**Code: 1G511**

B.Tech. I Year Supplementary Examinations May / June 2019
**Engineering Mechanics**
( Common to CE & ME )
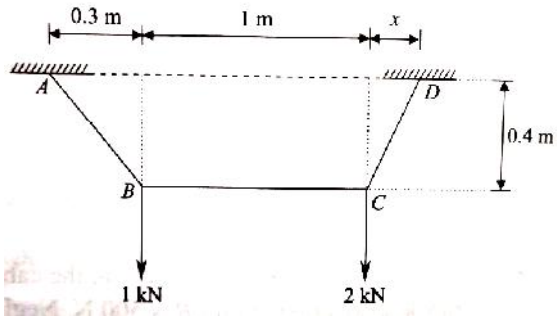
Max. Marks: 70                                                                Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)
*********

1.  A cable ABCD supports two loads 1kN and 2kN at points B and C respectively. Determine the tension in each portion of the cable if the portion BC remains horizontal. Also, determine the distance 'x' for which equilibrium can be maintained. Refer fig.



2.  The inclinations of a force passing through the origin are $\theta_y=55.4^0$ and $\theta_z=67.2^0$. Determine the angle $\theta_x$, if $F_x$=-100N. Also, express the force in vector form.

3.  Analyze the truss shown in fig. for axial forces and indicate the magnitude and nature of the forces on the diagram of the truss.
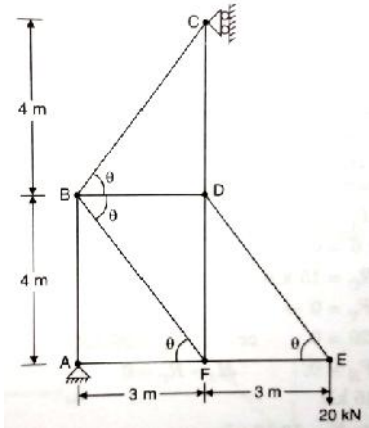


4.  Block-A weighing 1000N rests over block B which weighs 2000N as shown in fig. Block A is tied to wall with a horizontal string. If the coefficient of friction between blocks A and B is 0.25 and between B and floor is 1/3, what should be the value of P to move the block B.
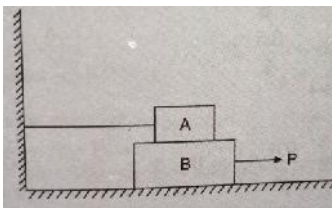
5. Find the centroid of the I-section shown in fig.
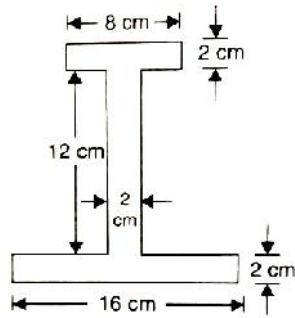


6. State and prove the parallel axis theorem.

7. A tower is 100m height. A particle is dropped from the top of the tower and at the same time another particle is projected upward from the foot of the tower. Both the particles meet at a height of 40m. Find the velocity with which the second particle is projected upward.

8. Two bodies directly in line and 10m apart are held stationary on an inclined plane having inclination of $20^0$. The coefficient of friction between the plane and lower body is 0.08 and that between the plane and the upper body is 0.05. If both the bodies are set in motion at the same instant, calculate the distance through which each body travels before they meet together.

***

**R-11 / R-13**

**Code: 1GC12**

B.Tech. I Year Supplementary Examinations May 2019
**Engineering Physics**
( Common to All Branches )

Max. Marks: 70                                                                    Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)
*********

1. a) Define interference and explain conditions of constructive and destructive interference

   b) Describe the theory of Newton's rings experiment

2. Show that FCC closely packed system than others with atoms

3. a) Explain the concept of Fermi-Dirac distribution function

   b) Classify the solids on the basis of energy band theory

4. a) Discuss the bias of pn junction diode in detail

   b) construct how photo diode works

5. a) Define magnetic flux and susceptibility

   b) Distinguish dia, para, ferro, anti ferro and ferrite materials.

6. a) Compare spontaneous and stimulated emissions

   b) Derive condition for stimulated emission through Einstein's coefficients

7. Discuss the structure, refractive index profile and performance characteristics of step index and graded index optical fibers

8. a) Define nanomaterials and write types of nanomaterials

   b) explain basic principles of nanomaterials

***

Hall Ticket Number :

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|

**R-11 / R-13**

**Code: 1GC13**

B.Tech. I Year Supplementary Examinations May/June 2019
**Engineering Chemistry**
( Common to All Branches )

Max. Marks: 70                                                                 Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)
*********

1.  a)  What are boiler troubles? How are they caused? Give suggestions to minimize the troubles.

    b)  What is the principle of EDTA titration? Briefly describe the estimation of hardness of water by EDTA method.

2.  a)  On what factors does the conductance of a solution depend? How would you proceed to determine the conductivity of a solution?

    b)  Differentiate  concentration cells with transference and concentration cells without transference

3.      Discuss various factors which influence the corrosion of metals?

4.  a)  Write a note on
        i.    Degree of polymerization.
        ii.   Functionality.
        iii.  Tacticity of polymer

    b)  Write a note on processing of raw rubber? Explain the draw backs of raw rubbers.

5.  a)  What are explosives? How are they classified?

    b)  What are the precautions to be taken during storage of explosives?

6.      Explain the salient features of the phase diagram of water system. Discuss why the slope solid-liquid line is negative for water.

