R-15

Code: 5G522

I B.Tech. II Semester Supplementary Examinations Nov/Dec 2019
Engineering Graphics –II
(Common to CE and ME)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1.   A square pyramid 40 mm side and axis height of 70 mm is resting on HP on one of its base edges which is inclined at 30^0 to VP. The axis is inclined at 45^0 to HP. Draw its projections.   14M

OR

2.   A cone of base diameter 60 mm and axis height 80 mm rests on HP on one its points of base. The axis is inclined at 30^0 to HP and appears to be inclined at 45^0 to VP. Draw its projections.   14M

UNIT–II

3.   A rectangular Prism of base sides 50 mm x 30 mm and axis height 70 mm has the larger rectangular face parallel to VP. It is cut by a sectional plane perpendicular to VP and inclined at 30^0 to HP bisecting the axis. Draw the sectional front view, top view and true shape of the section.   14M

OR

4.   A cylinder of base diameter 50 mm and axis height 70 mm resting on HP on its base. It is cut by a sectional plane inclined at 30^0 to HP and passing through the top right corner. Draw its sectional top view, front view and true shape of the section.   14M

UNIT–III

5.   A cylinder of diameter 60 mm and axis height 80 mm resting on HP on its base is penetrated by another of diameter 40 mm and axis height 80 mm whose axis is parallel to both HP and VP and bisecting the axis of vertical cylinder.. Draw the projections showing the line of intersection.   14M

OR

6.   A cone of diameter 80 mm and axis height 90 mm is standing on HP on its base. It is penetrated by a cylinder of diameter 40 mm and 60 mm long bisecting the axis of cone. Draw the projections showing the intersection line.   14M
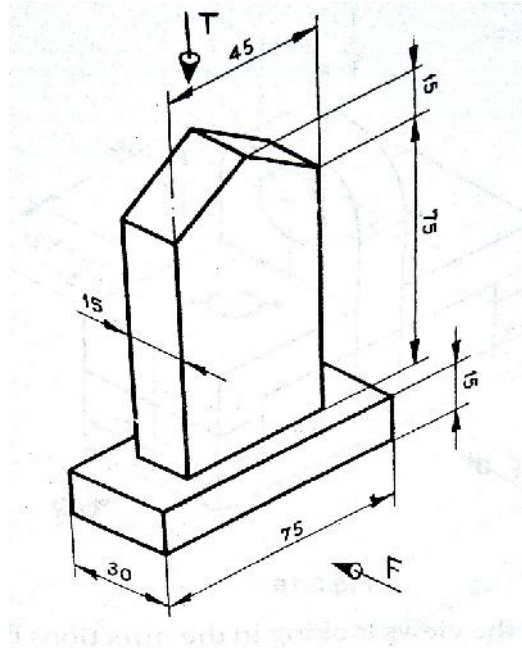
UNIT–IV

7.   A draw the isometric projection of a hexagonal prism of sides 40 mm and axis 60 mm standing vertical with two of its edges parallel to VP.   14M

OR

8.   Draw the isometric view of a cylinder of diameter 40 mm and height 60mm.   14M
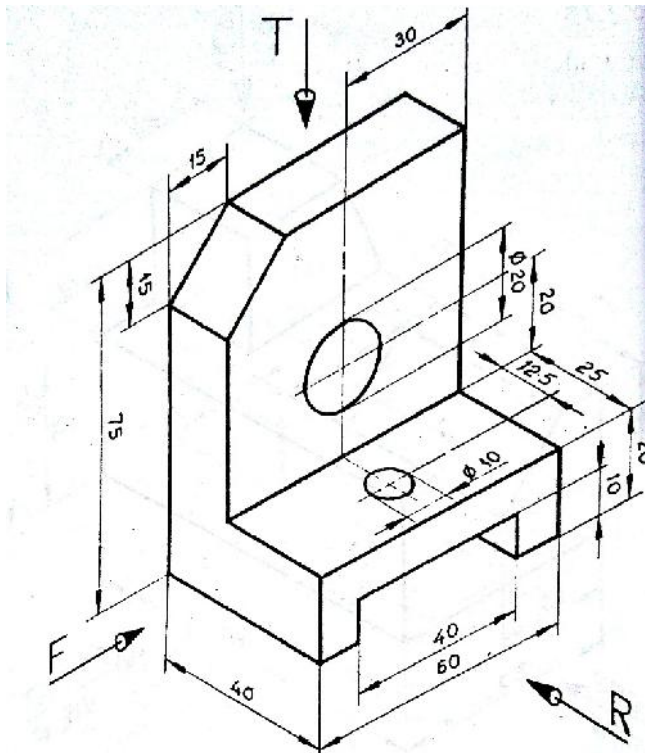
UNIT–V

