.

   σ_{yp} of material = 600 MPa.

   Design the drive.

   (5 + 20 = 25 marks)

Or

Turn over

3. (a) What is the difference between velocity factor for a bevel gear teeth cut on milling machine and bevel gear teeth generated on a machine?

   (b) A pair of bevel gear with Zp = 25, Zg = 50 has module of 5 mm. and face width of 40 mm. Ultimate strength of gear material is 450 MPa. Determine beam strength of gear. Suggest suitable hardness of gears.

   (5 + 20 = 25 marks)

4. (a) What are the most commonly used materials for worm and gear wheel?

   (b) A worm and worm wheel set is designated by 2/54/10/8. The effective surface area of gear housing is 1.8 m^3 and heat transfer coefficient is 16 W/m^2 °C. If the ambient temperature 25° C. Work shaft runs at 1000 r.p.m. Power transmitted through worm is 4 kW then what is the rise in temperature of lubricating oil.

   (5 + 20 = 25 marks)

   [2 × 25 = 50 marks]

Part B

5. (a) What is the difference between thick film and thin film lubrication?

   (b) The following data is given for a 360° hydrodynamic bearing

   Radial load = 3.6 kN

   Journal diameter = 55 mm

   Bearing length = 27.5 mm

   Radial clearance = 0.05 mm

   Viscosity of lubricant = 25 CP.

   Somerfield number of bearing is 0.0923.

   Determine (i) Journal speed ; (ii) Coefficient of friction ; (iii) Power loss in friction ; (iv) Flow requirement ; (v) Temperature rise.

   (5 + 20 = 25 marks)

6. A single row deep groove ball bearing has a dynamic load capacity of 12,400 N and operates at the following cycle :

   (a) Radial load 4,000 N at 500 r.p.m. for 25% of time.

   (b) Radial load of 8,000 N at 600 r.p.m. for 25% of time.

   (c) Radial load of 6,000 N at 720 r.p.m. for 50% of time.

   Calculate the life of the bearing.

   (25 marks)

7. (a) Explain how $L_{50} = 5 L_{90}$ for a ball bearing.

    (b) A ball bearing carries a radial load of 3.5 kN and is to be designed for 6,000 hours of operation at 1400 r.p.m. with a reliability of 98%. Select the bearing.

                                                                   (5 + 20 = 25 marks)

8. Design an impeller of a centrifugal pump to lift water from a sump to a reservoir with the following data :

    Discharge = 50 litres/sec.

    Suction head = 2.5 m

    Delivery head = 9.5 m

    Length of suction pipe (total) = 8 m.

    Length of delivery pipe = 50 m.

    Number of bends in delivery branch = 1

    Number of bends in suction branch = 1

    Specific speed = 1000 r.p.m.

    Suction pipe diameter = 15 cm.

    Delivery pipe diameter = 20 cm.

    Design should include (a) Total head ; (b) Speed of impeller ; (c) Impeller diameters and breadths at inlet and outlet ; (d) Inlet and exit angles of vane.

    Take number of vanes as 6 and manometric efficiency as 80%, coefficient of friction = .007.

                                                                   (25 marks)

                                                                   [2 × 25 = 50 marks]

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B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Eighth Semester

Branch : Mechanical Engineering

AEROSPACE ENGINEERING (Elective II) (M)

(Supplementary/Mercy Chance)

Time : Three Hours   Maximum : 100 Marks

Part A

Answer all questions.

Each question carry 4 marks.

1. What is the difference between the troposphere and the stratosphere ?

2. Differentiate between static, dynamic and stagnation conditions.

3. How does the pressure distribution over an aerofoil changes as we increase the angle of attack from negative values to beyond the stalling angle.

4. What is meant by the aerodynamic centre of an aerofoil section ?

5. Discuss the advantages and disadvantages of Ramjet engines.

6. What is meant by after burning ?

7. What are the four most important forces which act upon an aeroplane during flight ?

8. Explain how it is that an aeroplane can fly level at a wide range of air speeds.

9. Distinguish between "indicated" air speed and "true" air speed.

10. What are the advantages and disadvantages of solid propellant rocket engines.

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each question carries 12 marks.

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

Or

12. Derive the continuity equation in differential form for a compressible fluid in Cartesian Co-ordinate system.

13. A model aerofoil section (span 0.3m, Chord 50 mm) is tested in a wind tunnel at a velocity of 30.8 m/s. The maximum lift obtained as 11N. Find the value of the maximum lift coefficient.

