II/SEM/COMMON/2019(S)NEW

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING.(NEW SYLLABUS)

(Theory-4 a&b))

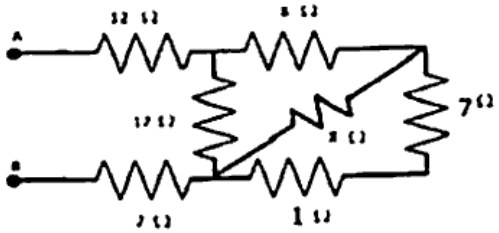
TIME:3 Hrs. **F.M-80**

(ANSWER ANY FIVE INCLUDING Q.NO-1 AND Q.NO-2)

Figures in the right hand margin indicate marks.

Q-1 (ANSWER ALL) **(2×10=20)**

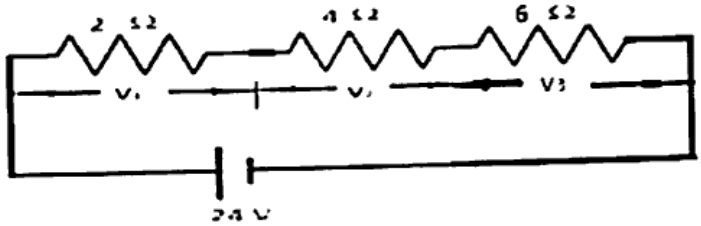
(a) Find the equivalent resistance of the network between A & B of the following circuit.



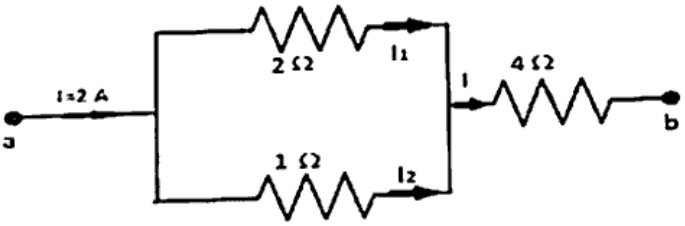
(b) State Ohm's law.

(c) State KCL & KVL

(d) Find V1 ,V2 and V3 in the circuit.



(e) Find the currents I1 &I2 in the above circuit.



(f) Write down two advantages of integrated circuits.

(g) Define filter.

(h) Define transducer.

(i) Define modulation.

(j) Write down the working principle of photovoltaic transducer.

Q-2 (ANSWER ALL) **(5×6=30)**

(a) Give a brief classification of dc generator on the basis of field excitation.

(b) A resistance of 20 ohm , inductance of 0.2 H and capacitance of 150 μF are connected in series and are fed by a 230 volt,50 Hz supply. Find X_L, X_C, Z, Y, P.F, active power and reactive power.

(c) Explain briefly about ac through pure resistance with phasor diagram.

(d) Write down the difference between vacuum tube and semiconductor.

(e) Define transistor. State different types of transistor configuration. Write down the output and input current gain relationship in CE,CB and CCconfiguration.

(f) Write down the difference between modulation and demodulation.

Q-3 (a) Explain about the hydro power plant with a neat block diagram. (5)

(b) Give a brief classification of material according to electrical conductivity with respect to energy band diagram. (5)

Q-4 (a) Briefly explain the types of wiring for domestic installations. (5)

(b) State the working of D.C. power supply system with the help of block diagram. (5)

Q-5 (a) Explain briefly about the main parts of dc machines . (5)

(b) State the working of basic oscillator with different elements through simple block diagram. (5)

Q-6 (a) Write down the different uses of PMMC types of instruments. (5)

(b) State different types of transducers. Explain briefly about active and passive transducer. (5)

Q-7 (a) A building has the following electrical appliances (5)

(i) A 1HP motor running for 5 hrs in a day.
(ii) Three fans each of 80 watt running for 10 hours in a day.
(iii) Four tube lights each of 40 watt running for 15 hours per day.

Find the monthly bill if 1 unit=Rs.2.50/-. The month is November.

(b) Explain briefly about the working principle of multimeter with basic block diagram. (5)

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Total Pages – 4

II – Sem/COMMON/2019(S)(New)

COMMUNICATIVE ENGLISH

(Theory – 1 (a))

Full Marks : 80

Time : 3 hours

Answer all questions

Figures in the right-hand margin indicate marks

1. Read the following passage carefully and do as directed :

Soon we had left behind the smoky air of the city and had reached the country station where our walk was to begin. The sun was shining and there was cool gentle breeze to make it just right for walking.

