

Total No. of Pages 3

Third SEMESTER

2K17
Roll No. 5P/032

B.Tech.

MID- SEMESTER EXAMINATION

Sept -2018

MG201 Fundamentals of Management

Time: 01:30 Hours

Max. Marks: 25

Note: Answer all the questions. Assume suitable missing data, if any. Maximum word limit (100).

Q1. 'Steel India Ltd.' decided to set-up its steel manufacturing factory in the backward area of Orissa where very less job opportunities were available. People of that area welcomed this effort of 'Steel India Ltd.' To attract people to work in its factory it also decided to provide many other facilities like school, hospital, market etc. in the factory premises.

'Steel India Ltd.' started earning huge profits. Another competing company asked its production manager 'Aslam' to investigate the reasons of earning huge profits by 'Steel India Ltd.' Aslam found that in both the companies there was systematic co-ordination among the various activities to achieve organisational goals. Every employee knew who was responsible and accountable to whom. The only difference was that in his organisation communication took place only through the scalar chain whereas 'Steel India Ltd.' was allowing flow of communication in all the directions as per the requirement which lead to faster spread of information as well as quick feedback.

- (i) Identify and explain the type of organization structure which permits 'Steel India Ltd.' the flow of communication in all the directions.
- (ii) Compare the advantages of the type of organisation identified in (a) above, with any other type of organization structure usually adopted by companies. (5 marks)

Q2. Alliance Ltd is engaged in manufacturing plastic buckets. The objective of the company is to manufacture 100 buckets a day. To achieve this, the efforts of all departments are co-ordinated, and interlinked and authority responsibility relationship is established among various job positions. There is clarity on who is to report to whom.

P.T.O.

- (i) Identify and explain in brief the features and importance of the **function of management** discussed above.
- (ii) Discuss the various steps in the process of the function identified above. (5 marks)

Q3. Shiv Nadar, chairman and CEO of HCL attributes the success of the group to its management team and their entrepreneurial spirit which together have enabled it to handle rapid changes in the environment and technologies. At HCL management believes that happy, satisfied and self motivated employees help in reducing costs and increase productivity. It also has a strong sense of social responsibility and has set up educational institutions in the field of management, engineering, computers etc.

- (i) Identify and explain briefly the **significance** of understanding management by quoting relevant lines from the case study.
- (ii) Also explain briefly, any four characteristics of Management.

Q 4. Nutan Tiffin Box service was started in Mumbai by Mumbai Dabbawalas. The Dabbawalas who are the soul of entire Mumbai aim to provide prompt and efficient services by providing tasty homemade tiffin to all office goers at right time and place. The service is uninterrupted even on the days of bad weather, political unrest and social disturbances. Recently they have started online booking system through their website 'mydabbawala.com'. Owing to their tremendous popularity amongst the happy and satisfied customers and members, the dabbawalas were invited as guest lecturers by top business schools. The Dabbawalas operate in a group of 25-30 people along with a group leader. Each group teams up with other groups in order to deliver the tiffin on time. They are not transferred on frequent basis as they have to remember the addresses of their customers. They follow certain rules while doing trade- (No alcohol during working hours; No leave without permission; Wearing of white cap & carrying ID cards during business hours.) Recently on the suggestion of a few self-motivated fellow men, the dabbawalas thought out and executed a plan of providing food left in tiffins by customers to slum children. They have instructed their customers to place red sticker if food is left in the tiffin, to be fed to poor children later.

P.T.O.

- (i) Identify and explain in brief any two principles of management given by Fayol from above paragraph.
- (ii) Discuss any two values which the Dabbawalas want to communicate to the society. **(5 marks)**

Q5. A recent rate cut in the interest on loans announced by the Banks encouraged Amit, a science student of Progressive School to take a loan from State Bank of India to experiment and develop cars to be powered by fuel produced from garbage. He developed such a car and exhibited it in the Science Fair organised by Directorate of Education. He was awarded first prize for his invention.

- (i) Identify and explain the dimensions of business environment discussed in the above case.

“Business environment offers both opportunities as well as threats.” Do you agree with this statement. Support your answer with suitable example of a company of your choice. **(limit your answer to 100 words) (5 marks)**

XXXXXX

THIRD SEMESTER

B.Tech. [EP]**MID SEMESTER EXAMINATION****September-2018****EP-203: MATHEMATICAL PHYSICS**

Time: 1.5 Hours

Max. Marks: 25

Note : Answer **ALL** questions.

Assume suitable missing data, if any.

