Register Number :

Name of the Candidate :

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B.E. DEGREE EXAMINATION, 2013

(COMMON TO ALL BRANCHES)

(SECOND SEMESTER)

BPHC-204. ENVIRONMENTAL STUDIES

May]   [Time : 3 Hours

Maximum : 75 Marks

(Maximium 60 marks those who found before 2011-12)

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

UNIT – I

1. Explain the various renewable energy sources in the earth.

(OR)

7. Explain the Wildlife

Protective Act

Turn Over

2. Explain the adverse environmental impacts of modern agriculture and land degradation.

UNIT – II

3. Describe food chains, food web and energy flow in the ecosystem.

(OR)

4. Explain *in-situ* and *ex-situ* conservation of bio-diversity along with their merits and limitations.

UNIT – III

5. Explain the causes, effects and control of soil pollution.

. (OR)

6. Discuss briefly the disposal of municipal solid waste.

UNIT – IV

7. Explain the Wildlife Protective Act and Forest Protective Act.

(OR)

8. Outline the various family welfare plans in the Post-independent India.

UNIT – V

9. State the different natural calamities and explain any one in detail.

(OR)

10. Explain the causes and effects of Tsunami.

Register Number :

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B.E. DEGREE EXAMINATION, 2013

(Common to ALL Branches)

(FIRST SEMSTER)

CLEC-101. TECHNICAL ENGLISH

(New Pattern)

(For those who joined between 2008-09 & 2010-11)

May] [Time : 3 Hours

Maximum : 60 Marks

PART – A (10 × 2 = 20)

Answer ALL questions.

ALL questions carry EQUAL marks.

1. What is communication?

2. What are the types of communication?

3. What is a transitive verb?

Turn Over

4. Transcribe the following words :

   (a) Listening.

   (b) Wheat.

   (c) Salt.

   (d) Ship.

5. What is concord?

6. *Fill in the blanks with suitable tense:*

   (a) I ..... (speak) to the manager.

   (Use Past partciple.)

   (b) The judge ......(forgive) the culprit.

   (Use past participle.)

7. *Convert the following sentences into other voice :*

   (a) My father teaches me grammar.

   (b) The house was painted red by him.

8. *Fill in the blanks with suitable article :*

   (a) Take .... break and do something.

   (b) He is ..... University student, doing ...... part-time job.

9. *Combine them using a co-ordinating conjunction :*

   (a) He has a car. He has a bike.

   (b) He is friendly. He has no friends.

10. (a) He is ....Delhi. He is a person ... high profile.

    (b) He came ...... the exact moment ..... the fixed day.

    PART – B   (5 × 8 = 40)

    Answer ALL questions.
    ALL questions carry EQUAL marks.

11. (a) What are the channels of communication?

    (OR)

(b) Define types of tones with suitable examples.

12. (a) Write a letter to the editor of a newspaper about the increasing stray dogs in your area.

(OR)

(b) Write a letter of complaint to the Chairman of your Municipal Corporation about the leather company letting its effluent on the road in your area.

13. (a) A leading software company calls for programme officer withrResume with job application letter to the Human Resource Manager.

(OR)

(b) Respond to the following newspaper advertisment :

Wanted Mechanical Engineer for a reputed automobile company. Freshers can also apply. Send your resume to the human resource manager.

14. (a) You are the transport manager of the Chennai Public School. Your school bus met with an accdident. Write an accident report to the Principal of your school.

(OR)

(b) Joy Alukas plan to establish a branch in Chidambaram. As an area manager, make a detail survey and submit a feasibility report to your Managing Director.

15. (a) Write an essay on the social pressures faced by the Indian student.

(OR)

(b) Write an essay on MNCs in India (Multinational Companies) and its impact on Indian culture.

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B.E. DEGREE EXAMINATION, 2013

(Common to ALL Branches)

(FIRST YEAR)

102. ENGINEERING MATHEMATICS - I

(New Pattern)

(For those who joined during 2008-09 to 10-11)

May]   [Time : 3 Hours

Maximum : 60 Marks

Answer ALL questions.
ALL questions carry EQUAL marks.

PART – A   (10 × 2 = 20)

1. If 2,2 are two eigen values of

$$\begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix}$$

find the third eigen value and determine eigen values of A^{-1}.

Turn Over

2. What is the curvature of a straight line?

3. Solve :

$$\frac{d^2y}{dx^2} + \mu^2 y = 0.$$

4. Find the P.I. for

$$(D^2 + 9) \ y = 11 \sin 3x.$$

5. Find the value of :

$$\int_0^a \int_0^{\sqrt{ay}} xy \cdot dy \ dx.$$

6. If

$$\phi = 3x^2 y - y^3 z^2,$$

find grad ϕ at (1, −1, 2).

7. State the Cauchy - Riemann equations in Cartesian form.

8. State the Cauchy's integral theorem.

9. State a function, which has no Laplace transform.

10. State the initial value theorem.

PART - B (5 × 8 = 40)

11. (a) Verify the Cayley-Hamilyon theorem for

(i) $\begin{pmatrix} 3 & 2 & 1 \\ 0 & 2 & 0 \\ 1 & 2 & 3 \end{pmatrix}$ (4)

(ii) Find the radius of the curvature of

$$y = c \log\left(\sec\left(\frac{x}{c}\right) \right).$$

at any point. (4)

(OR)

(b) (i) Find the evolute of $y^2 = 4ax$. (5)

(ii) Find the eigen values of

$\begin{pmatrix} 2 & -2 & 1 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{pmatrix}$ (3)

Turn Over

12. (a) (i) Solve :

$$\frac{d^2y}{dx^2} + 4y = \cos 2x. \qquad (4)$$

(ii) Solve :

$$x^2 \frac{dy}{dx^2} + 4x \frac{dy}{dx} + 2y = 0. \qquad (4)$$

(OR)

(b) (i) Solve :

$$\frac{dx}{dt} + 4x + 3y = 0.$$

$$\frac{dy}{dt} + 2x + 5y = 0. \qquad (4)$$

(ii) Solve :

$$\frac{d^2y}{dx^2} + 7 \frac{dy}{dx} + 12y = e^{-x}. \qquad (4)$$

13. (a) (i) Find the directional derivatives of

$$\phi = x^2yz + 4xz^2$$

at (1, 1, 1) in the direction of

$$\vec{i} + \vec{j} - \vec{k}. \qquad (3)$$

(ii) Change the order of integration and evaluate : (5)

$$\int_0^a \int_x^a (x^2 + y^2) \, dy \, dx.$$

(OR)

(b) Verify the Gauss divergence theorem for

$$\vec{F} = (x^2 - yz) \vec{i} + (y^2 - zx) \vec{j} + (z^2 - xy) \vec{k}$$

taken over the rectangular parallel piped

$$0 \le x \le a,$$

$$0 \le y \le b,$$

$$0 \le z \le c. \qquad (8)$$

Turn Over

14. (a) (i) Obain the Taylor's series for

$$f(z) = \frac{1}{(z+1)(z+3)}$$

in $| z | < 1$. (4)

(ii) Find the iamge of $| z - 2 | = 2$ under the mapping $w = \frac{1}{z}$ (4)

(OR)

(b) (i) Evaluate :

$$\int_c \frac{z^3 + 2z + 1}{(z-1)(z-4)} \, dz ;$$

$c : | z | = 2.$ (4)

· (ii) Test the analyticity of the function

$f(z) = e^z.$ (4)

15. (a) Using Laplace transform, solve :

$$(D^2 + 4D + 8) y = 1,$$

given that $y(0) = 0, y'(0) = 1·0.$ (8)

(OR)

(b) (i) Find :

(A) $L (t \, e^{-t} \sin t)$.