Or

Turn over

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

    (a) Chord and chord length.

    (b) . Span. (c) Aspect ratio

    (d) . Camber . (e) . Angle of attack.

15. An aircraft powered by two gas turbines is flying at 600 knots. If the jet velocity is 440 m/s , and the mass flow is 66 kg/s for each engine, what is total thrust being developed ? What is the total power being developed by the gas turbines ?

Or

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

17. An aeroplane weighs 10000 N ; the drag on normal horizontal flight is 1250 N, the centre of pressure is 25 mm behind the centre of gravity, and the line of drag is 150 mm above the line of thrust. Find what load on the tail plane, which is 6 m behind the centre of gravity, will be required to maintain balance in normal horizontal flight.

Or

18. On a propeller-driven aircraft

    (a) Why will we get less range if we fly too high ?

    (b) At what height should we fly for best endurance ?

    (c) Why is the air speed for best endurance different from the air speed for best range.

19. A satellite of 100 kg mass is circling the earth on a radius of 18000 km from the centre of earth. Calculate (a) the force exerted on the satellite by the earth (b) The time taken for one complete orbit.

Or

20. An aircraft is flying at a true air speed of 138.8 m/s at a height of 7000 m, where the air density is 0.653 kg /m³ and the pressure is 466 mb. What are the pressures transmitted to the air speed indicator via

    (a) the static to be and

    (b) the pitot tube. What will be the indicated air speed if the density assumed in the calibration of the instrument was 1.225 kg/m³.

(5 × 12 = 60 marks)

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Eighth Semester

Branch : Mechanical Engineering

PROJECT MANAGEMENT (Elective II) (M)

(Supplementary/Mercy Chance)

Time : Three Hours   Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. How would you evaluate the appropriateness of a technology?

2. Show how various financial estimates and projections are interrelated?

3. Discuss the authority and orientation problem in a project settings.

4. What are the steps involved in PERT analysis?

5. Discuss the moving average model of forecasting and mention its drawbacks.

6. How would you make a choice between selected values of smoothing constants for making forecasts?

7. What is risk free rate? How would you measure it?

8. Discuss the risk adjusted discount rate method.

9. What do you meant by Gantt charts? What are its advantages?

10. What in the significance of critical path in scheduling?

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each question carries 12 marks.

11. Describe briefly the various means of financial a project.

Or

12. Discuss the importance of considering alternative ways of transforming an idea into a concrete project.

Turn over

13. Discuss and evaluate the variance analysis approach to project control.

<div align="center">*Or*</div>

14. A publisher has to publish a text book. The activities associated with the production of text books are given below. Develop the network and determine the completion time and critical activities.

Activity	A	B	C	D	E	F	G	H	I	J
Predecessor	–	–	–	–	A, B	E	F	D	GH	CI
Duration (Weeks)	3	2	4	3	2	4	2	1	2	4

15. You are given the following information about demand of an item:

Month	1	2	3	4	5	6	7	8	9	10	11
Demand	220	228	217	219	258	241	239	244	256	260	265

Calculate forecasted values using (i) 3-monthly moving averages, (ii) 5-monthly moving averages.

<div align="center">*Or*</div>

16. Calculate the exponential forecasts using $\alpha = 0.3$ and the following data, use MAD as a tracking signal whenever the MAD exceeds 50 switch α to 0.8.

<div align="center">Quarter</div>

Year	I	II	III	IV
2005	70	160	110	200
2006	90	120	60	110
2007	100	190	150	300
2008	270	350	320	

17. What is Monte-carlo simulation. Explain the steps involved in it?

<div align="center">*Or*</div>

18. Explain the key steps involved in decision tree analysis.

19. How Ms Project software help engineers in scheduling a project?

<div align="center">*Or*</div>

20. List out the steps used in MS project to schedule a project?

<div align="right">(5 × 12 = 60 marks)</div>

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Eighth Semester

Branch : Mechanical Engineering

MANAGEMENT INFORMATION SYSTEMS (Elective III) (M)

(Supplementary/Mercy Chance)

Time : Three Hours   Maximum : 100 Marks

Part A

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

1. What are the main requirements for an MIS?

2. Explain a system.

3. How a model base different from a database?

4. List the five problems which may motivate an organisation to move towards the database approach.

5. What are the characteristics of LAN?

6. Discuss the main functions of data communication software.

7. What are the typical functional information subsystem in an organisation?

8. What is the role played by business in an organisation?

9. What are the steps involved in information system planning?

10. List the main steps involved in the implementation of MIS.

(10 × 4 = 40 marks)

Part B

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

11. (a) Describe various sources of getting the information.

