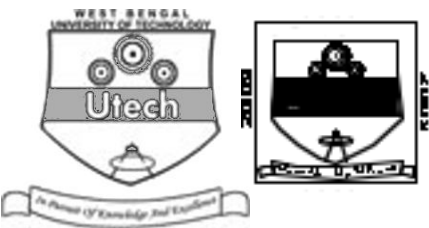


NAUTICAL PHYSICS & ELECTRONICS - II (SEMESTER - 2)

CS / BNS / SEM-2 / BNS-202 / 09



1.
Signature of Invigilator

2.
Signature of the Officer-in-Charge

Reg. No.

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Roll No. of the Candidate

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CS / BNS / SEM-2 / BNS-202 / 09

ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2009

NAUTICAL PHYSICS & ELECTRONICS - II (SEMESTER - 2)

Time : 3 Hours]

[Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
b) For **Groups – B & C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

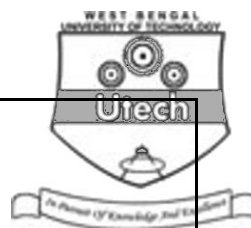
FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

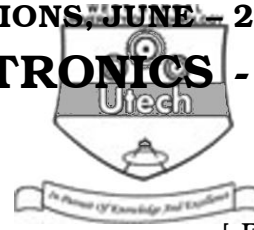
Group – A								Group – B				Group – C				Total Marks	Examiner's Signature
Question Number																	
Marks Obtained																	

Head-Examiner/Co-Ordinator/Scrutineer

2256 (05/06)



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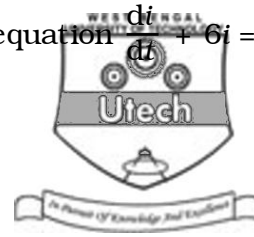
[Full Marks : 70

(Multiple Choice Type Questions)

- <http://www.makaut.com/>



- v) A first order circuit is described by a differential equation $\frac{di}{dt} + 6i = 0$, the natural frequency of the circuit is



- a) 6
b) 1
c) $\frac{1}{6}$
d) none of these.

- vi) The power factor of a purely resistive circuit is

- a) 0
b) 0.8
c) 1
d) 0.6

- vii) For lap-connected dc machine,

- a) $A = 4$
b) $A = P$
c) $A = 2$
d) none of these.

- viii) In a series L - C - R circuit $R = 200 \Omega$, $X_L = 400 \Omega$ and $X_C = 200 \Omega$. The phase angle of the circuit is

- a) 0°
b) 30°
c) 45°
d) 90° .

- ix) At a certain place the horizontal component is equal to the vertical component. The angle of dip at the place is

- a) 0°
b) 30°
c) 45°
d) 90° .

- x) Lenz's law is in accordance with the law of

- a) conservation of mass
b) conservation of energy
c) conservation of momentum
d) conservation of matter.



5

GROUP – B**(Short Answer Type Questions)**Answer any *three* of the following. $3 \times 5 = 15$

2. a) What do you mean by 'breakdown' of a diode ? Classify it. 1 + 2
 b) In the given figure, $V_Z = 5.6 \text{ V}$, $P_{Z \text{ max}} = 0.25 \text{ W}$ and $V_{i \text{ max}} = 10 \text{ V}$. Calculate the value of R_s . 2

Dia.

3. Distinguish between wet card and dry card compass. 5
 4. A fullwave rectifier in a *d.c.* backup supply system of a passenger vessel uses two diodes of forward resistance 18Ω . The transformer *rms* secondary voltage from centre tap to each end of secondary is 12 V and load resistance is 48Ω .
 Find :
 a) Mean load current
 b) *rms* value of load current
 c) efficiency of the rectifier. 5
 5. Establish the relation between angle of dip and latitude of place. 5

GROUP – C**(Long Answer Type Questions)**Answer any *three* of the following. $3 \times 15 = 45$

6. a) What is radiocarbon dating ?
 b) What is radiation hazard ?
 c) What is a nuclear reactor ? Draw the diagram and describe its working.
 d) What are work function and threshold frequency ?

The work function of a particle is 2.0 eV . Light of wavelength 3000 \AA is used to cause emission. Find the stopping potential and velocity of most energetic electrons.

 $3 + 2 + (1 + 4) + (2 + 3)$



7. a) What are meant by magnetic storm and annular variation ?
- b) Define the following :
- Magnetic equator
 - Deviation
 - Variation
 - Compass error.
- c) From where will you obtain the values of variation and deviation ? What is the deviation card on ship ?
8. a) An L-C-R circuit having a resistance of 5Ω and inductance of 0.4 H and a variable capacitance in series is connected across a 110 V , 50 Hz supply
- Calculate :
- The value of capacitance to give resonance
 - The current
 - Voltage across the capacitance
 - Voltage across the inductance
 - Q -factor of the circuit.
- b) Determine the half-life of a radioactive material of its activity falls to $\frac{1}{16}$ th of its initial value in 30 years. 10 + 5
9. a) Draw a labelled circuit diagram of a fullwave rectifier using $p-n$ junction diodes.
- b) A 4-pole DC shunt generator has lap connected armature winding. It has 500 armature conductors and is rotating with 700 rpm . Determine the generated emf if the field flux per pole is 3 m Wb .
- c) A transistor in common emitter mode has collector supply voltage of 14 V and the voltage drop across the $1.5 \text{ k}\Omega$ load resistance is 0.75 V . Determine the collector to emitter voltage and the base current if α is 0.96 . 5 + 5 + 5

END