F 9020 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

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. What are the needs for PPC in an organisation.
2. What is meant by sales trend ?
3. List out the objectives of routing.
4. Describe Master Production Schedule.
5. Explain the structure of a sequencing problem.
6. Describe the Johnson's rule for two-stage production.
7. What is meant by 'Open tender' ?
8. Write a note on ERP.
9. What is the difference between Loading' and 'Scheduling'.
10. Discuss the major features of PERT.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Discuss the long terms forecasting techniques.

Or

(b) Fit a straight line trend to the following data on demand of an item X and project the demand for the year 2010.

Year	2003	2004	2005	2006	2007	2008	2009
Demand	80	84	90	93	98	100	104

12. (a) Define production control. Explain the objectives and procedure of production control.

Or

(b) What are the components of an MRP system ? List out the problems in implementing MRP systems.

Turn over

13. (a) A book-binder has one printing press and one binding machine. The time required to perform the printing and finding operations for each book is given below :

Book	1	2	3	4	5	6
Printing time hours	30	120	50	20	90	100
Binding time hours	80	100	90	60	30	10

Determine the order of processing of books.

Or

(b) Consider the following 2 machines 6 jobs flow shop scheduling problem. Using Johnson's algorithm, obtain the optical sequence.

Job	1	2	3	4	5	6
M/C 1 (hours)	5	2	13	10	8	12
M/C 2 (hours)	4	3	14	1	9	11

14. (a) Why Integrated materials management is needed ? Describe about its components.

Or

(b) Define the concept of supply chain management. Describe various types of supply chain views.

15. (a) Discuss the steps involved in progress control. What are the different charts that can be used for progress reporting ?

Or

(b) A project schedule given below :

Job	1-2	1-3	2-4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-10	9-10
Time (hrs)	4	1	1	1	6	5	4	8	1	2	5	7

Construct the network, compute :

(i) Earliest and latest event times.

(ii) project duration and mark the critical path.

(5 × 12 = 60 marks)

F 9029 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

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.
Missing data may be assumed.

Part A

1. (a) Compare spur and helical gears. (5 marks)

   (b) A pair of 20° full depth involute spur gears is to transmit 30 kW at 250 r.p.m. of the pinion. The velocity ratio is 1 : 4. The pinion is made of cast steel having an allowable static stress f_0 = 100N/mm^2, while the gear is made of cast iron having allowable static stress f_0 = 55 N/mm^2.

   (20 marks)

2. (a) Explain the nomenclature of a helical gear. (5 marks)

   (b) A pair of helical gears with 30° helix angle is used to transmit 15 kW at 10,000 r.p.m. from the pinion shaft with a velocity ratio of 5 : 1. The gear is made of phosphor bronze having static strength 75 N/mm^2 and the pinion is made of hardened steel of static strength 120 N/mm^2. Find the module, pitch diameter and face width for 20° full depth involute teeth from the stand point of strength only.

   (20 marks)

3. (a) Explain forces acting in a bevel gear. (5 marks)

   (b) A pair of bevel gears consists of a 30 teeth pinion meshing with a 48 teeth gear. The gears are mounted on shafts, which are intersecting at right angles. The module at the large end of the tooth is 4 mm. Calculate :

   (i) The pitch circle diameters of the pinion and the gear.

   (ii) The pitch angles for the pinion and the gear.

   (iii) The cone distance.

   (20 marks)

4. (a) Explain the nomenclature of worm gears. (5 marks)

   (b) 1 kW power at 720 r.p.m. is supplied to the worm shaft. The number of starts for threads of worm are four with a 50 mm PCD. The worm wheel has 30 teeth with 5 mm module. The normal pressure angle is 20°. Calculate the efficiency of the worm gear drive and the power lost in friction.

   (20 marks)

[2 × 25 = 50 marks]

Turn over

Part B

5. (a) Explain theory of hydrodynamic lubrication. (5 marks)

   (b) A ball-bearing with a dynamic load capacity of 22.8 kN is subjected to a radial load of 10 kN. Calculate :

   (i) The expected life in million revolutions that 90% of the bearings will reach.

