

**B.TECH. DEGREE EXAMINATION, MAY 2016****Fourth Semester****EN 010 402—PRINCIPLES OF MANAGEMENT**

(Common to AI, AU, EC, EI, IC, IT, ME, MT, PO, PE and ST branches)

[New Scheme—2010 Admission onwards]

(Regular/Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. Define Mission and its significance in management.
2. Define Quality circles.
3. What is CPM ? Give some applications.
4. What is the importance of working capital ?
5. List the methods of sales forecasting.

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. Explain the importance of delegation of authority in an organisation.
7. Explain on the significance of labour turnover.
8. Briefly explain product life-cycle.
9. Explain on elements of cost.
10. Write a note on the duties of sales engineer.

(5 × 5 = 25 marks)

**Part C**

*Answer all questions.*

*Each full question carries 12 marks.*

11. Write detailed notes on (a) Planning ; (b) Organizing ; and (c) Co-ordinating.

Or

12. Explain in detail on (a) Line organisation ; (b) Line and Staff organization.

**Turn over**

13. Describe on "on the job training" with advantages and limitations.

Or

14. What is scientific selection of man power ? Describe the steps involved in recruitment and selection of employees.

15. Differentiate between PERT and CPM. What are their limitations ? Under what circumstances is CPM better than PERT.

Or

16. Explain on (a) Functions of production department ; (b) Various types of production with its features.

17. Differentiate between (a) Preference shares and equity shares ; (b) Shares and debentures.

Or

18. Explain in detail on (a) Marginal cost ; (b) Differential cost ; (c) Sunk cost.

19. Write a detailed note on marketing.

Or

20. Write short notes on the following :—

- (a) Sales promotion.
- (b) Pricing strategies.
- (c) Market research.

(5 × 12 = 60 marks)

**B.TECH. DEGREE EXAMINATION, MAY 2016****Fourth Semester**

Branch : Mechanical Engineering/Production Engineering

ME 010 403/PE 010 403—HYDRAULIC MACHINES (ME, PE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

**Part A***Answer all questions.**Each question carries 3 marks.*

1. How the laminar flow is different from turbulent flow ?
2. Describe the classification of turbines.
3. What are the different types of casing used in centrifugal pump and explain any *one* type of casing ?
4. Explain the principle of similitude.
5. State the effect of vapour pressure on lifting of liquids.

(5 × 3 = 15 marks)

**Part B***Answer all questions.**Each question carries 5 marks.*

6. Difference between impulse and reaction turbine.
7. Explain the various types of draft tube and their application.
8. State the Euler's head equation with an illustration.
9. Explain the term unit power, unit speed and unit discharge with reference to a turbine.
10. Explain the principle and working of a hydraulic intensifier.

(5 × 5 = 25 marks)

**Part C***Answer all questions.**Each full question carries 12 marks.*

11. Derive the force exerted by a jet of water on a fixed semi - circular plate in the direction of jet when, (i) The jet strikes at the centre of semi - circular plate (ii) The jet strikes the curved plate at one end tangentially when the plate is symmetrical.

Or

Turn over

12. A small ship is fitted with jets of total area  $0.65 \text{ m}^2$ . The velocity through the jet is  $9 \text{ m/s}$  and speed of the ship is  $18 \text{ Kmph}$  in sea water. The efficiencies of the engine and pump are  $85 \%$  and  $65 \%$  respectively. If the water is taken amid - ships, determine the propelling force and the overall efficiency, assuming the pipe losses to be  $10 \%$  of the kinetic energy of the jets.

13. With the help of neat diagram explain the construction and working of a pelton wheel turbine.

Or

14. A Kaplan turbine working under a head of  $20 \text{ m}$ . develops  $11772 \text{ kW}$  shaft power. The outer diameter of the runner is  $3.5 \text{ m}$ . and hub diameter is  $1.75 \text{ m}$ . The guide blade angle at the extreme edge of the runner is  $35^\circ$ . The hydraulic and overall efficiencies of the turbines are  $88 \%$  and  $84 \%$  respectively. If the velocity of the whirl is zero at outlet, Determine: (i) Runner vane angles at inlet and outlet at the extreme edge of the runner and (ii) Speed of the turbine.

15. A centrifugal pump having outer diameter equal to two times the inner diameter and running at  $1000 \text{ r.p.m.}$  Works against a total head of  $40 \text{ m}$ . The velocity of flow through the impeller is constant and equal to  $2.5 \text{ m/s}$ . The vanes are set back at an angle of  $40^\circ$  at outlet. If the outer diameter of the impeller is  $500 \text{ mm}$ . and width at outlet is  $50 \text{ mm}$ . Determine (i) Vane angle at inlet, (ii) Work done by impeller per second and (iii) Manometric efficiency.