- ✓ 1. Discuss the application of tensor analysis to thermal expansion. (5)
- ✓ 2. Solve $4 \frac{\partial u}{\partial t} + \frac{\partial u}{\partial x} = 3u$ subject to the condition that $u(0,x) = 3 e^{-x} - 5 e^{-5x}$ (6)
- ✓ 3. Define forward and backward differences. Construct forward difference table of $f(x)$ with $f(x) = x^3 - 2x^2 + 1$ for $x = 0, 1, 2$ and 3 . (4)
- ✓ 4. (a) Write the Law of transformation for A_{st}^{pqr} ($4 \times 2.5 = 10$)
- ✓ (b) Define dextral and real index in tensors. Give examples.
- ✓ (c) Show that the rank of a tensor is reduced by two using contraction.
- ✓ (d) Derive the relation between the central difference operator and shift operator

THIRD SEMESTER
END SEMESTER EXAMINATION
ME 251, ENGINEERING MECHANICS

Time: 1Hr 30min

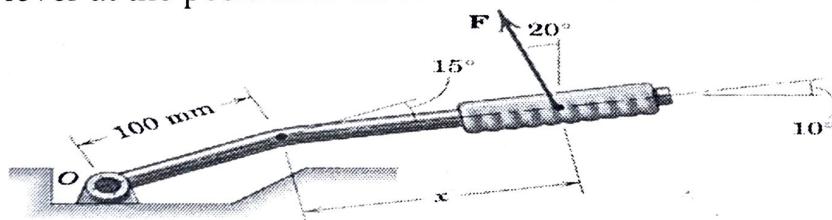
B.Tech. [EP]
SEPT 2018**Max Marks: 25****NOTE:** Answer any five questions.

Each question carries equal marks.

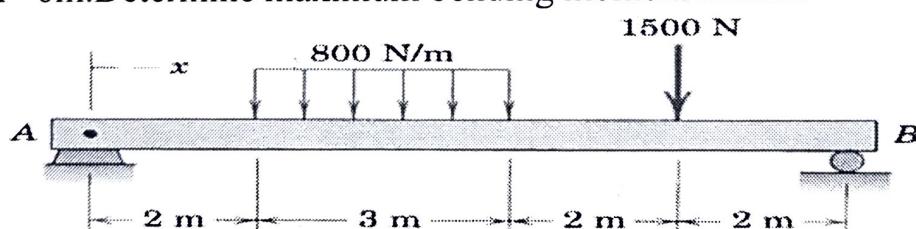
Assume suitable missing data, if any.

- 1 Explain following terms with neat sketch 5
 (i) coefficient of friction (ii) Angle of friction (iii) Angle of repose
 (iv) Cone of friction

- 2 A force F of magnitude 50N is exerted on the automobile parking brake lever at the position $x=250\text{mm}$. Calculate moment about point O. 5

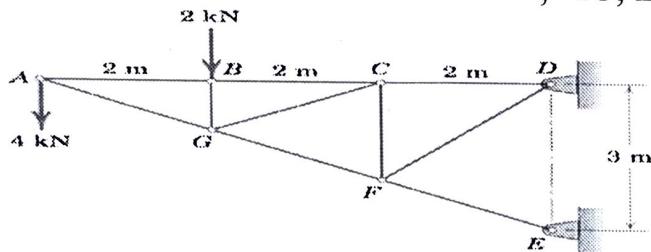


- 3 Plot the shear and moment diagram for the beam loaded with both the distributed and point load. What are the values of shear and moment at $x= 6\text{m}$. Determine maximum bending moment M_{max} . 5



4 Calculate the forces in members AB, AG, BG, CG, CF

5



5 A vertical pole is guyed by three cables PA, PB and PC tied at common point P, 10m above the ground. The base point off cable are A (-3,0,-4), B(1,-1,5) and (5,0,-1). If the tensile forces in the cables are adjusted to be 15, 18 and 20 KN, make calculations for the resultant force on the pole at P

5

END

Total No. of Pages: 1

Roll No.

THIRD SEMESTER

B.Tech. [EP]

MID SEMESTER EXAMINATION

(September- 2018)

EP - 205

CLASSICAL & QUANTUM MECHANICS

Time: 1.5 Hours

Max. Marks : 25

Note : Answer **ALL** questions. Assume suitable missing data, if any.

1. a) A particle of mass m is projected with initial velocity u at an angle α with the horizontal. Use Lagrange's equations to describe the path of the projectile. The resistance of the air may be neglected.

b) State and explain D'Alembert's principle. Derive Lagrange's equation of motion for a holonomic conservative system. (4+3)

2. a) Show that the probability density current for a plane wave in a medium is equal to the product of probability density and velocity of the particle in the medium.

b) The wave function of a particle of mass m moving in a potential $V(x)$ is $\Psi(x,t) = A e^{(-ikt - \frac{kmx^2}{\hbar})}$, where A and k are constants. Find the explicit form of the potential $V(x)$. (3+3)

3. a) If x and p_x are the coordinates and momentum operators, prove that

$$[x, p_x^n] = \frac{n\hbar}{2\pi} p_x^{n-1}$$

- b) State Ehrenfest theorem. Show that the average motion of a wave packet corresponding to a particle of mass m satisfies the equation

$$\frac{d}{dt} \langle p_x \rangle = - \left[\frac{dV}{dx} \right] \quad (3+3)$$

4. a) Consider a stream of particles of mass m , each moving in the positive x direction with kinetic energy E towards the potential barrier. Then,

$$V(x) = 0, \quad x \leq 0$$

$$= 3E/4, \quad x > 0$$

Find the fraction of particles reflected at $x = 0$.