9. Draw the front view, top view and left side view of the following figure.

14M

OR

10. Draw the front view, top view and right side view of the following figure.

14M

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Code: 5G521

I B.Tech. II Semester Supplementary Examinations Nov/Dec 2019
Engineering Mechanics - Dynamics
(Common to CE and ME)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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| UNIT–I |

1. A small projectile is fired vertically downward into a fluid medium with an initial velocity of 60 m/s. Due to the drag resistance of the fluid the projectile experiences a deceleration of a = (-0.4v3) m/s^2, where v is in m/s. Determine the projectile's velocity and position 4 s after it is fired.

OR

2. A projectile is fired with a speed of v = 60 m/s at an angle of 60° (Fig.1). A second projectile is then fired with the same speed 0.5 s later. Determine the angle ( ) of the second projectile so that the two projectiles collide. At what position (x, y) will this happen?
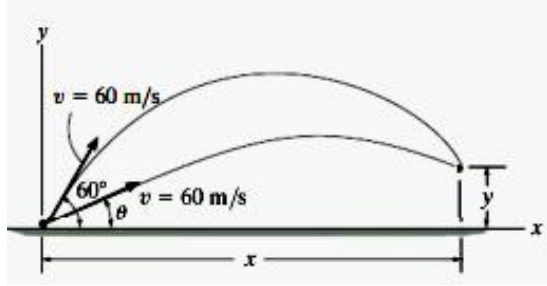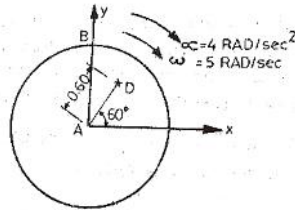

Fig.1

| UNIT–II |

3. A wheel of radius 1m rolls freely with an angular velocity of 5rad/s and with an angular acceleration of 4rad/s^2, both clockwise as shown in figure. Determine the velocity and acceleration at points B and D.

OR

4. The disk rotates about a fixed axis at O as shown in Fig.2. During the period t = 0 to t = 4 s, the angular position of the line OA in the disk varies as   (t) = t^3 −12t +6 rad, where t is in seconds. Determine (1) the angular velocity and the angular acceleration of the disk at the end of the period; (2) the angular displacement of the disk during the period; and (3) the total angle turned through by the disk during the period.
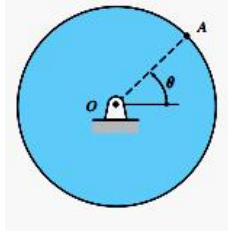

Fig.2

| UNIT–III |

5. Two weights 800N and 200N are connected by a thread and they move along a rough horizontal plane under the action of a force of 400N applied to the 800N weight as shown in fig. The coefficient of friction between the sliding surface of the weights and the plane is 0.3. Using D'Alembert's principle determine the acceleration of the weight and tension in the thread.