We decided to go on a walk called four miles square : it has four equal sides, each about four miles in length and on a map looks like a rough square. It is famous because each side passes through a different kind of country. We started up in high spirits along the first side, which followed a river, planning to have a swim and our first meal before we left it. Before long we came to a gate near which there was a notice, "Beware of the Bull". We were very annoyed. Our path ran through this field and as it was public foot path, the farmer had no right to put a dangerous animal in it. "Oh, but it's all right", my friend said, "The bull is tied up, Come on".

I followed because I could see for myself a strong rope tied to the ring it its nose at one end and round a large tree at other. We felt very bold and walked nearer, waving a red handkerchief just to show that we weren't afraid.

The bull began to walk towards us and did not stop. "He seems to have a long rope," I said walking more quickly. The bull too was walking more quickly. Then at the same moment we both saw that the rope was broken, and without another word we began to run.

We were half-way across the field; but did not take us long to reach the gate again. We jumped over, very much out of breath, and looked back to see the bull quietly examining a bag of food. "That was a clever trick of mine, wasn't it ?" said my friend : "I dropped the food on purpose to drive away the bull's attention".

(A) Answer the following briefly : 2 × 6

(*i*) How was the atmosphere during the beginning of the journey ?

(*ii*) What does it mean by "Four Mile Square" ?

(*iii*) What was the planning of the two travellers and what obstacle did they meet ?

(*iv*) Where was the bull and in which condition ? What mischief they played with the bull ?

(Turn Over)

(v) What was the consequence ?

(vi) How did the story end ?

(B) Match A with B : 1 × 4

A	B
(i) Country station	(a) Take caution
(ii) Beware	(b) Intelligent planning
(iii) Bold	(c) Village area
(iv) Trick	(d) Brave

(C) Give antonyms of the following : 1 × 2

(i) Quickly

(ii) Annoyed

(D) Supply a suitable title to the passage. 02

2. Read the following :

What makes a job perfect at one time and undesirable at another is simply change. The change may be in yourself, in the position or in the job market. A job could be perfect for you at this time of your life; but, you may some day become totally dissatisfied with the very same job for the simple reason that you have changed. Some jobs are rather easy. You may not consider a high salary as important now as you did a few years ago. You may not be able to travel as much as you used to. A job which you were keen on getting a few years ago may not interest you now simply because you have become older and your system of values has changed.

(A) Make a note of the above passage. 5

(B) Attempt a summary of the above passage basing upon the notes you have made. 5

(C) Five meanings of "RETURN" is given in Column A. Match the meanings with corresponding sentences given under Column B : 1 × 5

A (Meanings)

(i) Give back

(ii) Come back

(iii) Profit

(iv) Result

(v) Expectation

 (Continued)

B (Sentences)

(*a*) He didn't work hard. His failure is an apt return.

(*b*) Father will return home by 7 pm.

(*c*) He returned my book in time.

(*d*) My grandmother always waits for a return to all her efforts.

(*e*) In business return is not always good.

3. Answer any *five* of the following : 2 × 5

(*i*) What lesson of life did the writer from his days in street ?

(*ii*) What does the writer mean by "crab mentality" ? Where does its root lie ?

(*iii*) How did the poet and her friend spend their difficult periods ?

(*iv*) Explain the terms "Guadian Angel" and "Extra Special" as used by the poet.

(*v*) Why did people bless the Abbot of Aber brothok ?

(*vi*) Explain – "the cheering power of spring".

4. Do as directed : 1 × 5

(*i*) The harmonium _____ flawlessly. (play/plays)

(*ii*) Soldiers _____ be dedicated. (should/ought to)

(*iii*) I _____ him since monday. (Correct form of verb "not see")

(*iv*) I have _____ time to talk to you. Let's meet tomorrow. (little/a little)

(*v*) The troop sings patriotic songs only. (Change the voice)

5. Do as directed :

(A) Answer any *two* of the following : 4 × 2

(*i*) Write a paragraph in about 100 words describing the Vigilance Awareness camp organised by your students' club in your institute.

(*ii*) You are the Editor of your institute magazine. Its 2019 edition is going to be out in one month. Draft a notice giving all details like kind of articles you need, last date of their submission and others.

