MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Engineering Physics - II**

Branch: **Common to EEE, ECE, CSE, CE, ME & MINING**

Time: **3 hours**   Max. Marks: 75

PART – A

I. Answer ALL questions of the following   **5x1Mark=5 Marks**

1. Define Cosine law
2. Abbreviate LASER?
3. Define Superconductivity
4. What is Quantum Confinement Effect?
5. Define Reverberation Time.

II. Answer ALL questions of the following   **10x2Mark=20 Marks**

1. Explain Bragg's law with neat diagram
2. Write the conditions for bright and dark rings?
3. Explain Population Inversion.
4. What are Upward and Downward transitions and write their coefficients?
5. Explain Magnetic Levitation.
6. Define Polarizability .write the expressions for Electronic and Ionic Polarizabilities
7. List out few applications of Nano – technology
8. Explain the Attenuations in Optical Fibers.
9. What is Magnetostriction Effect? Explain
10. Define acoustics. write the formula for Reverberation Time using Sabine's

PART-B

Answer ALL questions of the following   **5x10 Marks= 50Marks**

1.
   a) Determine the radius of curvature of given Plano-convex lens using Newton's ring Experiment with neat diagram.
   b) Write the conditions for maxima and minima in interference due to reflected light in thin films

                                                                      (7+3)

OR

2.
   a) Definethe terms i) Polarisation ii)plane of Polarisation iii) Double Refraction
   b) Describe the Laue's method of determination of crystal structure with neat diagram
   c) A beam of X-rays of Wavelength $\lambda=1.25^0$ A is made to fall on material and its first reflection is noticed at $\theta=45^0$, what is the inter planar separation of this reflection.   (3+5+2)

3.
   a) Differentiate between Three and Four level schemes with suitable diagram.
   b) Explain the construction and working of Semiconductor laser with neat diagram. (4+6)

OR

4.
   a) Explain the characteristics of Laser.
   b) Explain Working of ruby Laser with energy level diagram
   c) List out few applications of laser in various fields   (3+4+3)

5.
   a) Define internal field. Derive an expression for internal field.
   b) Explain the terms i) Piezo-electricity ii) Ferro-electricity with suitable examples   (6+4)

OR

6.
   a) Explain the concept Perfect Diamagnetism
   b) Distinguish between Type-I and Type-II Superconductors with suitable examples
   c) List out few applications of Superconductors   (4+4+2)

7.
   a) Explain the Characterization of nanomaterial s by using TEM
   b) Explain the Synthesis of nanomaterials using Sol-gel method   (5+5)

OR

8.
   a) Discuss the concept of Acceptance angle, acceptance cone and numerical aperture And show relation among them with neat sketch
   b) The Refractive indices of core and cladding of a fiber are 1.450 and 1.441 respectively.
   ·) Calculate its Numerical Aperture and Acceptance angle.   (7+3)

9.
   a) Explain any two methods of detecting Ultrasonic Waves.
   b) Discuss the Production of Ultrasonic Wave using Piezo-electric Method with neat diagram (4+6)

OR

10.
   a) Explain all the Factors which are affecting architectural acoustics
   b) Write the remedies for all the factors.   (6+4)

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Engineering Chemistry-II**

Branch: **CE, EEE, ME, CSE & MINING**

Time: **3 hours**   Max. Marks: 75

PART – A

I. Answer ALL questions of the following   5x1Mark=5 Marks

1. Why Nylon possess high melting point?
2. What is meant by doping ?
3. State laws of photochemistry.
4. Define Phase and component.
5. Give relationship between units of calorific values .

II. Answer ALL questions of the following   10x2Mark=20 Marks

1. Mention the uses of Telfon.
2. What is a plastic? What are its constituents?
3. Write the preparative method for polylactic acid.
4. What is Vulcanization?
5. State and explain Grotthuss-Draper law.
6. Explain the principle involved in Lambert-Beer law.
7. What is condensed phase rule? Give an expression for this.
8. Give some applications of adsorption.
9. What is LPG? Give its composition.
10. Write characteristics of good fuel.   **PART-B**

Answer ALL questions of the following   5x10 Marks= 50Marks

Q1. a)Explain the compression moulding technique with the help of a neat diagram.
    b)Write the differences between addition and condensation polymerisation with examples.

(OR)

Q2. a)Write the preparation, properties and applications of nylon 6,6 and dacron.
    b)Differentiate between thermoplastic and thermosetting resins.