(B) $L^{-1}\left(\frac{s+1}{(s^2 + 2s + 3)} \right)$. (4)

(ii) Find the Laplace transform of

$$f(t) \begin{cases} t & : 0 < t < b. \\ 2b-1 : & b < t\,2b, \, f(t) = f(t+2b). \end{cases}$$

(4)

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B.E. DEGREE EXAMINATION, 2013

(FIRST YEAR)

103. ENGINEERING PHYSICS

(For the students joined between 2008 - 09 and 2010 - 11)

May]   [Time : 3 Hours

Maximum : 60 Marks

PART - A   (10 × 2 = 20)

Answer ALL questions.

ALL questions carry EQUAL marks.

1. State Stokes law.

2. Define Reverberation time.

3. What is Holography?

4. What is Air wedge?

5. What is Bravais lattice?

(OR)

Turn Over

2

6. What is Burger vector?

7. Define Meissonier effect.

8. What is Biomaterials?

9. State Compton Effect.

10. Mention any two properties of De Broglie Wavelength.

PART – B   (5 × 8 = 40)

Answer FIVE questions, choosing ONE FULL question from each unit.
ALL questions carry EQUAL marks.

11. Derive the expression for the time period of a torsional pendulum.   (8)

(OR)

12. What is meant by magnetostriction effect? Explain how the ultrasonic waves are produced using a magnetostriction oscillator.   (8)

13. Explain the construction and working of CO_2 laser.   (8)

(OR)

3

14. Explain Photo elasticity. Explain its use and discuss stress optic law.   (8)

15. What is packing factor? Prove that the packing fraction of hcp is ·074.   (8)

(OR)

16. Explain Crystal imperfection.   (8)

17. Derive the expression for the Clausius-Mossotti relation.   (8)

(OR)

18. What is Hall effect? Explain the experimental technique used to find hall coefficient.   (8)

19. Derive the expression for the particle in one dimensional box.   (8)

(OR)

20. Explain the construction and working of G.M counter.   (8)

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B.E. DEGREE EXAMINATION, 2013

(Common to ALL Branches)

(FIRST YEAR)

104. ENGINEERING CHEMISTRY

(New Pattern)

(For those who joined between 2008-09 & 2010-11)

May]   [Time : 3 Hours

Maximum : 60 Marks

PART – A   (10 × 2 = 20)

Answer ALL questions.
ALL questions carry EQUAL marks.

1. Differentiate temporary and permanent hardness.

2. Define green house effect.

3. What is meant by degree of polymerization?

Turn Over

4. What are the differences beween adsorption and absorption?

5. Define cetate number.

6. What are solar cells?

7. Define dry corrosion.

8. What are electrochemical cells? Give an example.

9. What are abrasives?

10. What are carbon nanotubes?

PART – B (5 × 8 = 40)

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

UNIT – I

11. (a) What is meant by desalination? How is it carried out by reverse osmosis method?

(b) Define BOD. Explain the determination of BOD in sewage water.

(OR)

12. (a) Explain the determination of dissolved oxygen by volumetric method.

(b) Give short notes on ozone layer depletion.

UNIT - II

13. (a) Differentiate addition and condensation polymerization.

(b) Derive Frerunlich adsorption isotherm.

(OR)

14. (a) Give the preparation, properties and uses of polyester and silicone resins.

(b) Explain the adsorption of gases on solids.

UNIT - III

15. (a) Describe the manufacture of gasoline by Bergius process.

(b) Discuss the principle and applications of solar cells.

(OR)

Turn Over

16. (a) Discuss the proximate analysis of coal.

(b) Explain the causes, mechanism and prevention of knocking of petrol in I.C. engine.

UNIT - IV

17. (a) Describe the construction and working of galvanic cell.

(b) Explain the mechanism of dry corrosion.

(OR)

18. (a) Explain the construction and workingof H_2-O_2 fuel cells.

(b) Explain the galvanization and tinning process.

UNIT - V

19. (a) What are abrasives? Discuss the properties of abrasives.

(b) Write short notes on fullerenes and nano composites.

(OR)

20. (a) Explain the properties of lubricants.

(b) Discuss the applications of carbon nanotubes.

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B.E. DEGREE EXAMINATION, 2013

(Common to ALL Branches)

(FIRST YEAR)

105. ENGINEERING MECHANICS

(For those who joined during 2008-09 to 2010-11)

May]   [Time : 3 Hours

Maximum : 60 Marks

PART – A   (10 × 2 = 20)

Answer ALL questions.
ALL questions carry EQUAL marks.

1. What are the methods availabe for finding the resultant of two forces?

2. Distinguish between space diagram and free body diagram.

3. Give the necessary and sufficient conditions for equilibrium of a rigid body in two dimensions.

Turn Over

4. List the various types of supports and their reactions.

5. Give the expressions for find centroid of an area.

6. Define moment of inertia of an area.

7. Explain tensile and compressive stresses.

8. How will you find volumetric strain?

9. Define the term reversibility.

10. Wrwite the advantages of simple machines.

PART - B   (5 × 8 = 40)

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

UNIT – I

11. Determine the resultant moment of the forces acting at A and B about point O (figure-1).

(8)
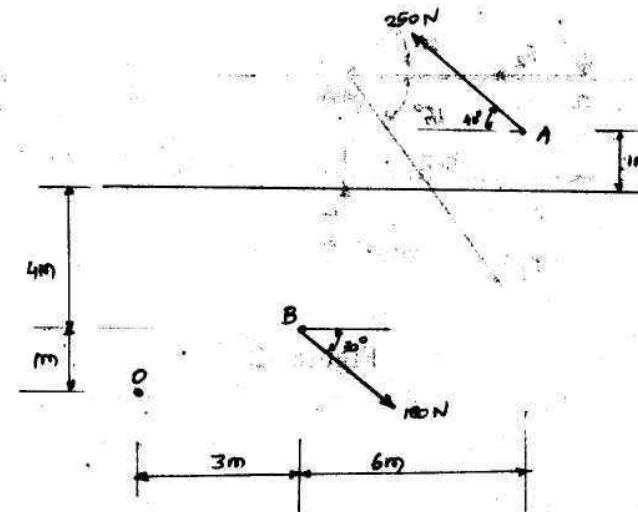
Figure -1

(OR)

Turn Over

12. Determine the values of F_1 and F_2 for equilibrium conditions of particle A shown in Figure-2. (8)
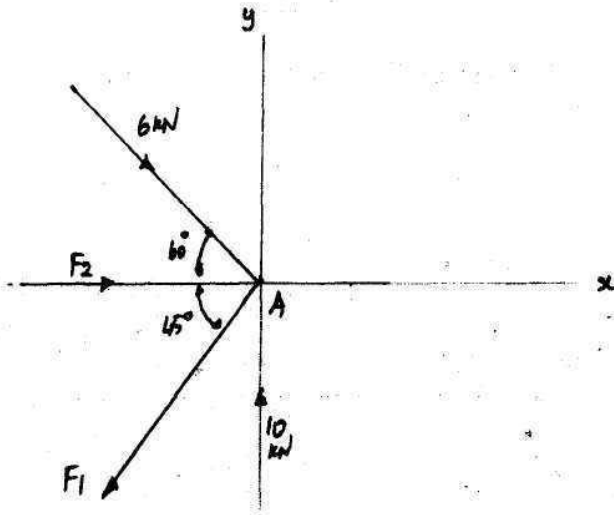