(*iii*) Your friend has met with an accident and will not be able to attend the forth-coming semester examination. Write a letter of consolation to him/her.

(*iv*) You are Suverna chemicals, C/138, Gajapati Nagar, Berhampur dealing with indoor cleansers. Draft a letter of complaint to Sadasiva Chemicals and Chemicals, Binod Bihari, Baripada-12. Who has supplied you duplicate materials.

(B) Read the following advertisement : 7

Gupta Deos and Perfumes
North Commercial Area
Baripada
Odisha

No. BBN/04/2019 28th April 2019

We are a well doing sector in cosmetics specially deos and perfumes in Odisha. We need 03 junior Engineers in Chemical Engineering for our production unit. Qualification: Diploma in Chemical Engineering; Experience : 01 year; Age : Not more than 26 as on dt. 01.01.2019. Salary negotiable with free housing and fooding.

Apply within 10 days to the undersigned.

Manager,
H. R.
ABC Co.(P) Ltd., Hydrabad

Now draft a job application and attach your C.V. to it. Don't write your original identity instead write Mr. X, Phone No. xxxxxxxxxx, etc.

6. Answer any *three* of the following : 5 × 3

(*i*) Body language communicates significantly. Explain with reference to postures and gestures.

(*ii*) What does it mean by audio signal ? Explain with examples. State merits and demerits of audio signal.

(*iii*) Proxemics is the study of what ? Discuss its different areas.

(*iv*) Give short notes on :

(*a*) Inter personal communication

(*b*) Importance of audience and its purpose.

Total Pages – 2

II – Sem/COMMON/2019(S)(New)

COMPUTER APPLICATION

(Theory : 1(b))

Full Marks : 80 *Time* : 3 hours

Answer any **five** questions including **Q. Nos. 1 & 2**

Figures in the right-hand margin indicate marks

1. Answer the following : 2 × 10

(*a*) Define hybrid computer.

(*b*) What is CPU ?

(*c*) What do you mean by multitasking operating system ?

(*d*) Define WWW.

(*e*) Define algorithm.

(*f*) What is folder ?

(*g*) Differentiate between constants and variables in C program.

(*h*) State the different types of relational operators provided by C.

(*i*) Define protocol.

(*j*) What do you mean by compiler ?

2. Answer the following : 5 × 6

(*a*) Discuss the generation of computer. Explain the key features of computers of each generation.

(*b*) Compare the features of DOS and WINDOWS operating system.

(*c*) Define software. Describe various type of software and briefly explain them.

(*d*) What is file access ? Explain the various types of file access method.

(*e*) Define network. Explain various types of network.

(*f*) Draw a flowchart to convert temperature from degree Celsius to Fahrenheit.

3. Explain the components of computer with a block diagram. 10

4. Draw a flowchart and write a program in 'C' to find out whether a number is odd or even. 10

5. Define operating system. Explain different types of operating system. 10

6. What is topology ? Explain various types of topologies. 10

(Turn Over)

7. Write short notes on (any *two*) :

(*i*) Loops in C

(*ii*) Virus

(*iii*) Data transmission mode

(*iv*) Arrays in 'C'.

II–Sem/COMMON/2019(S)(New)

ENGG. MATH - II

Full Marks : 80 (Theory : 3)

Time : 3 hours

Answer any five questions including **Q. Nos. 1 & 2**

Figures in the right-hand margin indicate marks

1. Answer *all* questions : 2 × 10

(*a*) Evaluate :

$$\lim_{x\to 1}\left(\frac{\frac{1}{x^2}-\frac{1}{4}}{x-2}\right)$$

(*b*) If $u = t^2$ and $v = \sin t^2$, then find $\frac{dv}{du}$.

(*c*) If $f(x, y) = e^{xy}$, then find $y\cdot\frac{\partial f}{\partial y}$.

(*d*) Find derivative of $\sqrt{x}$ w.r.t. x^2.

(*e*) Examine the existence of

$$\lim_{x\to\frac{5}{2}}[x]$$

(*f*) If $y = c_1e^x + c_2e^{-x}$, then find $\frac{d^2y}{dx^2}$.

(*g*) Evaluate

$$\int e^{(5x+3)}\cdot dx$$

(*h*) The two forces act on a particle at a point. Find their resultant if they are $(4\hat{i}+\hat{j}-3\hat{k})$ and $(3\hat{i}+\hat{j}-\hat{k})$.