Or

16. (a) Explain the characteristics curve of a centrifugal pump.  
(b) With a neat sketch, explain the principle and working of a multistage centrifugal pump.

(6 + 6 = 12 marks)

17. The pressure difference  $\Delta p$  in a pipe of diameter  $D$  and length  $L$  due to viscous flow depends on the velocity  $V$ , viscosity  $\mu$ , and density  $\rho$ . using Buckingham's  $\pi$ -theorem, obtain an expression for  $\Delta p$ .

Or

18. Derive the expression for (Turbine) (i) Unit speed, (ii) Unit discharge, and (iii) Unit power.  
19. The cylinder bore diameter of a single acting reciprocating pump is  $150 \text{ mm}$ . and its stroke is  $300 \text{ mm}$ . The pump runs at  $50 \text{ r.p.m.}$  and lifts water through a height of  $25 \text{ m}$ . The delivery pipe is  $22 \text{ m}$ . long and  $100 \text{ mm}$ . in diameter. Find the theoretical discharge and the theoretical power required to run the pump. If the actual discharge is  $4.2 \text{ liters/s}$ , find the percentage slip. Also determine the acceleration head at the beginning and middle of the delivery stroke.

Or

20. (a) With a neat sketch, explain the principle and working of a self priming pump.  
(b) With a neat sketch, explain the principle and working of a fluid coupling.

(6 + 6 = 12 marks)

[5 × 12 = 60 marks]

**B.TECH. DEGREE EXAMINATION, MAY 2016****Fourth Semester**

Branch : Automobile Engineering/Mechanical Engineering

AU 010 404/ME 010 404—MANUFACTURING PROCESS (AU, ME)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

**Part A***Answer all questions.**Each question carries 3 marks.*

1. What is gating ? Explain the term gating ratio.
2. Explain fusion as it related to welding.
3. What are the advantages of tandem rolling ?
4. What is the difference between Piercing and punching ?
5. Discuss the difference between Fullering, edging and blocking.

(5 × 3 = 15 marks)

**Part B***Answer all questions.**Each question carries 5 marks.*

6. What are the advantages and Pressure Casting ?
7. Explain, why the quality of submerged arc welding is very good.
8. Discuss how the seamless tubes are produced.
9. Why is Hubbing an attractive alternative to producing simple dies ?
10. Discuss the different types of forging defects.

(5 × 5 = 25 marks)

**Part C***Answer all questions.**Each full question carries 12 marks.*

11. Describe the advantages and limitations of hot chamber and cold chamber die casting process with examples.

*Or*

12. Explain why squeeze casting produces parts with better mechanical properties, dimensional accuracy and surface finish than expandable mold process.

**Turn over**

13. Illustrate the Gas Metal arc welding with suitable sketch and its major applications.

*Or*

14. Explain about the Flux cored arc welding with a schematic illustration and discuss the process capabilities.

15. What are the advantages of ring rolling ? Explain the ring rolling process with a schematic illustration.

*Or*

16. Explain the technical and economic reasons for taking larger rather than smaller reductions per pass in flat rolling.

17. What are the sequence of operations in a typical forging process ? Give a brief note about the automation in forging.

*Or*

18. Explain the open-dig forging process with schematic illustration and explain the terms upsetting, Barreling and cogging.

19. Discuss the features of Progressive, compound and combination die with suitable sketches.

*Or*

20. Write short notes on the following :—

(a) Electromagnetic forming ;

(b) Explosive forming.

(5 × 12 = 60 marks)

**B.TECH. DEGREE EXAMINATION, MAY 2016****Fourth Semester**

Branch : Automobile / Mechanical / Production Engineering

AU 010 406 / ME 010 406 / PE 010 406 – ELECTRICAL TECHNOLOGY [AU, ME, PE]

(New Scheme – 2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

**Part A***Answer all questions.**Each question carries 3 marks.*

1. Define critical field resistance and critical speed.
2. What is the necessity of starter for DC Motor?
3. How starting torque is increased in slip ring induction motor?
4. Draw and explain the mechanical characteristics of DC series motor.
5. Mention the application of Dielectric heating.

(5 × 3 = 15 marks)

**Part B***Answer all questions.**Each question carries 5 marks.*

6. Explain the reasons for voltage drop in shunt generator when loaded.
7. Explain Swinburne's Test in DC Machines.
8. Explain the types of rotor construction in Alternator.
9. Discuss the factors that affect the choice of motor for a particular application.
10. Explain the types of power diodes.