Q3 a)What are Biodegradable polymers? How they are classified and mention thier applications.
   b)Explain the mechanism of intrinsic doping in polyacetylenes.
(OR)

Q4. a)What are liquid crystal polymers? Explain the properties and applications.
    b)Give the preparation, properties and applications of Buna-S and Butyl rubber.

Q5. a) Draw and explain the block diagram for U.V visible spectrum.
   b) What is electromagnetic spectrum? Explain electronic transitions

(OR)

Q6. a) State and explain the Einstein-Stark law of photochemical equivalence with example.
   b) How will you determine the quantum efficiency?

Q7.a) What is Gibb's phase rule? Define and explain various terms involved in the phase rule, with suitable examples.
   b) Discuss the applications of phase rule to the water system.

(OR)

Q8.a) Derive Freundlich adsorption isotherm
   b) Differentiate between lyophilic and lyophobic solutions. Write a short note on   i)Brownian movement ii)Tyndall effect

Q9. a)What is cracking? Describe the process of fixed bed catalytic cracking.
   b) A sample of coal was found to contain the following composition
      C=82%,H=4.5%, S=1%,O=12% and remaining is ash. Calculate the minimum   amount of air required for the complete combustion of 1 kg of coal.

(OR)

Q10. a)Define Octane and Cetane numbers. Discuss their significance.
    b)What are the advantages of Natural gas?

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Mathematics-II**

Branch: **EEE, ECE, CSE, CE, ME & MINING**

Time: 3 hours   Max. Marks: 75

PART – A

I. Answer ALL questions of the following   **5x1Mark=5 Marks**

1. Find $\dfrac{\partial(u,v)}{\partial(x,y)}$ if u = x cosy, v = x siny.

2. Evaluate $\Delta^2\, e^{2x}$

3. Obtain the value of $\gamma(-\frac{1}{2})$.

4. Evaluate $\int_0^1 \int_0^x dx\, dy$.

5. If a = xy + yz + zx then find grad a.

II. Answer ALL questions of the following   **10x2Mark=20 Marks**

1. Write the geometrical interpretation of Rolles theorem.

2. Verify Cauchy's mean vale theorem for f(x) = x, g(x) = x^2 in (-3, 0).

3. If $u_0 = 1$, $u_1 = 1.5$, $u_2 = 2.2$, $u_3 = 3.1$, $u_4 = 4.6$ find $\Delta^3\, u_1$

4. Evaluate $\Delta^3 e^{ax+b}$.

5. Evaluate $\int_0^\infty x^n e^{-\sqrt{ax}}\, dx$

6. Find the root of the equation $x^3\, x^2\, 1 = 0$, correct to three decimal places, using the newton raphsons method.

7. Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^z dx\, dy\, dz$.

8. Find the area enclosed by the curves y = x^2 and y = x, by using double integration.

9. The temperature of points in space is given by T(x,y,z) = xy + yz + zx. A mosquito located at (1, 1, 1) desires to fly in such a direction that it will get warm as soon as possible. In what direction should it move?

10. Prove that div $(r^n \bar{r}) = (n+3)r^n$ where $\bar{r}$ = xi+yj+zk and r = $|\bar{r}|$.

PART-B

Answer ALL questions of the following   **5x10 Marks= 50Marks**

1. If $u=\dfrac{x+y}{x-y}$ and $v=\dfrac{xy}{(x-y)^2}$, verify whether u and v are functionally related. If so, find the relationship between them.

(OR)

2. Find extreme values of sinx + siny +sin(x+y).

3. Find the polynomial f(x) by using Lagrange's formula for

x	0	1	3	4
f(x)	-12	0	6	12

Also find y at x =2.

(OR)

4. Using Gauss backward difference formula, find y(18) from the following table

x	0	5	10	15	20	25
y	7	11	14	18	24	32

5. Evaluate $\int_0^{2a} x^2 \sqrt{(2ax-x^2)}dx$.

(OR)

6. Find the real root of 3x = 1 +cosx, correct to three decimal places, using Newton Rephson method.

7. Evaluate $\int_0^a \int_y^a \dfrac{x^2 dx\, dy}{\sqrt{(x^2+y^2)}}$ by changing the order of integration.

(OR)

8. Evaluate $\int_0^\infty \int_0^\infty \int_0^\infty \dfrac{dxdydz}{(1+x^2+y^2+z^2)^2}$.

9. Verify Green's theorem for $\int_c (xy+y^2)\, dx + x^2\, dy$ where c is closed curve of the region bounded by x=0, y=0, and x+y=1.