(*i*) Solve

$$\frac{dy}{dx}=\frac{x}{y}.$$

(*j*) Find the derivative of $\sin^{-1}(3x)$.

2. Answer any *six* questions : 5 × 6

(*a*) If $f(x)=\begin{cases}\frac{x-|x|}{x}, & x\neq 0\\ 2, & x=0\end{cases}$ at $x = 0$.

Show that $\lim_{x\to 0} f(x)$ does not exist.

(*Turn Over*)

(*b*) Evaluate

$$\lim_{x\to 0}\left(\frac{x - x\cos 2x}{\sin^3 2x}\right).$$

(*c*) If $y = \tan^{-1}x$, prove that

$$(1+x^2)\,y_2 + 2xy_1 = 0.$$

(*d*) If $f(x, y) = \dfrac{2x-3y}{x^2+y^2}$, find $f_x(1, 2)$ and $f_y(1, 2)$.

(*e*) Solve the differential equation,

$$x(1+y^2)\,dx + y(1+x^2)\,dy = 0.$$

(*f*) Evaluate

$$\int e^x\left(\frac{1}{x} - \frac{1}{x^2}\right)dx.$$

(*g*) Find the area bounded by the curve $xy = c^2$, the x-axis and $x = 2$, $x = 3$.

(*h*) Evaluate

$$\int_0^{\pi/2} \frac{dx}{1+\cot x}.$$

3. Find the value of 'a' if

$$\lim_{x\to 2}\frac{\log_e(2x-3)}{a(x-2)} = 1.$$ 10

4. Differentiate, $\tan^{-1}(\sec x + \tan x)$. 10

5. Evaluate

$$\int \log(1+x^2)\,dx.$$ 10

6. If $y = (\sin^{-1}x)^2$, show that

$$(1-x^2)\,y_2 - xy_1 - 2 = 0.$$ 10

7. Find sine of the angle between the vectors $\vec{a}$ and $\vec{b}$ where

$$\vec{a} = 2\hat{i} - \hat{j} + 3\hat{k} \text{ and } \vec{b} = \hat{i} + 3\hat{j} + 2\hat{k}.$$ 10

Total Pages – 2

II – Sem/COMMON/2019(S)(New)

ENGINEERING CHEMISTRY

(Theory : 2(b))

Full Marks : 80

Time : 3 hours

Answer any **five** questions including **Q. Nos. 1 & 2**

Figures in the right-hand margin indicate marks

1. Answer *all* questions : 2 × 10

(a) What are ore and mineral ?

(b) Define galvanisation and electrorefining ?

(c) Calculate the normality of H_2SO_4 solution containing 14.7 grams of solute in 3 litres of solution ?

(d) What are insecticides ? Give two examples ?

(e) Define isotopes and isotones.

(f) What are primary fuels ? Give examples two geseous primary fuels ?

(g) What are saturated hydrocarbons ? Give examples.

(h) What are acid radicals ? Give examples of two divalent monoatomic acid radicals ?

(*i*) How Na_2CO_3 removes permanent hardness ?

(*j*) Calculate equivalent weight of $MgCO_3$ and H_3PO_4 ?

2. Answer any *six* questions : 5 × 6

(a) Write the failure of Rutherford's Atomic Model ?

(b) Explain the formation of H_2O molecule ?

(c) What is concentration of ore ? Write the magnetic separation process ?

(d) Give comparison between various liquid fuels ?

(e) Write the composition and use of polyvinyl chloride ?

(f) Write the IUPAC names and structures of following compounds :

(*i*) $CH_3C(Br_2)CHCHCH(C_2H_5)CH_3$

(*ii*) CH_2CHCH_2CCH

(*iii*) Isoprene

(*iv*) BHC

(*v*) 2-bromo-5-chloro-3, 4-diethyl hexane.

(g) 40 gms of caustic soda is dissolved in water to prepare 5 litres of its solution, having density 1.02 gm/cc. Calculate the normality, molarity and molality of the solution ?

(Turn Over)

(*h*) What are bio-fertilizers ? Write uses of various such fertilizers ?

(*i*) If 6.9 gms of K_2CO_3 is present in 0.5 litres of its solution, then calculate the normality and pH of the solution ?