7.      The percentage composition of a sample of coal by weight was found to be: C = 76%, H = 5.2%, O = 12.8%, N = 2.7%, S = 1.2%, the remaining being ash. Calculate the minimum weight of air necessary for complete combustion of 1 kg of coal and percentage composition by weight of dry products, if 50% excess air supplied.

8.  a)  What is cement? How do you classify the cement?

    b)  What are the reasons for the failure of a refractory?

***

R-11 / R-13

**Code: 1GC14**

B.Tech. I Year Supplementary Examinations May / June 2019

## Mathematics-I

( Common to All Branches )

Max. Marks: 70                                                            Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

\*\*\*\*\*\*\*\*

1.  a)  Solve $y(\log y)dx + (x - \log y)dy = 0$.

    b)  If the temperature of the air is 30⁰C, and the substance cools from 100⁰C to 80⁰C in 10 minutes, find the temperature of the substance after 20 minutes.

2.      Solve $\dfrac{d^2 y}{dx^2} - 6\dfrac{dy}{dx} + 9y = 6e^{3x} + 7e^{-2x} - \log 2$.

3.  a)  Verify Rolle's theorem for $f(x) = (x+2)^3 (x-3)^4 \; in \,(-2,3)$.

    b)  Verify Lagrange's mean value theorem for $f(x) = \log_e^x \; in\,[1,e]$.

4.  a)  Trace the curve $y^2(a-x) = x^2(a+x)$

    b)  Trace the polar curve $r=a(1-cos\;)$

5.      Evaluate $\displaystyle\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyz \, dxdydz$

6.      Find the Laplace transform of $\dfrac{\cos at - \cos bt}{t} + t\sin at$

7.      Solve $\dfrac{d^2 y}{dx^2} - 2\dfrac{dy}{dx} + y = e^x, x = 2, \dfrac{dy}{dx} = -1 \, when \; x = 0.$

8.  a)  Find the directional derivative of $f(x,y,z) = xy^3 + yz^3$ at the point (2, -1, 1) in the direction of a vector $\bar{i} + 2\bar{j} + 2\bar{k}$.

    b)  Find div $\overline{F}$ and Curl $\overline{F}$ at the point (1,2,3) if $\overline{F} = 3x^2\bar{i} + 5xy^2\bar{j} + 5xyz^3\bar{k}$.

\*\*\*

**Code: 1G112**

B.Tech. I Year Supplementary Examinations May / June 2019
## C Programming and Introduction to Data Structures
( Common to CE, EEE, ME & ECE )

Max. Marks: 70                                                    Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)
*********

1. a) What is Programming Language? What is the generation of programming Language? Describe it briefly.

   b) What is an algorithm? Describe the characteristics of an Algorithm.

2. a) Describe the Structure of a C program.

   b) Write a C program to calculating area and perimeter of a circle.

3. a) Define an Array? What are different types of Arrays explain?

   b) Write a program to read array of numbers and compute sum and average of the numbers.

4. a) Define string. Explain declaration and initialization of string variables.

   b) What is a pointer? What are the features of pointers? Write a C program to print address of a variable

5. a) Define Structures. Explain with an example how structure members are initialized and accessed.

   b) Explain nested structures with an example?

6. a) Explain different modes to open a file.

   b) Write a C program to copy contents from one file to another file.

7. a) Define Stack. Explain in detail about stack operations.

   b) Write the steps for evaluating postfix expression

8. a) Write a program for sorting given numbers using selection sort technique

   b) Explain linear search with an example.

***

**R-11 / R-13**

**Code: 1G512**

B.Tech. I Year Supplementary Examinations May 2019
**Engineering Graphics**
( Common to CE and ME )

Max. Marks: 70                                                Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)
*********

1. a) Bisect an angle AOB given angle AOB = $45^0$ and angle AOB = $125^0$

   b) Construct a Heptagon of side 30mm

2.    The top view of a 75mm long line AB measures 65mm, while the length of its front view is 50mm. Its one end A is in H.P. and 12mm in front of the V.P. Draw the projections of AB and determine its inclinations with the H.P. and the V.P.

3. a) A circular plane of diameter 50mm is perpendicular to H.P. and parallel to V.P. The centre of the circle is 30mm above H.P. and 25mm infront of V.P. Draw its projections.

   b) A pentagonal plane of side 25mm is perpendicular to both H.P. Draw its projections.

4. a) A cube of 40mm side, is resting with a face on HP such that when one of its vertical faces is inclined at $30^0$ at VP.

   b) Draw the projections of a pentagonal prism, base 25mm side and axis 50mm long, resting on one of its rectangular faces on the HP

5.    A cone with a base diameter 60mm and axis 75mm long is resting on its base on H.P. It is cut by a section plane parallel to H.P. and passing through the mid-point of the axis. Draw the projections of the cut solid

6.    Draw an isometric projection of the following planes when the plane is horizontal

       i)   A square plane of side 40mm

       ii)  A rectangular plane 60mm x 80mm

7.    A vertical cylinder of 60mm diameter is penetrated by another cylinder of 45mm diameter. The axes of the two cylinders are intersecting at right angle. Draw the projections of the two cylinders, showing the curves of intersection.

8.    A hexagonal plane of side 30mm is resting on H.P. with a corner in P.P. and the two sides are equally inclined to P.P. The station point is 40mm in front of P.P. on the central line of the plane. The station point is 60mm above the ground. Obtain the perspective projection of the plane.

***