FACULTY OF BASIC AND APPLIED SCIENCES
DEPARTMENT OF PHYSICS
RAIN SEMESTER 2017/2018 SESSION EXAMINATION

B

...GENERAL PHYSICS II CODE: PHY 102 UNIT: 3 Time: 1½ Hours

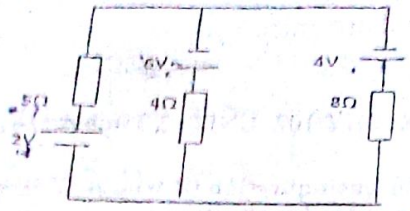
...Attempt Questions 1 – 35
...workings in the space provided after each question (it will be graded) and
...corresponding to your answer on the objective sheet.
...NO ATTACH ANY SHEET

NO: ..... DEPT: .....

C	D	E	13	A	B	C	D	E	25	A	B	C	D	E
C	D	E	14	A	B	C	D	E	26	A	B	C	D	E
C	D	E	15	A	B	C	D	E	27	A	B	C	D	E
C	D	E	16	A	B	C	D	E	28	A	B	C	D	E
C	D	E	17	A	B	C	D	E	29	A	B	C	D	E
C	D	E	18	A	B	C	D	E	30	A	B	C	D	E
C	D	E	19	A	B	C	D	E	31	A	B	C	D	E
C	D	E	20	A	B	C	D	E	32	A	B	C	D	E
C	D	E	21	A	B	C	D	E	33	A	B	C	D	E
C	D	E	22	A	B	C	D	E	34	A	B	C	D	E
C	D	E	23	A	B	C	D	E	35	A	B	C	D	E
C	D	E	24	A	B	C	D	E						

1. Kirchhoff's current and voltage laws are respectively statements of the laws of conservation of (A) field and wave (B) energy and momentum (C) charge and energy (D) proton and magnetron (E) energy and electron.

Use the information below to answer questions 2, 3 and 4



2. The current through the 5-Ω resistor is: (A) 4.28 A (B) 0.956 A (C)1.212A (D) 2.141A (E) 0.324A

3. The current through the 4-Ω resistor is: (A) 1.14 A (B) 0.478 A (C) 0.804 A (D) 1.106 A (E) 0.162 A

4. The current through the 8-Ω resistor is: (A) 0.478 A (B) 0.114 A (C) 0.106 A (D) 0.152 A (E) 1.14 A

5. When two or more resistors are connected in series, all the statements below are correct except i) The equivalent resistance is larger than the largest single resistance in the circuit. ii) The equivalent resistance is smaller than the least single resistance in the circuit. iii) The same current flows through each of the resistors. iv) The same potential difference is applied across each of the resistors. v) When one of the resistors is open

12. The ratio of the radii of ^{238}U and ^{4}He is (A) 2 (B) 3.9 (C) 4.5 (D) 2.9 (E) 1

13. The energy released in the fission reaction $^{235}_{92}U + {}^{1}_{0}n \rightarrow {}^{140}_{58}Ce + {}^{93}_{41}Nb + 3({}^{0}_{1}n)$ is (Given that B_{tot}/A values of 7.5 MeV for a = 235, 8.3 MeV for A = 140 and 8.5 MeV for A =93) (A) 190 MeV (B) 20 MeV (C) 50 MeV (D) 30 MeV (E) 1 MeV

14. Nuclides with the same number of neutrons is called (A) isomers (B) isobar (C) isotones (D) isotopes (E) atom

15. A radioactive substance gives 378 counts per minute at a certain time. 24 hours later the count rate had fallen to 58 per minute. The half- life of the material is (A) 10.0 hours (B) 5 hours (C) 2.5 hours (D) 2 hours (E) 8.89 hours

16. A wave is represented by $y = 0.20 \sin [0.4\pi(x - 60t)]$, where y and x are in cm and t is in s. Find the velocity of the wave in cms^{-1}. (A) 120 (B) 60 (C) 24 (D) 4.8 (E) 8.4