3. Explain Bohr's Atomic Model ? How this model rectified the defect of Rutherford's Atomic Model ? 6 + 4

4. (*a*) Make a comparison between Arrhenius Theory and Lowry-Bronsted theory ? 5

(*b*) Explain the atmospheric corrosion ? 5

5. (*a*) What is electrolysis ? Explain the process of electroplating ? 1 + 5

(*b*) Write the limitations of Lewis theory for acid and base ? 4

6. (*a*) Write the composition and uses of brass, alnico and duralumin ? 6

(*b*) Write the uses of naphthalene and benzoic acid ? 2 + 2

7. (*a*) 21.2 gms of sodium carbonate is dissolved in water to prepare 2 litres of its solution, having density 1.01 gm/cc. Calculate the normality, molality of the solution ? 4

(*b*) Explain ion-exchange process of water softening ? 6

II/SEM/COMMON/2019(S)NEW

ENGINEERING DRAWING

[PRACTICAL-3(a)]

FULL MARK :100

TIME : 3 HOURS

Answer any six questions including Q NO. 8

Figures in the right-hand mark indicate marks.

1. Construct a diagonal scale of R.F =1 : 250 to show meters and decimeters and long enough to measure upto 40m. Show distances of 34.6m & 21.9m on the scale. [15]

2. Construct an ellipse by arc of circle method ,when the length of major and minor axes are 100mm and 70mm respectively. [15]

3.Construct a parabola by eccentricity method ,when the distance between focus and directrix is 60mm. [15]

4. A regular hexagonal plate of side 50mm lies 20mm above H.P. with two of its base side parallel to H.P . The plate is lying 25mm infront of V.P and inclined 45° to V.P and perpendicular to H.P. Draw the projections of the plate . [15]

5. A cone lying with its base on the H.P and is cut by a horizontal cutting plane parallel to H.P and at a distance of 40mm above H.P . The diameter of the cone is 60mm and hight is 70mm .Draw the projection of the sectioned top view of the cone . [15]

6. A line AB 85mm long has one end 15mm above H.P and 25 mm in front of V.P. The line is inclined at 35° to H.P and 50° to V.P . Draw the projections of the line. [15]

7. Draw the isometric view of a hexagonal prism of side of base 25mm, height 70 mm with axis horizontal. [15]

8. Draw the following views of a building from the specification given below adopting a suitable scale.

(a) Plan at window sill level [15]

(b) Elevation [10]

SPECIFICATION :

1. Room size =7000×4000
2. Wall thickness =300
3. Plinth projection = 50
4. Plinth hight =450
5. Chajja projection=500
6. Thickness of slab=150
7. Front verandah wide=3000
8. Pillar =300×300
9. Step=250×150
10. Door=1200×2100 (provide one door in the front wall of room)
11. Window=1000×1500 (provide two windows each on front and back wall of room and one each in the side wall of room.
12. Ceiling height of room and verandah =3500
13. Parapet height =600

Missing data if any may be assumed suitably. The dimensions are in mm

Total Pages—3

II—Sem/COMMON/2019(S)(New)

ENGINEERING MECHANICS

(Theory : 4)

Full Marks : 80

Time : 3 hours

Answer any five questions including Q. Nos. 1 & 2

Figures in the right-hand margin indicate marks

1. Answer the following : 2×10

   (*a*) What is free body diagram ?

   (*b*) State polygon law of forces.

   (*c*) State the condition of equilibrium.

   (*d*) Define angle of friction.

   (*e*) What do you mean by centroid of a lamina ?

   (*f*) Write any two disadvantages of friction.

   (*g*) State the relation between M.A., VR and efficiency of a simple lifting machine.

   (*h*) State law of machine.

   (*i*) Define power and write down its S.I. unit.

   (*j*) State Newton's 2nd law of motion.