   (ii) The corresponding life in house, if the shaft is rotating at 1450 r.p.m.

   (20 marks)

6. Select a single row deep groove ball-bearing for a radial load of 4 kN and a thrust load of 5 kN, operating at a speed of 1,600 r.p.m. for an average life of 5 years at 10 hours per day. Assume uniform and steady load.

   (25 marks)

7. A journal bearing 6 cm in dia and 9 cm long runs at 450 r.p.m. The oil used for hydrodynamic lubrication has absolute viscosity of 60 centripoises. If the diametral clearance is 0.01 cm, find the safe load on the bearing.

   (25 marks)

8. Select a pump impeller for the following requirement :

Discharge	=	1000 lpm
Speed	=	2000 r.p.m.
Suction lift	=	3.5 m of water
Delivery lift	=	30 m of water

(25 marks)

[2 × 25 = 50 marks]

F 9045 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Eighth Semester

Branch—Mechanical Engineering

AEROSPACE ENGINEERING (Elective—II) (M)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Discuss the variation of temperature with Altitude.
2. Write down the integral form of momentum equation. Explain the usefulness of integral formulation.
3. How does supersonic lift slope vary with Mach Number ?
4. Differentiate between profile drag and induced drag.
5. What are the advantages of the Turbojet engine over Ramjet engine ?
6. What do you mean by thrust Augumentation ?
7. What are the factors which govern the performance of an aeroplane ?
8. Explain the range and Endurance of aeroplanes.
9. Differentiate between indicated air speed and true air speed.
10. Discuss the classification of wind–tunnels.

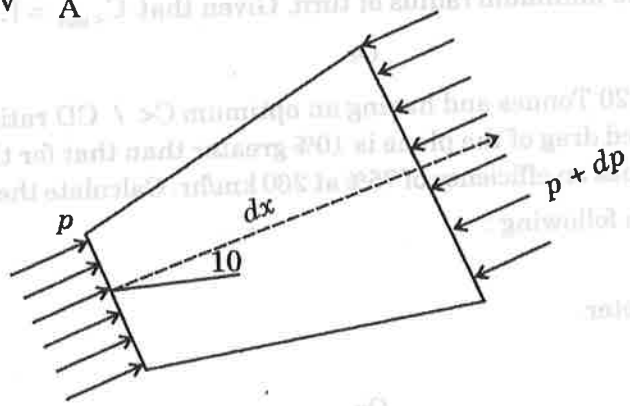
(10 × 4 = 40 marks)

Part B

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

11. Consider frictionless steady flow of a compressible fluid in an infinitesmal stream tube as shown in the figure. Demonstrate by continuity and momentum theorem.

(a) $d\rho/\rho + dv/v + \frac{dA}{A} = 0$.



(b) $dP + \rho v dV + \rho g dz = 0$.

Or

Turn over

12. If the conditions of the standard atmosphere at the mean sea level is given by $\phi_0 = 1.013$ bar, $T_0 = 288.2\ k$, $\mu_0 = 1.79 \times 10^{-5}$ kg/m.s. Determine pressure, temperature, density and viscosity at attitudes of 10,000 m and 15,000 m.

13. State and explain Buckingam-π theorem. Derive by dimensional analysis the fundamental relationship between thrust and the relevant basic parameters for motion of an airplane propeller in a viscous compressible fluid.

Or

14. The folloiwng data refers to the test on a two-dimensional wing in the wind tunnel.

Angel of Incidence in degree (α)	–5	–1	3	7	11	15	16	17
Lift Coefficient (C_L).	–0.281	0.1239	0.524	0.921	1.315	1.673	1.746	1.29
Drag Coefficient (C_D).	0.0075	0.0061	0.0074	0.01	0.016	0.032	0.04	0.151

Plot the characteristics of aerofoil in the form of suitable graph and compute the following values from the graphs.

(a) Angle of zero lift.

(b) Stalling angle.

(c) Slope of the lift curve.

(d) Angle at which L/D ratio is maximum for the aerofoil.

15. From the blade element theory of a propeller blade show that the maximum efficiency corresponds to $Y = \pi/4 - \frac{\theta}{2}$ Radians.