A beam of 12 eV electrons is incident on a potential barrier of height 30 eV and width 0.05 nm. Calculate the transmission coefficient. (3+3)

Total No. of Pages: 2

Roll No.

THIRD SEMESTER**B.Tech. [EP]****MID SEMESTER EXAMINATION****(SEPT.-2018)****EP201 INTRODUCTION TO COMPUTING****Time: 1 Hour 30 Mins****Max. Marks: 30**

Note: Attempt all the questions. Use comment line in each program to write the script/function file name.

1. (a) Refractive index variation of pure silica can be given by following

equation
$$n(\lambda) = C_0 + C_1\lambda^2 + C_2\lambda^4 + \frac{C_3}{(\lambda^2 - l)} + \frac{C_4}{(\lambda^2 - l)^2} + \frac{C_5}{(\lambda^2 - l)^3};$$

Where C's constants having values:

Q1

$$C_0 = 1.4508554, C_1 = -0.0031268, C_2 = -0.0000381,$$

$$C_3 = 0.0030270, C_4 = -0.0000779, C_5 = 0.0000018, l = 0.035$$

Write a Matlab program to plot the variation of refractive index of pure silica, $n(\lambda)$ in wavelength range 1.0 to 2.0 in the step of 0.05. The value of refractive index at various wavelengths should also be tabulated in the tabular form (one column for wavelength and next column for corresponding refractive index of silica with proper table caption). [5]

(b) Explain the working of "save" and "fprintf" to save the output in desired file with suitable example. ✓ Q2 [5]

2 (a). In double slit diffraction experiment, the expression of resultant intensity is given by $I = 4I_0 \frac{\sin^2 \beta}{\beta^2} \cos^2 \gamma$, where $\beta = \frac{(\pi b \sin \theta)}{\lambda}$ &

$\gamma = \frac{(\pi d \sin \theta)}{\lambda}$. b is the slit-width, d is the spacing between two consecutive slits, λ is the wavelength of incident light wave and θ is the angle of diffraction. Write a Matlab script file which first prompts the user to input b , d , λ , θ_{min} and θ_{max} (θ_{min} and θ_{max} are the limits of θ for intensity plotting) and plot I/I_0 with θ . [5]

Q3

(b). Explain following commands with suitable and complete example
(i) abs & angle (ii) disp & num2str [5]

3. (a) What will be OUTPUT in the command window? [5]

- (i) $A = [12 \ 3 \ 14 \ 6; 1 \ 7 \ 6 \ 8; 9 \ 1 \ 3 \ 2];$
 $A^*A, A.*A$
- (ii) $\text{ceil}(1.7)+1$
- (iii) $A = [2 \ 4 \ 6 \ 8; 3 \ 6 \ 8 \ 9; 7 \ 8 \ 9 \ 11]; x = A(:, [1 \ 3 \ 4])$
- (iv) ' a '>'matlab'
- (v) $x = [0 \ 2 \ -2 \ 7]; y = [2 \ 3 \ -5 \ 7]; n = (x \leq y) \& (x > 2)$

(b) Write a Matlab program which computes the factorial of a given positive integer. The program should take the *input from the user*, and should *check the validity of input number*. In case of wrong input (i.e. negative integer, decimal number) a relevant message about the *error should display*. Output should be like ($n! = \text{numerical value}$) [5]
(Do not use inbuilt factorial command for factorial calculation)

*****END*****

Total No. of Page 01

Roll No.

THIRD SEMESTER

B.Tech (EP)**MID SEMESTER EXAMINATION****September-2018****EP207: Digital Electronics (Engineering Analysis****and Design)****Time: 1:30 Hours****Max. Marks : 30****Note : All questions are compulsory.**

Assume suitable missing data, if any.

3 Q.1. Given a two input MUX, write down its truth table. Use this two-input MUX such that it works as an AND gate. 5

✓ Q.2. Implement the following function using NOR gates.

$$\begin{aligned} \text{Output} &= 1 \text{ when the inputs are } \sum m (4,3,2,1,0) \\ &= 0 \text{ when the inputs are } \sum m (5,6,7). \end{aligned}$$

✓ Q.3. Design and explain the working of a 2's Complement Adder/Subtractor. 5

✓ Q.4. Describe a common cathode 7-segment display. Why edge triggering is preferred over level triggering in flip-flops? 5

1 4 Q.5. Design a counter such that it generates the sequence of mentioned states (1,3,7,15,14,12,8,0) using D Flip-flops. 5

✓ Q.6. Explain how a T flip-flop can be realized from a SR- flip-flop. Give the necessary excitation table and block diagram. 5

END