OR

6.   The 100-kg block A shown in Fig.4 is released from rest. If the masses of the pulleys and the cord are neglected, determine the speed of the 20-kg block B in 2 s.
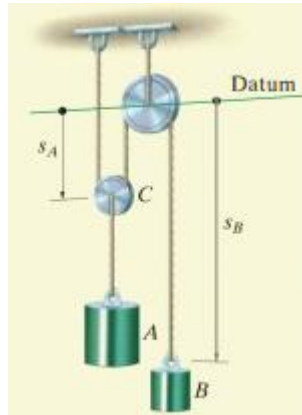

Fig.4

UNIT–IV

7.   In Fig.5, If the coefficient of kinetic friction between the 100-kg crate and the plane μ_k=0.25, determine the speed of the crate at the instant the compression of the spring is x=1.5 m. Initially the spring is un-stretched and the crate is at rest.
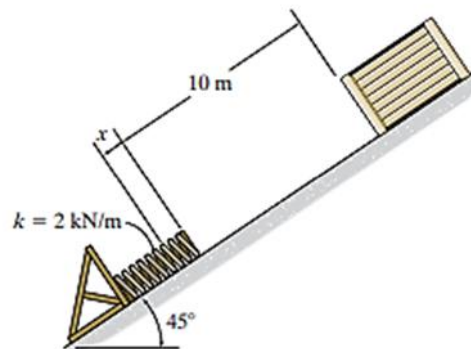
Fig.5

OR

8. a) Discuss impulse-momentum principle.

    b) Explain impact of jet on plate

UNIT–V

9.   The drum shown in Fig.6 has a mass of 60 kg and a radius of gyration k_o = 0.25 m. A cord of negligible mass is wrapped around the periphery of the drum and attached to a block having a mass of 20 kg. If the block is released, determine the drum's angular acceleration.

Fig.6

OR

10.   Discuss equations of motion for translation motion of a rigid body.

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R-15

Code: 5GC23

I B.Tech. II Semester Supplementary Examinations Nov/Dec 2019
Engineering Physics
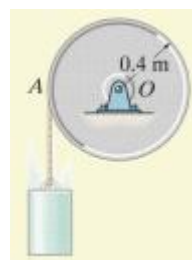(Common to CE, ME and CSE)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Explain the construction and working of He – Ne laser   8M

   b) Newton's rings are observed in the reflected light of wave length 5900 Å. The diameter of 10th dark ring is 0.5 cm. Find the radius of curvature of the lens used.   6M

OR

2. a) Discuss the point to point optical fiber communication system and mention its advantages over the conventional communication systems   8M

   b) The angle of acceptance of an optical fiber is 30^0 when kept in air. Find the angle of acceptance when it is in a medium of refractive index 1.33.   6M

UNIT–II

3. a) Derive Bragg's law for X-ray diffraction   8M

   b) Copper has fcc structure of atomic radius 0.1278 nm. Calculate the interplanar spacing for (3 2 1) plane.   6M

OR

4. a) What is space lattice? Describe briefly the seven systems of crystals   7M

   b) Explain the various detection methods for ultrasonics.   7M

UNIT–III

5. a) Setup time-independent Schrodinger wave equation in one dimension and explain Eigen function and Eigen values   7M

   b) Define Fermi energy and Fermi factor. Discuss the probability of occupation of electrons when $E<E_f$ and $E>E_f$.   7M

OR

6. a) What is wave function? Give its physical significance and properties   8M

   b) Find the relaxation time of conduction electrons in a metal of resistivity 1.54×10^{-8} ohm-m, if the metal has 5.8×10^{28} conduction electrons per m^3.   6M

UNIT–IV

7. a) Describe with suitable diagrams the construction and action of a P-N junction diode   8M

   b) Give a brief account of high temperature superconductivity   6M

OR

8. a) Describe in short the formation of energy bands in solids and hence explain how it helps to classify materials into conductors and insulators   8M

   b) The Hall co-efficient of a material is -3.68×10^{-5} m^3/C. What is the type of charge carriers? Also calculate the carrier concentration.   6M