Or

16. With a neat sketch explain the working of a Turbojet engine. Discuss the effect of forward speed and altitude on the performance of Turbojet engine.

17. An aeroplane of wing loading 150 kg/m^2 performs a correctly banked turn at an air speed of 160 km/hr. Calculate the minimum radius of turn. Given that $C_{<max} = 1.5$.

Or

18. An aeroplane weighing 20 Tonnes and having an optimum C< / CD ratio of 16 is loaded 750 kg/ m length of span. Induced drag of the plane is 10% greater than that for the elliptic loading of the aerofoils. The propelled has an efficiency of 75% at 260 km/hr. Calculate the aerodynamic efficiency.

19. Write short notes on the following :

(a) Altimeter.

(b) Rate of climb meter.

(c) Gyrocompass.

Or

20. With neat sketches explain the working of a liquid propellant rocket and mention its advantages and disadvantages.

(5 × 12 = 60 marks)

F 9081 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

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. Define Empowerment.
2. Give any *four* characteristics of an effective team.
3. What is meant by Juran Trilogy ?
4. What are the main strategies for continuous improvement ?
5. Describe Cause and Effect diagram with an example.
6. What are the uses of Histogram ?
7. What is meant by '5S concept' ?
8. Explain the significance of JIT.
9. 'Lack of management commitment is major for the failure of TQM'. Discuss.
10. What are the major dimensions of quality ? Discuss.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Explain the major contribution of Deming to quality management.

Or

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

12. (a) What is meant by Quality cost ? Describe various components of Quality cost.

Or

(b) Define KAIZEN. Explain its importance and applications areas.

13. (a) Discuss the process of Benchmarking. Mention the criticisms of Benchmarking.

Or

(b) Explain the approach of Quality function deployment with the help of an example.

Turn over

14. (a) What is meant by Kanban ? Explain its working and benefits.

Or

(b) Discuss the concept, objective and organisational structure of Quality circles in detail.

15. (a) What are the elements of a TQM program ? Discuss with reference to a manufacturing industry.

Or

(b) ISO 9000 certification is a total Quality Management tool. Discuss.

(5 × 12 = 60 marks)

F 9047 **(Pages : 3)** **Reg. No.....**

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

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. List the basic characteristics of a project.
2. How does the basic functions of management come into play in the course of a project ?
3. What is a network ? What are its basic components ?
4. Explain the term resource levelling.
5. What is the difference between quantitative forecast methods and qualitative forecast methods ?
6. How is the moving average method similar to exponential smoothing ?
7. What type of information for decision making does simulation typically provide ?
8. What is a payoff table ? Under what type of decision-making payoff tables are useful ?
9. describe the difference between formative evaluation and summary evaluation in project management.
10. What reports are sent to functional managers ?

(10 × 4 = 40 marks)

Part B

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

11. What are the four types of project management roles ? Describe the responsibility and authority of managers in each role.

Or

12. What is a feasibility study ? Describe its contents and purpose.
13. A marketing firm is planning to conduct a survey of a segment of the potential product audience for one of its customers. The planning process for preparing to conduct the survey consists of six activities with procedure relationships and activity time estimates as follows :

Turn over

Activity	*Description*	*Activity predecessor*	*Time estimates* (days)
a	Determine survey objectives	—	3
b	Hire personnel	a	3
c	Design questionnaire	a	5
d	Train personnel	b,c	4
e	Select target audience	c	3
f	Make personnel assignments	d, e	2

(i) Determine all paths through the network and duration of each and indicate critical path.

(ii) Determine earliest and latest activity start and finish times.

(iii) Determine stack for each activity.

Or

14. The following table provides the information necessary to construct a project network and project crash data :

Activity	*Predecessor*	*Activity time (weeks)*		*Activity cost (Rs.)*	
		Normal	*Crash*	*Normal*	*Crash*
a	—	16	8	50,000	1,10,000
b	—	14	9	25,000	45,000
c	a	8	6	12,500	17,500
d	a	5	4	15,000	32,500
e	b	4	2	37,500	75,000
f	b	6	4	20,000	40,000
g	c	10	7	75,000	1,12,500
h	d,e	15	10	1,25,000	2,00,000

Construct the project network and crash to the maximum possible amount.