Figure -2

UNIT - II

13. The beam AB shown in figure-3 is supported by a roller at A and by a pin at B. Determine the value of the force F_1 and F_2 if the reaction at A is 50 kN (↑) and at B is 15 kN (↑). (8)
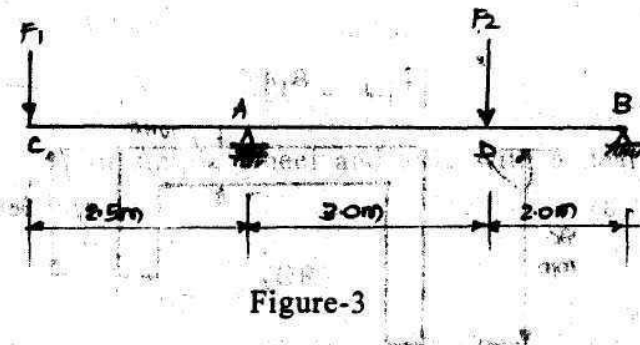

Figure-3

(OR)

14. Determine the reactions at the supports of the portal frame shown in figure-4. (8)
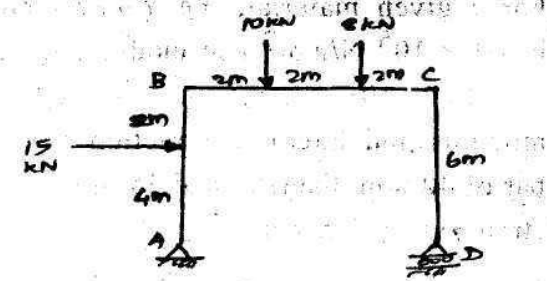

Figure-4

Turn Over

UNIT - III

15. Outline the step by step procedure of finding radius of gyration of a symmetrical I-section.

(8)

(OR)

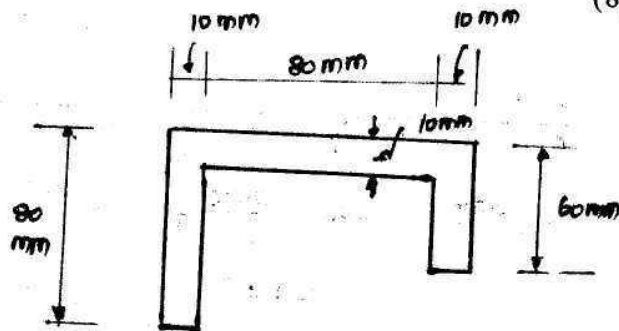16. Locate the centroid for the section shown in figure-5.

(8)

Figure -5

UNIT - IV

17. For a given material, the Young's modulus is $1 \cdot 1 \times 10^5$ N/mm^2 and modulus of rigidity is $0 \cdot 43 \times 10^5$ N/mm^2. Determine the bulk modulus and lateral contraction of a round bar of 40 mm diameter and 25 m length when stretched by 2·5 mm.

(8)

(OR)

18. A reinforced concrete column is 30 cm × 30 cm in section. The column is provided with 8 bars of 20 mm diameter. The column carries a load of 200 kN. Find the stresses in concrete and steel bars.

Take Es = $2 \cdot 1 \times 10^5$ N/mm^2.

Ec = $0 \cdot 14 \times 10^5$ N/mm^2.

(8)

UNIT - V

19. Explain simple wheel and axle with a neat sketch.

(8)

(OR)

20. Explain simple screw jack with a neat sketch.

(8)

Register Number :

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B.E. DEGREE EXAMINATION, 2013

(COMMON TO ALL BRANCHES)

(FIRST YEAR)

106. BASIC ENGINEERING

(For Candidates of 2008-09 Batch to 2010-11)

May]   [Time : 3 Hours

Maximum : 60 Marks

Section - I - Answer ALL questions.

Section - II - Answer any TWO FULL questions.

PART – A

(CIVIL ENGINEERING)   (20)

SECTION - I   (3 × 2 = 6)

Answer ALL questions.

1. Write the size of standard brick (modular brick).

2. Write the Trapezoidal rule for areas.

3. Write the disadvantages of dam.

Turn Over

SECTION - II (2× 7 = 14)

Answer any TWO questions.

4. Describe the types of deep foundation.

5. The following perpendicular offsets were taken at 10 metres intervals from a survey line to an irregular boundary line

   3·60, 2·80, 4·50, 8·25, 7·85, 6·45, 5·35.

   Calculate the area enclosed between the survey line and the boundary line by Trapezoidal rule and Simpson's rule.

6. Describe the factors which are to be considered for the selection of site for dams.

7. Define per capita consumption. List the factors affecting per capita consumptions. Explain any two.

PART – B

(MECHANICAL ENGINEERING)   (20)

SECTION - I   (3 × 2 = 6)

1. Define I.C.engine.

2. List the types of flames.

3. What are the advantages of gear drives?

SECTION - II   (2× 7 = 14)

Answer any TWO questions.

4. Write down the working of impulse turbine and also, list the advantages.

5. Compare four stroke and two stroke cycle engines, bring out clearly their relaive merits and demerits.

6. Write short notes on the following :

   (a) Rolling mill.

   (b) Forging.

PART – C

(ELECTRICAL ENGINEERING)   (20)

SECTION - I   (3 × 2 = 6)

1. Define current and voltage.

2. What are the types of single phase transformers?

3. Draw the logic diagram of JK flip-flop.

4

SECTION - II (2 × 7 = 14)

Answer any TWO questions.

4. In the circuit shown in figure-1, the power consumed in the 3 Ω resistor is 12 watts. Find the value of R.
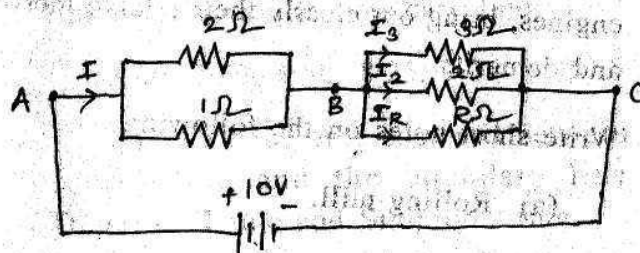

Figure -1

5. Explain the working principle of different types of DC generators with neat diagrams.

6. Discuss in detail amplitude modulation and frequency modulation.

B.E. DEGREE EXAMINATION, 2013

(FIRST YEAR)

107. ENVIRONMENTAL STUDIES

(New Pattern)

May]   [Time: 3 Hours

Maximum: 60 Marks

(For the students joined between 2008-09 and 2010-11)

PART-A   *(10×2=20)*

Answer ALL questions

All questions carry equal marks

1. Define Environment.

2. What is an aquifer?

3. Write short notes on wetland Ecosystem.

4. Who are producers and consumers?

5. List any four hot spots of the world.

6. What is the significance of Biodiversity?

7. List the methods adopted for discarding wastes.

8. Write short notes on Minamata diseases.

9. Define age structure.

10. What is value education?

PART-B   *(5×8=40)*

Answer any ONE FULL Question from each unit

All questions carry equal marks

UNIT-I

1. How can you as an individual conserve the natural resources like water and energy?   (8)

(OR)

2. a) List the types of soil erosion induced by water.   (2)

   b) Explain the cause and effect of over utilization of underground water.   (6)

UNIT-II

3. Discuss any one of the models of energy flow in an ecosystem.   (8)

(OR)

4. Discuss the structure and functions of the following:

   a) Forest ecosystem   (4)

   b) Pond ecosystem   (4)

UNIT-III

5. Discuss the consumptive use, ethical option and ecosystem service value of biodiversity.
(8)

(OR)

6. What is Red-data book? What do you mean by extinct endangered, vulnerable and rare species? Name some endangered species of plants and animals in our country. (8)

UNIT-IV

7. What is noise pollution? Discuss the sources and effects of noise and methods adopted for its control. (8)

(OR)

8. Explain in brief the following disaster with suitable case study:
   a) Floods (4)
   b) Earthquake (4)

UNIT-V

9. a) Describe the important waste land reclamation practices. (4)
   b) Discuss the urban problems related to energy. (4)

(OR)

10. Discuss the various issues and measures for woman and child welfare at national and international level. (8)

Register Number :

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B.E. DEGREE EXAMINATION, 2013

(Common to ALL Branches)

(FIRST YEAR)

101. TECHNICAL ENGLISH

(Revised Pattern)

(Those who joined during 2011-12
and after)

May]　　　　　　　　　　　　　[Time : 3 Hours

Maximum : 75 Marks

Answer ALL questions.