UNIT–V

9. a) Explain magnetic hysteresis on the basis of domain theory   7M

   b) Explain in detail any two applications of nanotechnology   7M

OR

10. a) Discuss the applications of hard and soft magnets   7M

    b) Explain the synthesis of nanomaterials using sol-gel method   7M

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I B.Tech. II Semester Supplementary Examinations Nov/Dec 2019
Data Structures
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) What is a pointer? List out the advantages and disadvantages using a pointer.   7M
   b) Distinguish between call by value and call by reference by means of a program.   7M

OR

2. a) What is Dynamic Memory Allocation? Write syntax for malloc(), calloc() and free().   7M
   b) Discuss command line arguments with an example.   7M

UNIT–II

3. a) Distinguish between Structure and Union and also mention their applications.   4M
   b) Explain Quick sort with the help of an example   10M

OR

4. a) Briefly explain File handling in C   10M
   b) Compare Linear search and Binary search.   4M

UNIT–III

5. a) What is stack? Specify any four applications where stacks are extensively used.   4M
   b) Write a routine to convert the following infix expression in to postfix expression:
      a+b*c/(e+f*g)   10M

OR

6. a) What is Queue? Specify any four applications where queues are extensively used.   4M
   b) Write a routine to implement circular queue.   10M

UNIT–IV

7. a) What is the difference between singly, doubly & circular linked lists?   7M
   b) Write a program to delete a node from the beginning of the linked list   7M
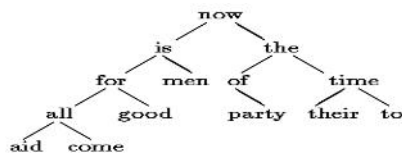
OR

8. a) Write a program to create a singly linked list in sorted order.   7M
   b) Summarize doubly linked list.   7M

UNIT–V

9. a) Explain Array representation of Binary tree   7M
   b) Define Graph and explain various graph representations.   7M

OR

10. Write the in order, preorder, and post order sequence of nodes for the following binary tree

14M

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Code: 5GC24

I B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Engineering Mathematics-II

(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) changing the order of integration $\int_{0}^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy\,dx$

7M

   b) Evaluate $\int_{0}^{1}\int_{1}^{2}\int_{2}^{3}\left(x^2 y^2 z^2\right) dx\,dy\,dz$

7M

OR

2. a) Find the area of the plate in the form of a quadrant (1st quadrant)of the ellipse $\dfrac{x^2}{a^2}+\dfrac{y^2}{b^2}=1$

7M

   b) Evaluate $\int_{0}^{1}\int_{0}^{1-z}\int_{0}^{1-x-y}\left(x+y+z\right)dx\,dy\,dz$

7M

UNIT–II

3. a) Find the Laplace Transform of $\left(\sqrt{t}-\dfrac{1}{\sqrt{t}}\right)^3$

7M

   b) Find the Laplace Transform of $f(t)=\begin{cases}2, & 0\le t\le 1 \\ 2t, & t\ge 1\end{cases}$

7M

OR

4. Find $L^{-1}\left\{\dfrac{2s^2-6s+5}{s^3-6s^2+11s-6}\right\}$

14M

UNIT–III

5. Solve $y''+2y'+5y=e^{-t}, y(0)=0, y'(0)=1$ Using Laplace Transform Technique

14M

OR

6. Using the Laplace Transform method to solve the differential equation $\dfrac{d^2x}{dt^2}-2\dfrac{dx}{dt}+x=e^t, with\ x=2, \dfrac{dx}{dt}=-1\ at\ t=0$

14M

UNIT–IV

7. a) Find $div\,\overline{F}$ and $curl\,\overline{F}$ where $\overline{F}=grad\left(x^3+y^3+z^3-3xyz\right)$

7M

   b) Show that $div\left(grad\ r^n\right)=n(n+1)r^{n-2}$

7M

OR

8. a) Evaluate $divergence\,of\left(2x^2z\,\overline{i}-xy^2z\,\overline{j}+3yz^2\,\overline{k}\right)$ at the point $(1,1,1)$.