15. The director of a club believes attendance in matches is directly related to number of wins by the team. The total annual attendance figures for the last 8 yers is given as follows :

Wins	*Attendance*	*Wins*	*Attendance*
4	36,300	6	44,000
6	40,100	7	45,600
6	41,200	5	39,000
8	53,000	7	47,500

The director believes the team will win atleast 7 matches this year. Develop a simple regression equation for this data to forecast attendance for this level

Or

16. The chariperson of a department wants to forecast the number of students enrol in next semester. The enrolment data for past 8 semesters are as follows :

Semester	*Students enroled*	*Semester*	*Students enrolled*
1	400	5	500
2	450	6	575
3	350	7	490
4	420	8	650

(i) Compute a 3-semester moving average forecast for semester 4 through 9.

(ii) Compute the exponentially smoothed (α = 0. 20) for the enrolement data.

(iii) Compare the forecasts using MAD.

17. A rescue squad receives an emergency call every 1, 2, 3, 4, 5 or 6 hours according to the following distribution.

Time between emergence calls	*Probability*
1	0.05
2	0.10
3	0.30
4	0.30
5	0.20
6	0.05

The squad is on duty 24 hours / day, 7 days / week.

(a) Simulate emergency calls for 3 days using random member table.

(b) Compute average time between calls.

Or

18. A company is considering to build a new facility. If the facility works they should realise a profit of Rs. 2,00,000. If it fails they lose Rs. 1,50,000. They believe that there is 60 per cent chance of failure. Another option is to build a pilot plant and to make the decision. The pilot plant will cost Rs.10,000. There is 50 per cent chance that pilot plant will succeed. If it succeed, there is 0.9 probability that new facility, if completed will be a success. If pilot plant fails, there is 20 per cent chance of new facility if completed will succeed. Find out selection by decision tree.

19. Explain the use of "microsoft project" using an AON project network.

Or

20. Describe the post completion (post-mortem) project review and post-installation system review.

(5 × 12 = 60 marks)

F 9002 (Pages : 2) Reg. No.....ME.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Eighth Semester

Branch—Mechanical Engineering and Automobile Engineering

PRODUCTION ENGINEERING (MU)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. How continuous chip with built up edge is formed ?
2. Explain the significance of nose radius of a cutting tool.
3. Define machinability.
4. What are the modes of tool wear ? Discuss.
5. Discuss the importance of particle size in powder metallurgy.
6. What is meant by hot pressing ?
7. Discuss any four properties of smart materials.
8. What are the common types of ceramic materials ?
9. Describe the working of ECM.
10. Write a note on stereo lithography.

(10 × 4 = 40 marks)

Part B

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

11. With the help of figures, explain the nomenclature of a single point cutting tool.

Or

12. Discuss the influence of various tool angles on cutting force and surface finish of work material.
13. What is Taylor's tool life equation ? Derive an expression for optimum value of cutting speed.

Or

14. What are the functions of cutting fluids ? What types of cutting fluids are used commonly in metal cutting processes ?
15. Write the basic steps of powder metallurgy process. What are its merits and limitations ?

Or

16. What are the characteristics of metal powders ? Discuss the compacting process of metal powders.

Turn over

17. What are the various glass forming constituents ? How glass is strengthened ?

Or

18. Discuss the properties and applications of Nickel based super alloys.

19. What are the requirements of tool material for EDM ? Discuss the product applications of EDM.

Or

20. Explain the principle of USM with the help of a neat diagram. How does it differ from conventional grinding ?

(5 × 12 = 60 marks)

F 9009 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

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. What is the difference between air injection and solid injection ?
2. Enlist the factors which affect the process of carburation.
3. What are the functions of a clutch ?
4. What are the advantages of epicyclic Gear box ?
5. List the requirements of a suspension system.
6. What is the main function of adamper/shock absorber ?
7. What are the advantages of tubeless tyre ?
8. What are the requirements of a good braking system ?
9. Enumerate the factors which affect the battery life.
10. Why is a generator required in the electrical system of a Car ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Discuss the general principle of S.I. engine combustion chamber design.
    (b) Enumerate and discuss the Chief qualities to be considered in selecting oil for lubrication.