OR

10. Verify stoke's theorem for the vector field $\bar{F}=$ (y - z +2)i+(yz +4)j –xzk where s is the surface of the cube x = 0 = y = z , z = 2 = x = y, above the xy- plane.

Code No.: **40M03**

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Mathematics – III**

Branch: **Common to EEE, ECE & CSE**

Time: 3 hours

Max. Marks: 75

PART – A

I. Answer ALL questions of the following   **5x1Mark=5 Marks**

1. Define Fourier series of a function f(x) in the interval (c,c+2π)
2. Find the Z-transform of $n^2 a^n$
3. State the formula for to evaluate $\int_{a}^{b} y\,dx$ by using Simpson's 1/3 rule.
4. State the $y(x_0+h)$ for the IVP $y^1 = f(x,y)$ with $y(x_0)=y_0$ by Picard's Method.
5. Find the general solution of $p + q = 1$

II. Answer ALL questions of the following   **10x2Mark=20 Marks**

1. Write the Dirichlet conditions for Fourier series expansion.
2. Determine the finite Fourier Sine transform of $f(x)=x^2$, $0<x<l$.
3. Find $z\left\{\dfrac{1}{n(n+1)}\right\}$
4. Determine the inverse Z-transform of $\dfrac{z+2}{z^2+5z+6}$
5. Evaluate $\int_{1}^{2} \dfrac{1}{x} dx$ by Trapezoidal Rule taking n=4.
6. State the normal equations to fit the parabola $y = a + bx + cx^2$.
7. Determine the value of $y(0.1)$, if y is the solution of IVP $y' = x + y + xy, y(0) = 1$ using Euler's method with step length $h = 0.1$.
8. Evaluate y(0.2) using Taylor's Series Method. Given that $\dfrac{dy}{dx} = x - y$ and y(0)=1.
9. Form the partial differential equation by elimination the arbitrary constants from the relation $\log(az - 1) = x + ay + b$
10. Obtain the partial differential equation of all spheres whose centre lie on the z-axis.

PART-B

Answer ALL questions of the following   **5x10 Marks= 50Marks**

1. (a) Find the half range sine series for f(x) = x(π-x) in 0,x<π .Hence deduce that
$$\frac{1}{1^3} - \frac{1}{3^3} + \frac{1}{5^3} - \frac{1}{7^3} + \cdots\cdots = \frac{\pi^3}{32}$$

(b) Find the Fourier sine and cosine transform of f(x) = $\dfrac{e^{-ax}}{x}$ and hence deduce that
$$\int_{0}^{\infty} \frac{e^{-ax} - e^{-bx}}{x} \sin(sx)dx .$$

(OR)

2. (a) Expand $f(x) = \begin{cases} \pi x, & if\ 0 < x < 1 \\ 0 & if\ 1 < x < 2 \end{cases}$ in to Fourier series.

   (b) Find the Fourier transform of $f(x) = \begin{cases} sin(x) if\ 0 < x < \pi \\ 0, otherwise \end{cases}$.

3. (a) If $f(z) = \dfrac{5z^2 + 3z + 12}{(z-1)^4}$, find the values of $f(2), f(3)$.

   (b) Find the $z\{n\cos(n\theta)\}$.

(OR)

4. (a) Solve the difference equation by using Z-transforms $u_{n+2} - 3u_{n+1} + 2u_n = 0$ given that $u_0 = 0$ and $u_1 = 1$.

   (b) Evaluate $z^{-1}\left[\dfrac{z^2}{(z-a)(z-b)}\right]$ by using Convolution theorem.

5. (a) Fit a curve of the form $y = ae^{bx}$ to the following data.

x	1	5	7	9	12
y	10	15	12	15	21

   (b) Evaluate $\displaystyle\int_0^2 e^{-x^2} dx$ using Simpsons 3/8rule .Taking h=0.25

(OR)

6. (a) Find $\dfrac{dy}{dx}$ at x=7.7 from the following data.

x	7.47	7.48	7.49	7.5	7.51	7.52	7.53
y	0.193	0.195	0.198	0.201	0.203	0.206	0.208

   (b) Fit a parabola of the form $y = ax^b$ to the following data.

x	1	2	3	4	5	6	7
y	2.3	5.2	9.7	16.5	29.4	35.5	54.4

7. (a) Find y(0.1) using Runga-Kutta 4th Order formula. Given that $\dfrac{dy}{dx} = x^2 - y$ and y(0)=1.