ALL questions carry EQUAL marks.

UNIT – I

1. Define types of listening with examples.

(OR)

2. What are the different steps involved in process of learning?

Elucidate the methods of relevant …… with …….

Turn Over

UNIT - II

3. (a) Write a brief note on : (4 × 2 = 8)

   (i) Articulation.

   (ii) Accent and intonation.

   (b) What are the strategies of good conversation? (7)

(OR)

4. Discuss the importance, types of body language in speaking strategies. (15)

UNIT - III

5. (a) Define the following with minimum of six examples. (4 × 2 = 8)

   (i) Topicalising.

   (ii) Schematising.

   (b) What are the Do's and Dont's in paraphrasing? (7)

(OR)

6. Elucidate the methods of referencing with examples. (15)

UNIT - IV

7. (a) Assume that you have to write a memo to your office manger explaining him / her why you are coming late to the office. Mention the following reasons for coming late :

   (i) Heavy traffice load.

   (ii) A long queue at company entry gate.

   (iii) Parking problem. (1 × 8 = 8)

   (b) Suppose you want to take an education loan from HSBC, write an e-mail for the credit manager of HSBC bank, Delhi requesting him to send you details regarding educational loans by HSBC bank. (1 × 7 = 7)

(OR)

8. What is a Report? Define types of reports. (15)

Turn Over

UNIT - V

(Compulsory)

9. *Fill in the blanks with suitable prepositions:*
$$(4 \times \frac{1}{2} = 2)$$

(a) In future, houses may be erected .... built-in computers controlling everything .... paying bills .... opening doors and regulating the entry ..... people.

(b) *Rewrite as directed* :

(i) I gave ₹ 1,000 to my brother. I also, gave ₹1,000 to my sister .

    (use either.... or ...). (2)

(ii) Alloy steels as well as plain carbon steels may be classified according to their ability to harden. *(Change the voice.)* (2)

(iii) I must finish the work today.

    (Add a question tag.) (2)

(iv) The people of India loves their culure and tradition.

    (Rewrite the sentence correctly.) (2)

(b) *Write ONE word substitution to any TWO of the following :* (2)

(i) One who is unable to pay one's debts.

(ii) That which cannot be recovered.

(iii) One who is able to make an eloquent speech.

(iv) A person who comes as a settler into a foreign country.

(v) *Match the column :* (3)

Exaggerate - adroit.

Clumsy - Uncritical.

Fastidious - Understate.

0 1 1 6

B.E. DEGREE EXAMINATION, 2013

(COMMON TO ALL BRANCHES)

(FIRST YEAR)

102. ENGINEERING MATHEMATICS - I

(Revised Pattern)

(Those who joined during 2011-12
and after)

May]   [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

Turn Over

UNIT – I

1. (a) Using Cayley- Hamilton theorem, to find the inverse of (7)

$$\begin{pmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{pmatrix}$$

(b) Diagonalize the matrix : (8)

$$\begin{pmatrix} -1 & 2 & -2 \\ 1 & 2 & 3 \\ 1 & 1 & 1 \end{pmatrix}$$

(OR)

2. (a) Discuss the maxima and minima of

$$f(x, y) = x^3 y^2 (1 - x - y).$$ (7)

(b) Find the circle of curvature at the point

$$\left(\frac{a}{4}, \frac{a}{4}\right)$$ of the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$

(8)

UNIT - II

3. (a) Solve :

$$(D^2 - 4D + 3) y = \sin 3x \cdot \cos 2x.$$

(7)

(b) Solve the following simultaneous equations :

$$\frac{dx}{dt} + y = \sin t;$$

$$\frac{dy}{dt} + x = \cos t;$$

given that $x = 2$ and $y = 0$ when $t = 0$.

(8)

(OR)

4. (a) Solve :

$$(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y =$$

$$2\sin[\log(1+x)].$$

(7)

Turn Over

(b) For a series LCR circuit with *emf* E_0 sin wt, derive the expression for steady state current by solving :

$$L\frac{d^2I}{dt^2} + R\frac{dI}{dt} + I/_C = wE_0\cos wt \qquad (8)$$

UNIT - III

5. (a) Find the directional derivative of

$$f(x, y, z) = xy^2 + yz^3$$

at the point (2, –1, 1) in the direction of vector $\vec{i} + \vec{2j} + \vec{2k}$. (7)

(b) Change the order of integration in

$$\int_0^1 \int_0^{2\sqrt{x}} x^2 \, dx \, dy$$

and hence evaluate. (8)

(OR)

6. (a) A vector field is given by

$$\vec{F} = (x^2 - y^2 + x)\vec{i} - (2xy + y)\vec{j}$$

Show that the field is irrotational and find its scalar potential. (7)

(b) Verify Stoke's theoem for

$$\vec{F} = (x^2 + y^2)\vec{i} - 2xy\vec{j}$$

taken around the rectangle bounded by the lines

$$x \pm a,$$

$$y = 0, y = b. \qquad (8)$$

UNIT - IV

7. (a) Find analytic function, whose real part is

$$\frac{Sin2x}{Cosh2y - Cos2x} \qquad (7)$$

(b) Discuss the mapping w = cos z. (8)

(OR)

8. (a) Expand

$$F(z) = \frac{1}{(z-1)(z-2)}$$

in the region $|z| > 2$ as a Laurent's series. (7)

Turn Over

(b) Evaluate :

$$\int_c \frac{z^2 - z + 1}{z - 1} \, dz$$

where c is the circle

(i) $|z| = 1$.

(ii) $|z| = \frac{1}{2}$.   (8)

UNIT - V

9. (a) Find

$$L\left(\frac{\sin at}{t}\right)$$

given that

$$L\left(\frac{\sin at}{t}\right) = \tan^{-1}\left(\frac{1}{s}\right).$$ (7)

(b) Find the inverse transforms of

(i) $\dfrac{s+2}{s^2 - 4s + 13}$

(ii) $\dfrac{s^2}{(s-2)^3}$ (4+4)

(OR)

10. (a) Using convolution theorem, evaluate :

$$L^{-1}\left[\frac{s}{(s^2 + a^2)^2}\right]$$ (7)

(b) Solve :

$$\frac{dx}{dt} - y = e^t;$$

$$\frac{dy}{dt} + y = \sin t;$$

given

$x(0) = 1$

$y(0) = 0$

by using Laplace transforms.   (8)

Register Number :

Name of the Candidate :

0 1 1 7

B.E. DEGREE EXAMINATION, 2013

(FIRST YEAR)

103. ENGINEERING PHYSICS

(Revised Pattern)

(For those who joined 2011 - 12 after)

May]   [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL questions from each unit.
ALL questions carry EQUAL marks.