Or

12. (a) Explain with a sketch 'thermostat cooling' method of cooling I.C. engines.
    (b) What is gear ratio ? How is it obtained ?
13. (a) Describe briefly with a sketch the construction and working of a single plate clutch.
    (b) Describe the working of a hydraulic torque converter.

Or

14. (a) Describe the working of a synchromesh gear box with the help of neat sketch.
    (b) Discuss briefly the causes of rear axle noises.

Turn over

15. (a) Give the layout of a steering system and label the various parts.

(b) Explain the terms toe-in and toe-out.

Or

16. (a) Enumerate the components of a suspension system and state their functions briefly.

(b) What do you mean by the term Independent Suspension ?

17. (a) Explain with a neat sketch a hydraulic braking system.

(b) What are the main features of the power brake system ?

Or

18. (a) State the essential requirements ofwheels in an automobile.

(b) What are the functions of a tyre ?

19. Describe with the help of a neat sketch a battery ignition system.

Or

20. Draw a simplified wiring circuit for the lighting system of a Car and discuss the same.

(5 × 12 = 60 marks)

F 9079 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

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. What are the different types of information required for management ?
2. What are the technical dimension of information ?
3. Explain the concept of databank.
4. What are the different parts of data communication process ?
5. Describe the basic components of any communication system.
6. What problems can occur in an international communication network ?
7. What steps are to be taken to control the MIS function ?
8. Discuss how can an MIS be evaluated.
9. Define reliability with respect to MIS.
10. Discuss the issue of 'File protection' in MIS.

(10 × 4 = 40 marks)

Part B

Each question carries 4 *marks.*

11. (a) What are the basic elements of MIS ? How does they help in managerial decisions ?

Or

(b) What is the difference between 'data' and information ? What are the characteristics of an operational information system ?

12. (a) What is meant by a Business Model ? What are its basic characteristics ?

Or

(b) Discuss the details of development of a Library database management system.

13. (a) What are the merits and demerits of decentralized data processing ? Discuss.

Or

(b) What are the characteristics of distributed data processing ? Explain its application area.

Turn over

14. (a) What are the objectives of control ? Enumerate the controls used for ensuring correct processing.

Or

(b) What is meant by application development cycle ? Explain with an example.

15. (a) Discuss the basic architecture of MIS with the help of schematic diagrams.

Or

(b) Discuss about the future prospects of MIS in manufacturing industries.

(5 × 12 = 60 marks)

F 9080 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2011

Eighth Semester

Branch—Mechanical Engineering

CRYOGENICS (Elective—III) (M)

(Supplementary)

Time : Three Hours Maximum : 100 Marks

Approved tables and charts are permitted.
Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. What is the significance of Third Law of Thermodynamics ?
2. List the main processes for the production of low temperatures.
3. Explain the properties of Liquid Oxygen.
4. What is inversion temperature ?
5. Explain an ideal gas liquefaction cycle with reference to a T-S-diagram.
6. Why pre-cooling is required in some gas liquefaction systems ?
7. What is magnetic cooling ?
8. What is the liquid yield and start up time required for a conventional Linde Helium liquifier ?
9. What is cryopumping ?
10. What is superconductivity ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explaint the recent developments made in the field of Cryogenic Engineering.

Or

12. Explain the important mile stones in the development of Cryogenic Engineering since 1900.
13. Explain the effect of low temperature on any two mechanical properties of Engineering materials.

Or

14. Differentiate between Type I and Type II superconductors.

Turn over

15. What do you mean by figure of merit and liquid yield ?

Or

16. Describe with sketch, any one liquifaction system for hydrogen.

17. Explain the working of Gifford-Mc Mohan Refrigerator with a neat sketch.

Or

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

19. Explain a Dewar vessel with a neat sketch.

Or

20. Write short notes on Cryogenics in space technology.

(5 × 12 = 60 marks)