   (b) Given $\dfrac{dy}{dx} = x + \sin y$,y(0)=1, Compute y(0.2) with h=0.2 using Euler's modified method

(OR)

8. If $\dfrac{dy}{dx} = 2e^x y$, y(0)=2 Find y(0.4) using Adam's Predictor Corrector Formula by calculating y(0.1),y(0.2)and y(0.3) using Euler's Modified formula.

9. (a) Apply Lagrange's method to solve the linear partial differential equations
   $$\left(x^2 - yz\right)p + \left(y^2 - zx\right)q = z^2 - xy$$

   (b). Obtain the solution of $\dfrac{\partial V}{\partial t} = k\dfrac{\partial^2 V}{\partial x^2}$ with boundary conditions $u(x,0) = 3\sin n\pi x$,
   $u(0,t) = 0, u(1,t) = 0$, where $0 < x < 1, t > 0$.

(OR)

10 (a) Apply Charpit's method, solve $z^2 = pqxy$

   (b) A tightly stretched string with fixed end points x=0 and x=l cm is initially in a position given by
   $y = y_0 \sin^3(\dfrac{\pi x}{l})$.If it is released from rest from this position, find the displacement y(x, t).

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Engineering Drawing –II**

Branch: **Common to CE, ME & Mining**

Time: **3 hours**   Max. Marks: 75

Answer *ALL*   questions   15 x 5 = 75M

1   **a)** Construct a scale of 1:8, to show decimetres and centimetres and to read up to 1m. Show a length of 7.6 dm on it.   (5M)
   b) On a map, the actual distance of 10m is represented by a line of 50 mm long. Calculate the scale factor. Construct a diagonal scale, long enough to measure 30 m and mark on it, a distance of 26.3 m.   (10M)

(OR)

2   Construct a scale, to measure km, 1/8 of a km and 1/40 of a km, in which 1km is represented by 4 cm. Mark on this scale, at a distance of 3.575 km.   (15M)

3   A cube of 50 edge, rests on one face on H.P, with its vertical faces equally inclined to V.P. It is cut by a section plane, perpendicular to V.P, producing a large rhombus. Draw the projections, true shape of the sections and determine the inclination of the section plane with H.P.   (15M)

(OR)

4   A vertical cylinder of 60 diameter, is penetrated by another cylinder of 60 diameter. The axes of the two cylinders are intersecting at right angle. Draw the projections of the two cylinders, showing the lines of intersection.   (15M)

5   A pentagonal pyramid of side of base 30 and axis 60 long, is resting on its base on H.P, with an edge of the base parallel to V.P. Draw the development of the lateral surface of the pyramid.   (15M)

(OR)

6   A cylinder of diameter of base 40 and axis 55 long, is resting on its base on H.P. It is cut by a section plane, perpendicular to V.P and inclined at 45° to H.P. The section plane is passing through the top end of an extreme generator of the cylinder. Draw the development of the lateral surface of the cut cylinder.   (15M)

7   A pentagonal pyramid of side of base 25 and height 50, rests with an edge of the base, touching the P.P. The station point is on the central line passing through the apex and 80 from P.P and 65 above the ground. Draw the perspective view of the solid.   (15M)

(OR)

8   A hexagonal plane of side 30, is resting on an edge on the ground with its surface inclined at 30^0 to P.P. The nearest corner of the plane is 10 away from P.P. The station point is 50 in front of P.P and 80 above G.L and in the central plane of the object. Draw its perspective.   (15M)

9   Write and explain, about different draw commands used in Auto CAD.   (15M)

(OR)

10 Explain about coordinate systems in Auto CAD With examples.   (15M)

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Data Structures and Software Tools**

Branch: **Common to EEE, ECE & CSE**

Time: **3 hours**   Max. Marks: 75

PART – A

I. Answer ALL questions of the following   **5x1Mark=5 Marks**
1. Write the applications of queue.
2. How to allocate the memory for linked list?
3. What is the Time Complexity of binary search?
4. What is XML?
5. List some Popular Plug-ins.

II. Answer ALL questions of the following   **10x2Mark=20 Marks**
1. Convert (a+b/c)/ (d-e*f) into pre- fix expression.
2. What are the operations of Stack?
3. What are the advantages of single linked list?
4. Describe stack operation by using linked list.
5. Explain the Asymptotic notations.
6. What is time complexity of Bubble, selection, Insertion sort?
7. What is Automating Testing?
8. Explain the steps for running of program by using JDT.
9. Explain different types of web tool.
10. What is hot code replace?