(5 × 5 = 25 marks)

**Part C***Answer all questions.**Each full question carries 12 marks.*

11. (a) Explain the load characteristics of DC series generator.  
(b) A shunt generator has FL current of 196 A at 220 V. The armature and shunt field resistances are  $0.15 \Omega$  and  $55 \Omega$  respectively. The stray losses are 1000 W. Calculate the FL efficiency.

(6 + 6 = 12 marks)

Or

**Turn over**

12. (a) Derive the condition for maximum efficiency in DC generator.  
(b) A short shunt compound generator has armature, series and shunt field resistances of  $0.15 \Omega$ ,  $0.1 \Omega$  and  $110 \Omega$  respectively. It supplies a load of 4 kW at 250 V. Find the generated e.m.f. if the contact drop/brush is 1 V.

(6 + 6 = 12 marks)

13. (a) Draw and explain the equivalent circuit of transformer.  
(b) A 25 KVA, 2000/200 V single-phase transformer has iron and full load copper losses of 400 W and 500 W respectively. Calculate :  
(i) Efficiency at 80% full load, 0.9 pf.  
(ii) Primary and secondary FL currents.

(6 + 6 = 12 marks)

Or

14. (a) Explain the various methods of cooling of transformers.  
(b) SC test results of a 20 KVA, 2200/220 V, 1  $\phi$  transformer is 86 V, 10.5 A, 360 W on HV side. Calculate the % Regulation at FL, 0.8 pf leading.

(6 + 6 = 12 marks)

15. (a) Derive the EMF equation of Alternator.  
(b) Explain why synchronous motor is not self starting and the methods of starting.

(6 + 6 = 12 marks)

Or

16. (a) Draw and explain the Torque slip characteristics of 3-phase induction motor.  
(b) Discuss different types of single-phase motors and their applications.

(6 + 6 = 12 marks)

17. (a) Explain individual and group drive with example.  
(b) Explain Regenerative braking.

(8 + 4 = 12 marks)

Or

18. (a) Discuss the advantages of electric traction and what are the different systems for track electrification.  
(b) Explain Plugging.

(8 + 4 = 12 marks)

19. Explain the principle of operation and two transistor analogy of SCR.

Or

20. With block schematic, explain Resistance welding scheme.

[5 × 12 = 60 marks]



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**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Fourth Semester**

Branch : Mechanical Engineering

**THEORY OF MACHINES-I (M)**

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 4 marks.*

1. What is a Kinematic Pair ? Give examples for Kinematic Pair.
2. State and prove Kennedy's Theorem.
3. Briefly explain Type synthesis and Dimensional synthesis.
4. Briefly explain synthesis of slider crank mechanism.
5. Explain with help of an example about Pantograph.
6. Explain briefly Graishopper mechanism.
7. What is a brake ? Explain any *one* type of brake.
8. Explain with neat sketch about Pony brake dynamometers.
9. State and prove law of gearing.
10. Explain the term "Contact Ratio".

(10 × 4 = 40 marks)

**Part B**

*Answer all questions.*

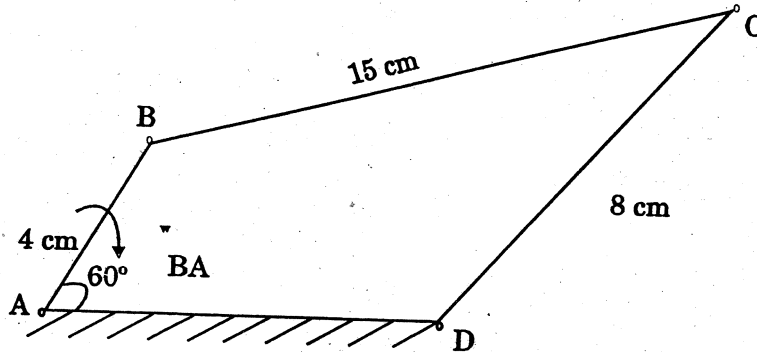
*Each full question carries 12 marks.*

11. Explain Elliptical Trammel and Scotch-Yoke mechanism.

*Or*

**Turn over**

12. In a four bar mechanism ABCD, AD is forced link and is 150 mm long. The crank AB is 40 mm long and rotates at 120 r.p.m. clockwise, while the link CD = 80 mm oscillates about D. BC and AD are of equal lengths. Find the angular velocity of link CD when angle BAD = 60°.