2. Answer any *six* questions : 5×6

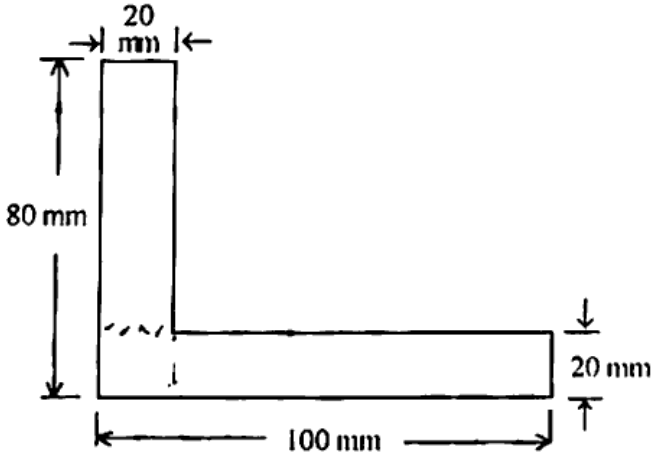
   (*a*) A particle is acted on by three forces 2, $2\sqrt{2}$ and 1 kN. The first force is horizontal and towards the right, the second acts at 45° to the horizontal and inclined right upward and the third is vertical. Determine the resultant of the given forces.

   (*b*) Derive the condition for reversibility of a machine.

   (*c*) Derive velocity ratio of a compound gear train.

   (*d*) A body of weight 50 N is pulled along a rough horizontal plane by a force of 18 N acting at an angle of 14° with the horizontal. Find the coefficient of friction.

   (*e*) Find the position of centroid of a *L* section as shown in the figure below :



(Turn Over)

(*f*) A constant force acting on a body of mass 20 kg changes its speed from 2·5 m/sec to 10 m/sec in 15 seconds. What is the magnitude of the force ?

(*g*) State and explain d'Alembert's principle.

(*h*) State and explain law of conservation of energy.

3. A spherical ball of weight 100 kgf rests on two smooth inclined planes as shown in the figure. Find the reaction of each inclined plane on the ball. 10

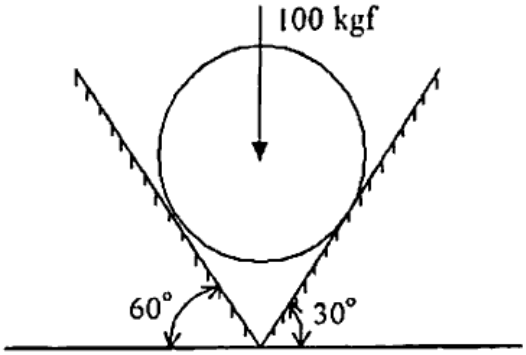
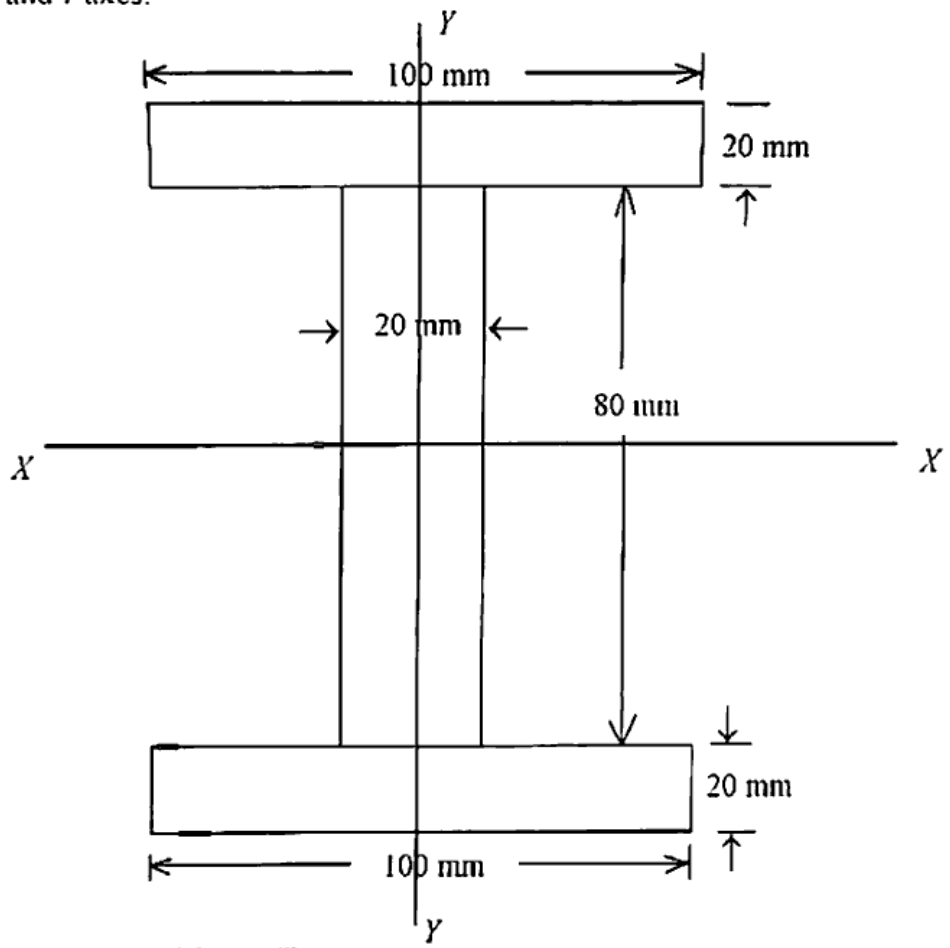