PART-B

Answer ALL questions of the following   **5x10 Marks= 50Marks**
1. Write a C program to convert the infix to prefix expression.
<div align="center">OR</div>
2. Write short notes on
    (A) Circular queue   (b) Dequeues

3. a) How to represent Single linked list? Explain with an example.
   b) Explain the advantages of linked list.
<div align="center">OR</div>
4. Write a C Program to implement Queue operation using linked list.
5. What is linear search? Write an algorithm to find the element by using linear search with example.
<div align="center">OR</div>
6. Write the steps and sort the following numbers by using Quick sort.
     45, 10, 65,80,74,35,55,12,62
7. What are Issues in Information Exchange?
<div align="center">OR</div>
8. Write short notes on
    (a) XSL transforms   (b) Automating testing with Junit
9. Explain eclipse platform and plug-in Architecture.
<div align="center">OR</div>
10. Write short notes on
    (a) Web standard tools   (b) Ajax tool framework.

Code No.: 40302

I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018

Subject: **Engineering Mechanics**

Branch: **Common to CE, ME & MINING**

Time: 3 hours   Max. Marks: 75

PART – A

I. Answer ALL questions of the following   5x1Mark=5 Marks

1. What is a moment of force?
2. Explain the term 'Support reaction'.
3. What is the moment of inertia of a rectangular section about an horizontal axis passing through base?
4. Give the relation between angular velocity and r.p.m.
5. Define energy

II. Answer ALL questions of the following   10x2Mark=20 Marks

1. Find resultant force for the two forces 10 kN and 15 kN acting at an angle of 33^0.
2. State principle of transmissibility of forces.
3. What are the conditions of equilibrium?
4. State lami's theorem.
5. State perpendicular axis theorem.
6. Define mass moment of inertia.
7. A stone is thrown vertically upward and return to earth in 5 sec. What was its initial velocity?
8. Define rolling resistance .
9. What is the relation between work done and power?
10. Two bodies of masses 40 kg and 20 kg are hung at the end of a rope, passing over a frictionless pulley. What is the tension in the string?

PART-B

Answer ALL questions of the following   5x10 Marks= 50Marks

1. A uniform wheel of 400 mm diameter, weighing 3 kN rests against a rectangular block of 100 mm height as shown in figure 1. Find the least pull, through the centre of the wheel, required just to turn the wheel over the corner A of the block. Also find the reaction on the block. Take all the surfaces to be smooth.
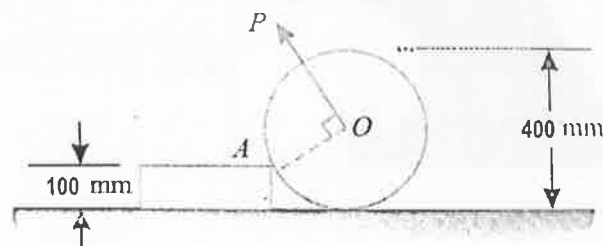

Figure 1

(OR)

2. State and Prove Varignon's theorem.

3. Two smooth circular cylinders each of weight 1000 N and radius 15 cm are connected at their centers by a string AB of length 40 cm and rest upon a horizontal plane, supporting above them a third cylinder of weight 2000 N and radius 15 cm as shown in Figure 2. Predict the force in the string AB and reactions on the floor at the points of contact D and E.
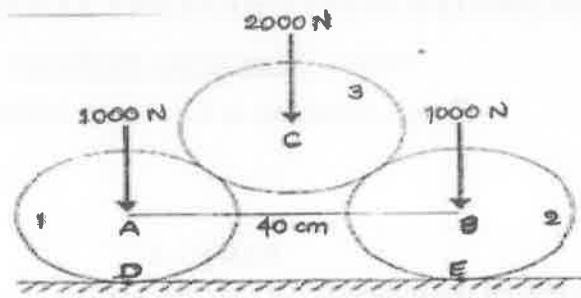

Figure 2

(OR)