13. Synthesis a four-bar Crank-Rocker Quick return mechanism with following data :

Length of rocker = 21.5 cm

The rocker suring = 45°

Time ratio = 1 : 1.25

Calculate : (a) Radius ; (b) The coupler length.

Or

14. Explain graphical method for dimensional synthesis with suitable example.

15. Explain with neat sketch Davis and Ackerman steering mechanism.

Or

16. Two shafts are connected by a Hooke's joint. The driving shaft rotates at a uniform speed of 1200 r.p.m. The angle between the shaft is 15°. Calculate the maximum and minimum speeds of the driven shaft.

17. Explain the following with neat sketch :

(a) Hydraulic brake.

(b) Single plate clutch.

Its working and advantages.

Or

18. A Torsion dynamometer is fitted to the propeller shaft of a marine engine. The following data apply :

Length of shaft	=	20 m
Angle of twist	=	2°
r.p.m.	=	300.
Outside diameter of hollow shaft	=	300 mm
Inside diameter of hollow shaft	=	200 mm
Modulus of rigidity of shaft material	=	$80 \times 10^6$ kPa.

Determine the power transmitted by the engine to the propeller.

19. A pinion having 20° involute teeth and 120 mm pitch circle diameter drives a rack. The addendum of both pinion and rack is 6 mm. Determine the least pressure angle which can be used to avoid interference. With this pressure angle find the contact ratio.

*Or*

20. Explain the various methods for avoiding interference in gears.

(5 × 12 = 60 marks)

**B.TECH. DEGREE EXAMINATION, MAY 2016****Fourth Semester**

EN 010 401—ENGINEERING MATHEMATICS—III

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

{Common for all branches}

Time : Three Hours

Maximum : 100 Marks

**Part A***Answer all questions.**Each question carries 3 marks.*

1. Find the fourier series of  $f(x) = x(2l - x)$  in  $(0, 2l)$ .
2. Find the Fourier Cosine Transform of  $e^{-ax}$ . ( $a > 0$ ).
3. Form the partial differential equation by eliminating the arbitrary function 'f' from  $f(z - xy, x^2 + y^2) = 0$ .
4. Find the binomial distribution which has mean 2 and variance  $4/3$ .
5. Define type I and type II error.

(5 × 3 = 15 marks)

**Part B***Answer all questions.**Each question carries 5 marks.*

6. Find the Fourier series expansion of  $f(x) = x^2 + x$  in  $(-2, 2)$ .
7. Find the Fourier transform of unit step function.
8. Solve  $x^4 p^2 - yzq - z^2 = 0$ .
9. A random variable X has a Poisson distribution of  $\sqrt{2}$   $P(X \leq 1) = P(X \leq 2)$  find  $P(X = 0)$ .
10. A random sample is taken from a normal population with mean 30 and standard deviation 4. How large a sample should be taken of the sample is to be between 25 and 35 with probability 0.98 ?

(5 × 5 = 25 marks)

**Turn over**

## Part C

Answer all questions.

Each full question carries 12 marks.

11. Find the Fourier series
- $f(x) = |\cos x|$
- in
- $-\pi \leq x \leq \pi$
- .

Or

12. Find the Fourier series expansion of :

$$f(x) = \begin{cases} 1, & 0 < x < 1 \\ 2, & 1 < x < 3. \end{cases}$$

13. Find the Fourier Transform of
- $f(x)$
- if :

$$f(x) = \begin{cases} 1 - |x| & |x| < 1 \\ 0, & |x| > 1, \end{cases}$$

Hence prove that  $\int_0^{\infty} \frac{\sin^4 x}{x^4} dx = \frac{\pi}{3}$ .

Or

14. Find
- $f(x)$
- of its Fourier sine transform is
- $\frac{s}{s^2 + 1}$
- .

15. Solve
- $z^2(p^2 + q^2 + 1) = c^2$
- .

Or

16. Solve
- $(pq - p - q)(z - px - qy) = pq$
- .

17. In a normal distribution 7% of the items are under 35 and 10% of the items are above 55. Calculate the mean and variance.

Or

18. Fit a Binomial distribution to the following frequency distribution :

$x$	:	0	1	2	3	4	5	6
$f$	:	13	25	52	58	32	16	4

19. Two independent samples of size 7 and 8 items have the following values :

Sample I : 10 12 10 14 10 9 8

Sample II : 9 11 11 13 15 9 12 14

Do the estimates of means of population differ significantly at 5% level of significance.

Or

20. The mean life time of a sample of 9 items is 49.11 and standard deviation 2.47. Does this mean value differ significantly from the assured mean value 47.5.

(5 × 12 = 60 marks)