Figure 1

4. Find the moment of inertia of the *I*-section as shown in the figure 2 about centroidal *X* and *Y* axes. 10



(Continued)

5. A ladder 5 meter long rests on a horizontal ground and leans against a smooth vertical wall at an angle of 70° with the horizontal. The weight of the ladder is 900 N and acts at its middle. The ladder is at the point of sliding, when a man weighing 750 N stands on a ring 1·5 m from the bottom of the ladder. Calculate the co-efficient of friction between the ladder and floor. 10

6. In a certain weight lifting machine, an effort of 15 N can lift a load of 300 N and an effort of 20 N can lift a load of 500 N. Find the law of the machine. Also find the effort required to lift a load of 880 N. 10

7. A ball is dropped from a height $h_0 = 1$ m on a smooth floor. Knowing that the height of the first bounce is $h_1 = 81$ cm determine 10

   (*a*) coefficient of restitution

   (*b*) expected height h_2 after the second bounce.

Total Pages – 2

II – Sem/COMMON/2019(S)(New)

ENGINEERING PHYSICS

(Theory : 2(A))

Full Marks : 80 *Time* : 3 hours

Answer any five questions including **Q. Nos. 1 & 2**

Figures in the right-hand margin indicate marks

1. Answer *all* questions : 2 × 10

(*a*) Write down the dimensional formula of the following physical quantities :

(*i*) Power

(*ii*) Frequency

(*b*) Given, $\vec{A} = \hat{i} - 2\hat{j} - 3\hat{k}$, $\vec{B} = 2\hat{i} + \hat{j} - 5\hat{k}$, Find $\vec{A} \cdot \vec{B}$.

(*c*) State Triangle law of vector addition.

(*d*) Define Latent Heat of Vaporization.

(*e*) Draw a ray diagram for refraction through a prism.

(*f*) Define Unit Pole.

(*g*) State the First Law of Thermodynamics.

(*h*) State Kirchhoff's 2nd Law.

(*i*) Write down two important applications of LASERS in Industry.

(*j*) State Fleming's Left Hand Rule.

2. Answer any *six* questions : 5 × 6

(*a*) Two forces whose magnitudes are in the ratio 3 : 5 give a resultant equal to 70 N. If the angle between them is 60°, find the magnitude of each force.

(*b*) A car attains a velocity of 50 m/sec in 5 minutes from standstill. Calculate the acceleration.

(*c*) Distinguish between mass and weight.

(*d*) State Newton's Laws of Gravitation and define G.

(*e*) Write different methods to reduce Friction.

(*f*) Establish the relation between α and β.

(*g*) State Coulomb's Laws in magnetism.

(*h*) State Faraday's Laws of Electromagnetic Induction.

3. Derive expressions for time of flight, maximum height and range of a projectile fired at an angle θ with the horizontal. 10

(Turn Over)

4. Calculate the amount of heat required to convert 5 gm of ice at $-5^{\circ}C$ to water at $60^{\circ}C$. Given, specific Heat of Ice = 0.5 Cal/gm $^{\circ}C$, Latent Heat of ice = 80 Cal/gm. 10

5. Define Critical Angle and Total Internal Reflection with diagram. Write down the principle and application of Optical Fibre. 6 + 4

6. State Coulomb's Laws of Electrostatics. Find out the equivalent resistance of 5 Resistors of which 2 Ω, 3 Ω and 5 Ω connected in series and 10 Ω and 20 Ω are connected in parallel to them. 5 + 5

7. Derive an expression for force acting on a current carrying conductor placed in a uniform magnetic field. Compare between Fleming's Left Hand Rule and Right Hand Rule. 6 + 4