$(5 \times 15 = 75)$

UNIT – I

1. (a) What are the different types of elastic moduli? Derive the necessary mathematical relation for them.   (8)

Turn Over

(b) Distinguish between streamline and turbulent flow. (7)

(OR)

2. (a) Derive an expression for Sabine's mathematical relation for reverberation time. (8)

(b) Explain how the ultrasonic waves are produced using a magnetostriction oscillator. (7)

UNIT – II

3. (a) Explain the construction and working of Ruby laser. (8)

(b) Write a note on fiber material. (7)

(OR)

4. (a) Describe the construction and working of Michelson interferometer. (8)

(b) Write a short note on the resolving power of a grating. (7)

UNIT – III

5. (a) What is packing factor? Prove that the Packing fraction of hcp is ·074. (8)

(b) What are Miller indices? How will you determine the Miller indices of a given plane? (7)

(OR)

6. (a) Explain the construction and working of Bragg's spectrometer. (8)

(b) Write a short note on Schotty defect. (7)

UNIT – IV

7. (a) Derive an expression for electrical conductivity based of electron in metal.(8)

(b) Write a short note on high temperature super conductivity. (7)

(OR)

8. (a) Distinguish between N-types, P-types semiconductor. (7)

   (b) Describe the properties and application of metallic glasses. (8)

UNIT – V

9. (a) Obtain an expression for De-Broglie wavelength and mention the properties of matter waves. (8)

   (b) Derive the Schrondinger time independent wave equation. (7)

(OR)

10. (a) Explain the construction and working of G.M counter. (8)

   (b) Write a short note on the interstellar energy processor. (7)

Register Number :

Name of the Candidate :

0 1 1 8

B.E. DEGREE EXAMINATION, 2013

(Common to ALL Branches)

(FIRST YEAR)

104. ENGINEERING CHEMISTRY

(Revised Pattern)

(For those who joined during 2011-12 and after)

May]   [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

UNIT – I

1. (a) Discuss any two boiler troubles of boiler feed water.   (7)

   (b) Define COD. Explain the determination of COD in sewage water.   (8)

(OR)

Turn Over

2. (a) What is desalination? How is it carried out? (7)

(b) Explain the causes and effects of ozone layer depletion. (8)

UNIT - II

3. (a) Derive Freundlich adsorption isotherm. (7)

(b) Give the preparation, properties and uses of vinyl resins, polyamids. (8)

(OR)

4. (a) Derive Langmuir adsorption isotherm. (7)

(b) Compare thermoplastic and thermosetting plastics. (8)

UNIT - III

5. (a) Discuss the ultimate analysis of coal. (7)

(i) Hydrogen and oxgen content.

(ii) Nitrogen content.

(b) Write a short note on : (8)

(i) Knocking in petrol and diesel engines.

(ii) Octane and cetane number.

(OR)

6. (a) Describe the method of manufacture of synthetic petrol. (7)

(b) Explain the construction and working of solar cells. (8)

UNIT - IV

7. (a) Explain the construction and working of galvanic cell. (7)

(b) Describe the protection methods of sacrifical anodic method and impressed voltage method. (8)

(OR)

8. (a) Discuss the mechanism of electrochemical corrosion. (7)

Turn Over

(b) Give an account of tinning and galvanising. (8)

UNIT - V

9. (a) What are abrasives? Give the preparation, properies and uses of abrasives. (7)

(b) Write short notes on preparation of carbon nano tubes. (8)

(OR)

10. (a) Discuss the properties of lubricants. (7)

(b) Give an account of nano composites. (8)

0 1 1 9

B.E. DEGREE EXAMINATION, 2013

(ANNUAL PATTERN)

(FIRST YEAR)

105. ENGINEERING MECHANICS

(Revised Pattern)

(Those who joined during 2011-12 and after)

May]   [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.
Assume suitable data wherever necessary.
EACH question carries FIFTEEN marks.

UNIT – I

1. (a) State the law of parallelogram of forces and its use.   (5)

Turn Over

(b) A weight of 800 N is supported by two chains as shown in the figure-1. Determine the tension in each chain.(10)
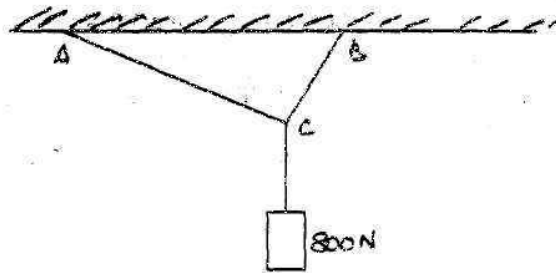

Figure -1

(OR)

2. (a) Discuss the classification of force system. (5)

(b) Four coplanar forces are acting at a point as shown in the figure-2. Determine both the magnitude and direction of resultant force. (10)
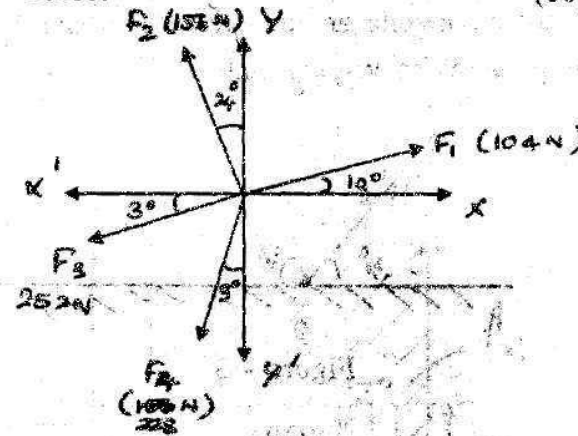

Figure -2

UNIT - II

3. (a) What are the different types of parallel forces? Differentiate between moment of a force and couple. (5)

(b) A ball of weight 120 N rests in a right angles grove as shown in the figure-3. The sides of the grove are inclined at an angle of 30° and 60° to horizontal. If all

Turn Over

the surfaces are smooth, then determine the reaction R_A and R_C at the point of contact. (10)
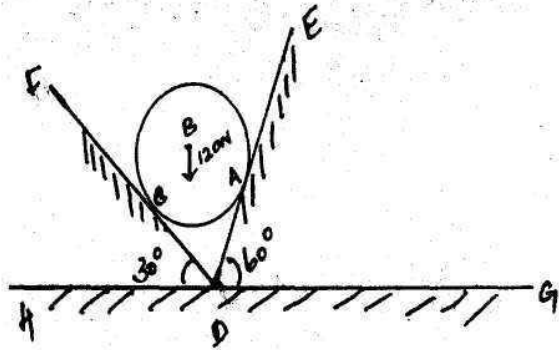

Figure - 3

(OR)

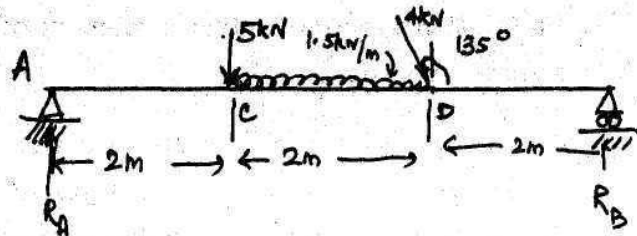4. A beam AB, 6 m long is loaded as shown in figure-4. Determine the reaction at A and B by analytically. (15)

Figure - 4

UNIT - III

5. From a rectangular lamina ABCD 10 cm × 12 cm a rectangular hole of 3 cm × 4 cm is cut as shown in figure-5. Find the centre of gravity of the remaining lamina. (15)

Figure -5

(OR)