Or

(b) Define MIS and discuss various characteristics expected of a good MIS.

Turn over

12. (a) What are the various methods of storing data? Explain.

Or

(b) In what sense does the database constitute the image of an organisation?

13. (a) Explain the three types of structures allowed in structured programming.

Or

(b) Define Network. Explain types and topologies of network.

14. (a) What are the steps involved in testing the information system?

Or

(b) Discuss the need and evaluation procedure for MIS in any organisation.

15. (a) How IT can help a company to be an agile competitor with the help of customer and business partner?

Or

(b) Explain the knowledge based expert system in detail.

(5 × 12 = 60 marks)

F 3319 (Pages : 2) Reg. No..................................

Name..................................

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Eighth Semester

Branch : Mechanical Engineering

CRYOGENICS (Elective III) (M)

(Supplementary/Mercy Chance)

Time : Three Hours   Maximum : 100 Marks

Approved tables and charts are permitted.

Part A

*Answer **all** questions.*

Each question carries 4 marks.

1. Define the figure of merit of a refrigerator.

2. Give short notes on the application of cryogenics engineering in the field of aeronautics.

3. Explain the uses of liquid Nitrogen.

4. Give normal boiling point, approximate density or density relative to water of liquid oxygen, liquid nitrogen and liquid hydrogen.

5. What is the role of expanders is any liquefaction system?

6. What is the basic difference between a liquefier and a refrigerator?

7. Derive the expression for cop of thermodynamically ideal isothermal source refrigeration system.

8. Explain Lurde-Hampson refrigerator with schematic diagram and T-S plot.

9. Write short notes on oxyogenic-fluid transfer systems.

10. What do you meant by super conductivity?

(10 × 4 = 40 marks)

Part B

*Answer **all** questions.*

Each question carries 12 marks.

11. Explain the historical development of cryogenic engineering since 1892.

Or

12. Explain in detail the application of cryogenic engineering in the field of health, science and industry.

Turn over

13. Explain the effect of low temperature on any two thermal properties of Engineering materials.

Or

14. From information on the mechanical and thermal properties of metals, select two metals that would be good choices for the inner sphere of a low-temperature container (dewar). List the advantages and disadvantages associated with the selection.

15. Write notes on ortho-para conversion in hydrogen liquefaction.

Or

16. Explain any one liquefaction system for nitrogen, with a schematic diagram and T-S plot.

17. Explain a two stage palse tube, refrigerator with the help of a neat schematic diagram.

Or

18. Explain the working of vuilleumier refrigerator with the help of schematic and T-S plot. Also derive an expression for COP.

19. Write short notes on cryogenies in space technology.

Or

20. Explain a Dewer vessel with a neat sketch.

(5 × 12 = 60 marks)

F 3320

(Pages : 2)

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

Name......................................

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Eighth Semester

Branch : Mechanical Engineering

TOTAL QUALITY MANAGEMENT (Elective III) [M]

(Supplementary/Mercy Chance)

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Part A

Each question carries 4 marks.

1. Explain the significance of customer in TQM.
2. Explain Maslow's hierarchy needs.
3. Define the term "process".
4. Explain PSDA cycle.
5. Explain the significance of quality fucntion deployment.
6. Explain the significance of FMFA.
7. Explain the significance of just in time.
8. Explain the significance of Kanban.
9. What are the barriers for implementing TQM in a service organization ?
10. What are the organizational factors congenial for implementing TQM in a manufacturing sector.

(10 × 4 = 40 marks)

Part B

Each question carries 12 marks.

11. (a) Enumerate the significance of customer feedback. Explain the various methods for collecting customer feedback.

Or

(b) Define "Teams". Why team work is important ? Describe the characteristics of successful teams.

12. (a) Explain the term Quality cost. Explain how quality cost can be catogorized.

Or

(b) Explain Juran's ten steps to quality improvement.

13. (a) Explain the concept of Benchmarking. Explain the process of Benchmarking.

Or

(b) Explain the steps for building a house of quality.

Turn over

14. (a) Discuss the total quality control tools with their application areas.

Or

(b) Discuss the significance, and objectives of quality circle with an example.

15. (a) Narrate the details of implementing TQM in a service sector familiate you.

Or

(b) Narrate the details of implementing TQM in a manufacturing firm.

(5 × 12 = 60 marks)