7M

   b) Show that $\nabla^2\left(\dfrac{1}{r}\right)=0$

7M

UNIT–V

9. Evaluate by stoke's theorem for a vector field $\overline{F}=(2x-y)\overline{i}-yz^2\,\overline{j}-y^2z\,\overline{k}$ over the upper half surface of $x^2+y^2+z^2=1$ bounded by projection on xy-plane.

14M

OR

10. Verify divergence theorem for $\overline{F}=4xz\,\overline{i}-y^2\,\overline{j}+yz\,\overline{k}$ taken over the cube bounded by $x=0, x=1; y=0,\ y=1; z=0, z=1$

14M

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R-15

Code: 5GC21

I B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Technical English

(Common to All Branches)

Max. Marks: 70　　　　　　　　　　　　　　　　　　　　　Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Why does the writer say that modern technology has become inhuman?

   b) What is the main difference between the systems of mass production and production by the masses as indicated in the passage?

OR

2. a) How does modern technology affect the earth's environment and natural resources?

   b) Do as directed in brackets.

   i. The court's decision was **fair**. (Replace the bold and italicized word with a synonym)

   ii. They own an acre of **fertile** land in the village. (Replace the bold and italicized word with its antonym)

   iii. Can I have a _____ please. (Fill in the blank with either 'pear' or 'pare'.)

   iv. My pet dog has a loud **bark**. (Write a sentence with a homonym of the italicized word)

   v. They _____ the fire in half an hour.(Fill in the blank with a phrasal verb with 'put')

   vi. The woman remembered _____ the house she grew up in. (choose between clearly/exactly)

   vii. I am not happy with my essay. I must _____ it. (A word with the prefix re-)

UNIT–II

3. a) What are the parameters responsible for the overall stability of climate in different parts of the world?

   b) What are the main ways in which human development has affected climate patterns on the earth?

OR

4. a) What are the two kinds of factors that cause the climate to change over long periods of time? Give two examples of each kind.

   b) Write a letter of application in response to an advertisement for the post of Trainee Engineer in a software company. You have a B.tech degree in IT and possess C programming skills and knowledge of Java.

UNIT–III

5. a) How does Solar Thermal Power work differently from Photovoltaic panels?

   b) Why does Spain figure among the top countries in the world as well as Europe that are using solar power?

OR

6. a) What are the two kinds of technologies currently used to generate solar power on a large scale?

   b) Re-write the following sentences as directed in brackets.

      i. The email that I sent Rita bounced.(change into a simple sentence)

      ii. In spite of raining we went shopping. (change into a compound sentence)

      iii. The squirrels hid the nuts in a hole at the bottom of the tree. (change into a complex sentence)

      iv. There is a_____ shop on the campus. (stationary/stationery)

      v. He was busy _____ over the costs. (pouring/poring)

      vi. Be careful. The book has a few _____ pages. (lose/loose)

      vii. vii. I found a _____of comics in my brother's cupboard. (hoard/horde)

   > **UNIT–IV**

7. a) What makes water one of the most powerful and wonderful things on the earth?

   b) What are some measures that are used to prevent soil erosion?

   OR

8. a) How according to Sir C.V.Raman, can rain water as well as the water of rivers be prevented from going to waste?

   b) Write up a technical report on an experiment you did in one of your core subjects. Follow the style and format of a formal report.

   > **UNIT–V**

9. a) How according to Swami Vivekananda, can people be made completely free of misery?

   b) What does the essay tell us about being 'unattached' in all that we do?

   OR

10. a) What is the nature of work according to the writer? In what spirit should it be done?

    b) Fill in the blanks in the sentences with words having positive connotations chosen from those in brackets.

       i. I He is a _____ lawyer. (notorious, well-known)

       ii. She is a _____ businesswoman. (shrewd, cunning)

       iii. There was a _____ breeze blowing. (cold, cool)

       iv. My aunt put her _____ arms around me. (fat, plump)

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