4. Determine the amount and direction of the smallest force P required to start the wheel in Figure 3 over the block. What is the reaction at the block?
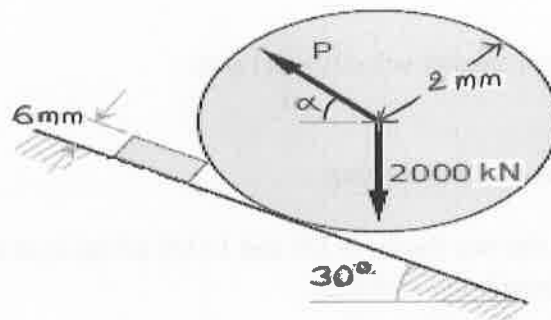
Figure 3

5. Locate the centroid of the shaded area in Figure 4.
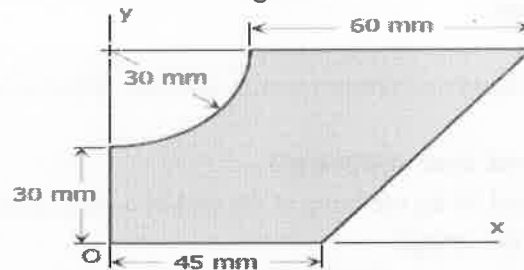
Figure 4

(OR)

6. Find the moment of inertia about the indicated x-axis for the shaded area shown in Figure 5.
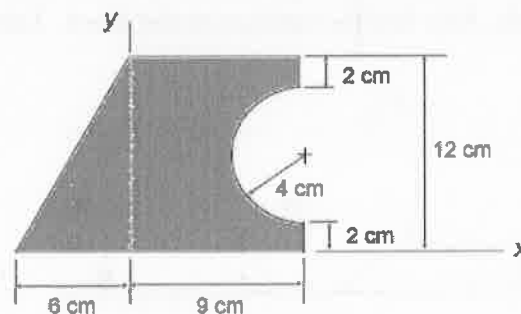
Figure 5

7. A motor cyclist wants to jump over a ditch as shown in figure 6. Find the necessary minimum velocity u at A in km/hr of the motor cycle. Also find the inclination and the magnitude of the velocity of the motorcycle just after clearing the ditch.
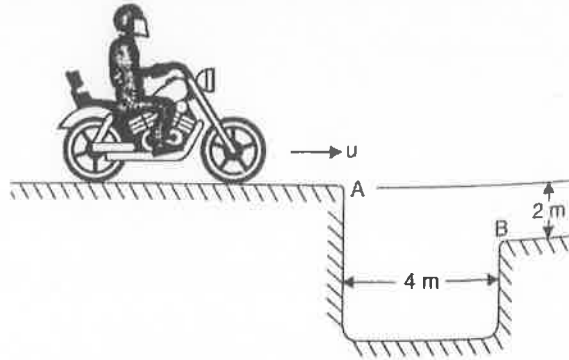

Figure 6

(OR)

8. Two weights 80 N and 20 N are connected by a thread and move along a rough horizontal plane under the action of a force 40 N, applied to the first weight of 80 N as shown in figure 7. The coefficient of friction between the sliding surfaces of the wrights and the plane is 0.3. Design the acceleration of the weights and the tension in the thread using D'Alembert's principle.
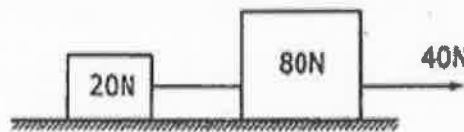

Figure 7

9. A wagon weighing 600 kN starts from rest, runs 40 m down a 1% grade and strikes a post. If the rolling resistance of the track is 5 N per kN, find the velocity of the wagon when it strikes the post. If the impact is to be cushioned by means of one bumper spring, which compresses 1 mm per 25 kN weight, determine how much the bumper spring get compressed?
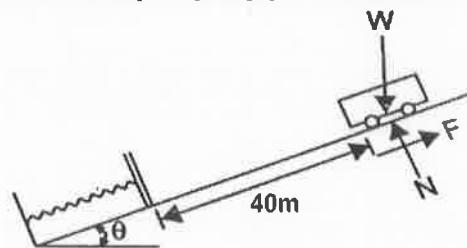

Figure 8

(OR)

10 Determine the tension in the strings and the velocity of 150 N block shown in Figure 9, 5 seconds after starting from

    (a) rest   (b) starting with a downward velocity of 2.5 m/sec.

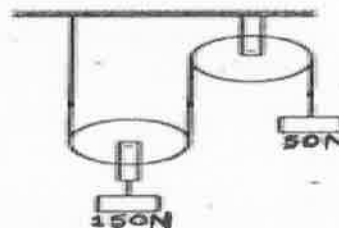   Assume pulleys as weightless and frictionless.

Figure 9