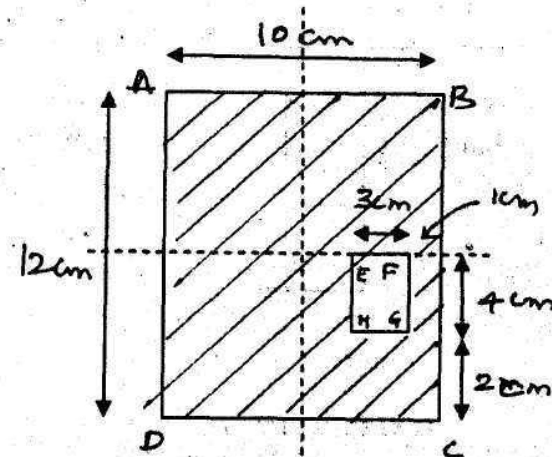**Turn Over**

6. Determine the moment of inertia about the horizonatal and vertical axis passing through the centre of gravity of the T-section of dimensions 10 cm × 10 cm × 2 cm. (Figure-6) (15)
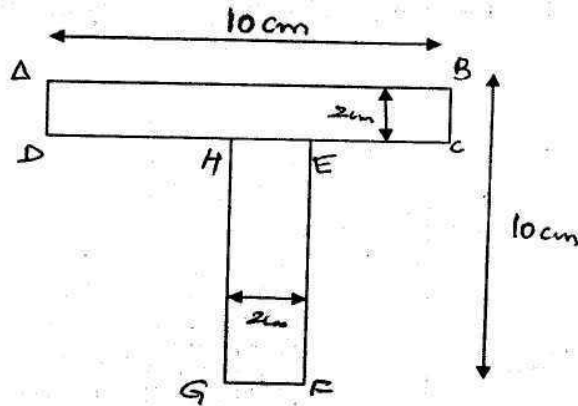

Figure - 6

UNIT - IV

7. (a) Define the term obliquity and how it is determined. (5)

(b) Direct stresses of 120 N/mm^2 tensile and 90 N/mm^2 compression exists on two perpendicular planes at a certain point in a body. They are also accompanied by shear stress on the planes. The greatest

principal stress at the point due to these is 150 N/mm^2. Calculate the magnitude of shear stress on the two planes. (10)

(OR)

8. An elemental cube is subjected to tensile stress of 30 N/mm^2 and 10 N/mm^2 acting on two mutually perpendicular planes and a shear stress of 10 N/mm^2 on these planes. Draw the Mohr's circle of stresses and hence, determine the magnitudes and direction of principle stresses. (15)

UNIT - V

9. (a) Differentiate velocity ratio and mechanical advantage. (5)

(b) An effort of 20 N is applied to a machine to lift a load of 900 N. The distance moved by the effort is 2·40 m and by the load the distance moved is 4 cm. Determine :

(i) Mechanical advantage.

(ii) Velocity ratio of the machine.

(iii) Efficiency of the machine.

(iv) Ideal effort required. (10)

(OR)

10. (a) State the working of second order and third order pulley. (5)

(b) A screw jack is used to lift a load of 3 kN. The screw of the screw jack is square threaded with two threads to 1·2 cm. If the co-efficient of friction between the nut and screw is 0·09 and the outer diameter of the screw is 6 cm, find the force at the end of the handle of length 60 cm to lift the load. (10)

Register Number :

Name of the Candidate :

0 1 2 0

B.E. DEGREE EXAMINATION, 2013

(Common to ALL Branches)

(FIRST YEAR)

106. BASIC ENGINEERING

(Revised Pattern)

(Those who joined during 2011-12 and after)

May]   [Time : 3 Hours

Maximum : 75 Marks

Attempt ALL from each unit.

Draw neat sketches wherever necessary.

ALL questions carry EQUAL marks.

PART - A   (25)

(CIVIL ENGINEERING)

UNIT – I

1. (a) State the scope of civil engineering.

(4)

Turn Over

(b) Explain the properties of building materials. (9)

(OR)

2. (a) State the differences between plain cement concrete and reinforced cement concrete. (4)

(b) Explain the components of building with a neat sketch. (9)

UNIT - II

3. (a) State the classifications of building as per BIS. (4)

(b) Explain the component of bridges with a neat sketch. (8)

(OR)

4. (a) State the significance and objectives of protected water supply. (4)

(b) Explain the domestic waste water treatement with a neat flow diagram.(8)

PART - B (25)

(MECHANICAL ENGINEERING)

UNIT – I

5. (a) List any four mounting of boiler and state their function. (5)

(b) Explain the principle of working of an open cycle and closed cycle gas turbine with a neat sketch. (8)

(OR)

6. (a) Compare two stroke and four stroke IC engine. (5)

(b) Discuss the principle and working of simple carburetor with a neat sketch.(8)

UNIT - II

7. (a) Explain the principle and working of carbon arc welding. (5)

(b) Draw a neat sketch of Column and Knee type milling machine and explain its working. (7)

(OR)

Turn Over

8. (a) State the advantages and disadvantages of gas welding. (5)

   (b) Explain the working and application of Bevel gears with a neat sketch. Mention the important advantages. (7)

PART - C (25)

(ELECTRICAL ENGINEERING)

UNIT - I

9. (a) Three loads A, B and C are connected in parallel to a 240 volt source. Load -A takes 9·6 KW, Load-B takes 60 Amp. and Load-C is a resistance of 4·8 Ω. Calculate :

   (i) R_A and R_B,

   (ii) The total equivalent resistance of the three loads

   and (iii)The total current. (6)

   (b) A series RL circuit with R = 25 Ω, and L = 0·02 H is connected to a 250 V, 50 Hz source. Calculate :

   (a) The impedance,

   (b) Current,

   (c) Power

   and (d) Power factor. (7)

(OR)

10. (a) With a neat diagram, explain the working principle of single phase transformer. (6)

   (b) Explain the working of dynamometer type Wattmeter with diagram. (7)

UNIT - II

11. (a) Discuss about active and passive components. (6)

   (b) Draw the input and output characteristics of BJT in CE mode and explain. (6)

(OR)

Turn Over

12. (a) Explain the basic logic gates with symbols and truth tables. (6)

(b) Describe the function of Modem with neat diagram. (6)

Register Number :

Name of the Candidate :

0 1 2 1

B.E. DEGREE EXAMINATION, 2013

(Common to ALL Branches)

(FIRST YEAR)

107. ENVIRONMENTAL STUDIES

(Revised Pattern)

(For the students who joined during 2011-12 and after)

May]   [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.

ALL questions carry EQUAL marks.

UNIT — I

1. (a) Give a detailed account of the methods of exploitation of water and what backlashes are expected from them (8)

Turn Over

(b) Explain the various soil conservation methods. (7)

(OR)

2. (a) Discuss the impacts of modern agriculture on the environment. (7)

(b) Give a detailed account of geothermal energy. (8)

UNIT - II

3. Give a detailed account of how the transfer of energy and materials are taking place continuously while the ecosystem continues to be stable. (15)

(OR)

4. (a) Give a detailed account of the process of succession in a terristial ecosystem. (7)

(b) Discuss how the grassland ecosystem have been termed as the greatest farmlands on earth. (8)

UNIT - III

5. (a) Explain the various causes for the loss of biodiversity. (7)

(b) Describe the ecological significance of biodiversity. (8)

(OR)

6. What is meant by extinction? Illustrate with examples. (15)

UNIT - IV

7. Explain the effects of air pollution and the various control measures adopted for air pollution. (15)

(OR)

8. (a) Explain the various sources of marine pollution. (7)

(b) Explain the measures you would take in case of cyclones. (8)

Turn Over

UNIT - V

9. What is an environmental impact assessment? Describe the process in detail. (15)

(OR)

10. (a) Enumerate the salient provisions of Air (Prevention and Control of Pollution) Act, 1981. (7)

(b) Discuss the factors that affect the population growth. (8)

B.E. DEGREE EXAMINATION, 2013

(CIVIL /STRUCTURAL / MECHANICAL ENGINEERING)

(FIRST SEMESTER)

PCLEC-101/PCSEC-101/PMEEC-101-MATHEMATICS-I
(New Regulations)

May)

(Time: 3 Hours

Maximum: 75 Marks

(Max: 60 marks those who joined before 2011-12)

Answer any ONE FULL question from each unit   (5×15=75)

All questions carry equal marks

UNIT-I

1. Verify Cayley-Hamilton theorem and find inverse of $\begin{pmatrix} 6 & -2 & 2 \\ -2 & 1 & -1 \\ 2 & -1 & 2 \end{pmatrix}$ (15)

(OR)

2. Reduce the quadratic form $8x^2+7y^2+3z^2-12xy-8yz+4xz$ to a cannonical form by orthogonal reduction.   (15)

UNIT-II

3. a) Find $\frac{dy}{dx}$ if $x^y=y^x$.   (7)

   b) Find the minimum value of $x^2+y^2+z^2$ subject to $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=1$.   (8)

(OR)

4. a) If $x =\cosh \phi \cos \vartheta$, $y=a \sinh \phi \sin \vartheta$ the n find $\frac{\partial(x,y)}{\partial(\phi,\vartheta)}$.   (7)

   b)Expand Taylor's series for $f(x)= x^2y+\sin y+e^x$ in $(1,\pi)$ (8)

UNIT-III

5. a) Find the equation of the plane passing through the points (2,5,-3), (-2,-3,5) and (5,3,-3).   (7)

   b) Find the equation of the plane passing through the line of intersection of the planes $2x-5y+z=3$ and $x+y+4z=5$ and parallel to the plane $x+3y+6z=1$.   (8)

(OR)

6. a) Find the equation of the line through the point (-2,3,4) and parallel to the planes $2x+3y+4z=5$ and $3x+4y+5z=6$.   (7)

   b) Find the shortest distance between the lines $2x+y-z=0 = x-y+2z$ and

   $x+2y-3z-4=0 = 2x-3y+4z-5$.   (8)

UNIT-IV

7. a) Find the equations to the spheres which passes through the circle $x^2+y^2+z^2=1$, $2x+4y+5z=6$ and touches the plane $z=0$. (7)

    b) Find the equation of the sphere passing through the points (1,2,3) (0,-2,4) (4,-4,2) and (3,1,4) (8)

(OR)

8. a) Find the centre and radius of the circle given by $x^2+y^2+z^2-2x-4y-6z-2=0$ and $x+2y+2z-20=0$. (7)

    b) Find the equation of the cone with verten(5,4,3) and with $3x^2+2y^2=6$, $y+z=0$ is base. (8)

UNIT-V

9.
    a) Evaluate $\int_{0}^{\pi}\dfrac{x\tan x}{\sec x+\tan x}dx$ (8)

    b) Evaluate $\iiint_{R}(x-y+z)dx\,dy\,dz$, where R is given by $1 \le x \le 2$; $2 \le y \le 3$; $1 \le z \le 3$. (7)

(OR)

10. a) Obtain the reduction formula for $\int\cos^n x\,dx$. (7)

    b) Show that $\beta(m,n) = \dfrac{\Gamma(m)\,\Gamma(n)}{\Gamma(m+n)}$. (8)

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B.E. DEGREE EXAMINATION, 2013

(CIVIL /STRUCTURAL / MECHANICAL ENGINEERING)

(SECOND SEMESTER)

PCLEC-201/PMEEC-201/PSEC-201.MATHEMATICS-II

May) (*Time: 3 Hours*

Maximum: 75 Marks
(Max: 60 marks those who joined before 2011-12)

Answer any ONE FULL question from each unit
All questions carry equal marks

UNIT-I

1. a) Prove that $\dfrac{Sin7\theta}{Sin\theta} = 7 - 56\,Sin^2\theta + 112\,Sin^4\theta - 64\,Sin^6\theta$. (6)

    b) If $sin(\theta + i\phi) = Cosd + i\,sind$; prove that $t\,Cos^2\,\theta = \pm\sin\alpha$. (6)

    (OR)

2. a) Prove that $Sin^5\theta = \dfrac{1}{16}[Sin5\theta - 5Sin3\theta + 10Sin\theta]$. (6)

    b) If $cos(x+iy) = Cos\theta + iSin\theta$ show that $Cos2x + Cosh2y = 2$. (6)

UNIT-II

3. a) Solve $\dfrac{d^2y}{dx^2} + 3\dfrac{dy}{dx} + 2y = Sin3x$. (6)

    b) Solve $x^2\dfrac{d^2y}{dx^2} + 4x\dfrac{dy}{dx} + 2y = \log x$. (6)

    (OR)

4. a) Solve the Simultaneous equations.

    $\dfrac{dy}{dt} + 2x + 3y = 2e^{2t}$; $\dfrac{dx}{dt} + 3x + 2y = 0$ (6)

    b) Solve $(x+1)^2\dfrac{d^2y}{dx^2} + (x+1)\dfrac{dy}{dx} + y = 4\cos(\log(x+1))$. (6)

UNIT-III

5.

a) Solve $\dfrac{d^2y}{dx^2} + 4y = Sec2x$, by the method of variation of parameters. (6)

b) Solve the equation $x^2y'' + xy' + (x^2 - \dfrac{1}{4})y = 0$ by reducing it to the normal form. (6)

(OR)

6.

a) Solve by the method of variation of parameter $\dfrac{d^2y}{dx^2} + y = \tan x$. (6)

b) Solve $\dfrac{d^2y}{dx^2} + \tan x \dfrac{dy}{dx} - y\cos^2 x = 0$ by changing the independent variable. (6)

UNIT-IV

7.

a) Find the angle between the surfaces $x \log z = y^2 - 1$ and $x^2 y = 2 - z$ at the point (1,1,1). (6)

b) Find the constants a,b,c so that $\vec{F} = (x + 2y + az)\vec{i} + (bx - 3y - z)\vec{j} + (4x + cy + 2z)\vec{k}$ is irrotational. (6)

8.

a) If $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$ such that $|\vec{r}| = r$ prove that i) $\nabla(\dfrac{1}{r}) = \dfrac{-\vec{r}}{r^3}$

ii) $\nabla(r^n) = nr^{n-2}\vec{r}$ (3+3)

b) Prove that $\vec{F} = (y^2 \cos x + z^3)\vec{i} + (2y\sin x - 4)\vec{j} + 3xz^2\vec{k}$ is irrotational and find its scalar potential. (6)

UNIT-IV

9.

Verify Stoke's theorem for a vector field defined by $\vec{F} = (x^2 - y^2)\vec{i} + 2xy\vec{j}$ in the rectangular region in the xoy-plane bounded by the lines x = 0, y=0, x=a, y=b. (12)

(OR)

10.

Verify Gauss divergence theorem for the function $\vec{F} = y\vec{i} + x\vec{j} + z^2\vec{k}$ over the cylindrical region bounded by $x^2 + y^2 = 9$, z = 0 and z = 2

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B.E. DEGREE EXAMINATION, 2013

(MECHANICAL ENGINEERING)

(SECOND SEMESTER)

PMEEC-205.ELECTRONICS

May]   [Time: 3 Hours

Maximum: 75 Marks

(Max: 60 marks those who joined before 2011-12)

Answer any ONE Question from each UNIT
All questions carry equal marks

UNIT-I

1. a) Explain the forward Bais of P-N junction and draw the characteristics.
                                                                                        (8)
    b) Discuss the operation of UJT and draw the characteristics.   (7)

(OR)

2. a) Explain the full wave rectifier operation and derive the expression for Ripple factor.
                                                                                        (7)
    b) Write short notes on zener voltage regulators.   (8)

UNIT-II

3. Draw and explain common emitter amplifier operation and derive the voltage gain and current gain.   (15)

(OR)

4. a) Explain complementary symmetry class B push-pull amplifier.   (10)

    b) Discuss the cross over distortion.   (5)

UNIT-III

5. a) Discuss the operation SCR and draw the characteristics.   (8)

    b) Explain the DC shunt motor speed control.   (7)

(OR)

6. a) List the ideal characteristics of operation amplifier.   (7)

    b) Explain any two applications of operational amplifier.   (8)

UNIT-IV

7. a) Explain the universal gate.   (8)

    b) Discuss the operation of J-K flip flop.   (7)

(OR)

8. Design a modulo 9 counter and draw the output wave form.   (15)

UNIT-V

9. Draw and explain any one Microprocessor Based Application.   (15)

(OR)

10. With suitable block diagram explain the general Microprocessor.   (15)

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Register Number:

0542

Name of the Candidate:

B.E. DEGREE EXAMINATION, 2013

(ELECTRICAL AND ELECTRONICS ENGINEERING)

(SECOND SEMESTER)

PEEEC-201. MATHEMATICS - II

(New Regulations)

May]

[Time : 3 Hours

Maximum : 75 Marks

(Maximum : 60 marks for those who joined before 2011-2012)

Answer any ONE FULL question from each unit
All questions carry equal marks

UNIT-I

1. a) Solve : $\dfrac{d^2y}{dx^2} + 4y = x^4 + \cos^2 x$ (7)

   b) Solve : $\dfrac{dx}{dt} + y = \cos t$; $\dfrac{dy}{dt} + x = \sin t$ (8)

(or)

2. a) Solve : $\dfrac{d^2y}{dx^2} + 4\dfrac{dy}{dx} + 3y = e^{-x}\sin x + 4e^{-3x}$ (7)

   b) Solve : $x^2\dfrac{d^2y}{dx^2} + 3x\dfrac{dy}{dx} + 5y = x\cos(\log x) + 3$. (8)

UNIT-II

3. a) Find the singular integral of the partial differential equation. (5)

   $Z = px + qy + p^2 - q^2$

   b) Solve : $y^2 p - xyq = x(z - 2y)$ (6)

   c) Eliminate the arbitrary function f from $Z = f\left(\dfrac{xy}{z}\right)$ and form the partial differential equation. (4)

(or)

4. a) Form the partial differential equation by eliminating the arbitrary constant a and b from $\log_e = (az - 1) = x + ay + b$ (7)

   b) Solve : $(D^2 + DD^1 - 6D^{12})\ Z = \cos(2x + y) + e^{3x-y}$ (8)

UNIT-III

5. a) Find the Fourier Series for $f(x)=|x|$ in $(-\pi,\pi)$ and deduce that (7)

$$\frac{1}{1^2}+\frac{1}{3^2}+\ldots\ldots+\frac{1}{5^2}=\frac{\pi^2}{8}.$$

   b) Find the complex form of Fourier series of f(x)=sin x in (0<x<2). (8)

(or)

6. a) Find the half-range cosine series for $f(x)=x(\pi-x), 0<x<\pi$. And also deduce (8)

that $\frac{1}{1^4}+\frac{1}{2^4}+\frac{1}{3^4}+\ldots\ldots=\frac{\pi^4}{90}$.

   b) Find the Fourier series of f(x) = 2, -2 < x < 0 (7)

= x,   0 < x < 2

and also deduce that $1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\ldots\ldots=\frac{\pi}{4}$.

UNIT-IV

7. An insulated rod of length 20 cms has its ends A and B maintained at 0°C and 100°C (15) respectively until steady state conditions prevail. If the temperature at B is suddenly lowered to 0°C and maintained, find the subsequent temperature distribution in the rod at any time t.

(or)

8. A string is stretched and fixed at the points x=0 and x=40 and the points of the string (15) are given initial velocity.

$$V=\frac{Kx}{20}, \text{ if } 0<x<20$$

$$=\frac{K}{20}(40-x), \text{if } 20<x<40 \text{ where } x \text{ is the distance from the end x=0. Find the}$$

displacement of the string at any time t.

UNIT-V

9. a) Find $L^{-1}\left[\frac{S^2+16}{(S^2+1)(S^2+4)}\right]$ (5)

   b) Evaluate : $\int_0^\infty e^{-t}\frac{\sin^2 t}{t}dt$ (5)

   c) Find $L^{-1}\left[\tan^{-1}\left(\frac{2}{s}\right)\right]$ (5)

(or)

10. a) Find the Laplace transform of the wave function of period T as (5)

$f(t)=\frac{t}{T}, 0<t<T$ and $f(t+T)=f(t)$.

   b) Solve : $\frac{d^2y}{dt^2}+6\frac{dy}{dt}+9y=2e^{-3t}, y(o)=1$ and $y'(0)=-2$ by using Laplace (10) Transform.

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B.E. DEGREE EXAMINATION, 2013

(COMMON TO ALL BRANCHES)
(THIRD SEMESTER)

MEEC-301. MATHEMATICS-III
(Old Regulations)
(For the students joined during 2006-07 batch and before)

May)   (Time: 3 Hours

Maximum: 60 Marks
Answer any ONE FULL question from each unit
All questions carry equal marks

UNIT-I

1. a) Express Sinhax in Fourier series of periodicity 2π for $-\pi < x < \pi$ (6)

   b) Find the complex Fourier series for $f(x)=e^{x}, -\pi < x < \pi$ (6)

                                    (OR)

2. a) Expand the function $f(x)=Sinx$, $0<x<\pi$ in Fourier cosine Series.   (6)

   b) Find Fourier Series of periodicity 2 for f(x), given
            $f(x)= 0$, in $-1<x<0$
                 $= 1$, in $0<x<1$ (6)

UNIT-II

3. a) Form the partial differential equation by eliminating the arbitary constants $Z= ax^{n}+by^{n}$.   (6)

   b) Solve $(D^{3} - 7DD'^{2} - 6D'^{3}) Z = Sin(x+2y)$.   (6)

                                    (OR)

4. a) Solve $x^{2}p^{2}+y^{2}q^{2}=z^{2}$.   (6)

   b) Find the general solution of $x(z^{2}-y^{2})p+y(x^{2}-z^{2})q=Z(y^{2}-x^{2})$ (6)

UNIT-III

5. a) Find $L\left[\dfrac{\cos at - \cos bt}{t}\right]$ (6)

   b) Find $L^{-1}\left[\dfrac{4s+5}{(s-1)^{2}(s+2)}\right]$ (6)

                                    (OR)

6. Solve $(D^{2}+2D+5)y=e^{-t}sint$, $y(0)=0$, $y'(0)=1$.   (12)

UNIT-IV

7. a) If f(z) is an analytic function, then prove that $\left(\dfrac{\partial^2}{\partial x^2}+\dfrac{\partial^2}{\partial y^2}\right)|f(z)|^2 = 4(f'(z))^2$. (6)

   b) Find the bilinear transformation mapping the points Z=1, i,-1 into points w=2, i,-2 (6)

(OR)

8. a) Show that the transformation $w = \dfrac{1}{z}$ transforms circles and straight lines in the z plane into circles (or) straight lines in the co-plane. (6)

   b) Prove that an analytic function with constant real part is constant. (6)

UNIT-V

9. a) Evaluate $\int\dfrac{z+4}{z^2+2z+5}\,dz$, where C is the circle |z+1+i|=2. (6)

   b) Using Cauchy's Residues theorem, evaluate $\int_C\dfrac{4-3z}{z(z-1)(z-2)}dz$, where C is the circulate |z|=3/2. (6)

(OR)

10. a) Expand $\dfrac{1}{(z-1)(z-2)}$ in Laurent's series valid in the region 0<|z-2|<1. (6)

   b) Using Contour integration, prove that $\int_0^{\alpha}\dfrac{\cos mx}{x^2+a^2}dx = \dfrac{\pi}{2a}e^{-mx}, m \ge 0$ (6)

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