17. The fundamental frequency of a closed pipe organ is 165 Hz. If the speed of sound in air is 330 ms^{-1}, what is the length of the pipe in cm? (A) 200 (B) 100 (C) 75 (D) 50 (E) 25

18. Which of the following is a percussion instrument? (A) xylophone (B) piano (C) guitar (D) trumpet (E) flute

19. The following are properties of electromagnetic (emt) waves except (A) travel at the speed of light. (B) are transverse waves (C) The ratio of the electric field to the magnetic field is equals to the speed of light. (D) both longitudinal and transverse. (E) carry both energy and momentum.

20. A spherical satellite orbiting Earth is lighted on one side by the Sun, with intensity 340 W/m^2. If the radius of the satellite is 1.00 m, what power is incident upon it? (A) 4.21×10^3 W (B) 2.03×10^3 W (C) 5.0×10^4 W (D) 2.0×10^8 W (E) 2.03×10^7 W

21. A convex lens of focal length 10 cm is used to form a real image which is half the size of the object. How far from the object is the image? (A) 45 cm (B) 30 cm (C) 15 cm (D) 20 cm (E) 25 cm

22. A diverging lens of focal length 20 cm forms an image half the size of the object. What is the object distance? (A) 11.11 cm (B) 100 cm (C) 60 cm (D) 8.71 cm (E) 20 cm

23. An object of height 3.0 cm is placed 10 cm in front of a biconvex lens of focal length 15 cm the image of the object is (A) real and 3.00 cm tall (B) virtual and 3.00 cm tall (C) virtual and 9.00 cm tall (D) real and 9.00 cm tall (E) virtual and 0.09 cm tall

24. The speed of light in air is 3×10^8 m/s. if the refractive index of light from air to water is 4/3, calculate the speed of light in water (A) 2.25×10^8 m/s (B) 2.25×10^8 m/s^2 (C) 4.00×10^5 m/s (D) 4.33×10^3 m/s (E) 4.00×10^8 m/s^2

25. When yellow a card is observed through a blue glass, the card appears as (A) black (B) green (C) red (D) white (E) purple.

26. In a 60° prism of refractive index 1.5, calculate the angle of minimum deviation when light is refracted through the prism (A) 40.2° (B) 37.5° (C) 37.2° (D) 40.5° (E) 40.6°

27. A solenoid with 1000 loops is 40cm long. Find the magnetic flux density inside the solenoid when a current of 5A is carried by its windings if the solenoid has an air core. (A) 0.01571 T (B) 0.01871 T (C) 0.01971 T (D) 0.00171 T (E) 0.00071 T

29. How many loops has an air core solenoid of length 20 cm. If the magnetic flux density is 3.14×10^{-2} T and it carries a current of 5 A by its windings?
(A) 100 (B) 1000 (C) 3000 (D) 500 (E) 2000

30. A 20 m length wire 1.5 mm in diameter has a resistance of 3.0 Ω. What is the resistance of a 35 m length of wire 3.00 mm in diameter made of the same material?
(A) 1.43 Ω (B) 1.48 Ω (C) 1.34 Ω (D) 1.31 Ω (E) 1.38 Ω

31. A simple generator has 100-loop square coil of side 6.0 cm. Calculate the angular velocity and the frequency of rotation if it had field of 0.5 T and peak voltage 12.0 V
(A) 66.7rad/s : 10.6 Hz; (B) 65.7rad/s : 10.5 Hz; (C) 64.2rad/s: 10.2 Hz; (D) 62.6rad/s : 10.0 Hz; (E) 64.7rad/s : 10.3 Hz;

32. A generator Vo = 50 volts and frequency 1.0 KHz is connected with a 10 Ω resistor, 2 mH inductor and 80 μF capacitor all in series. Determine the peak value of the current in the circuit (A) 3.0 A (B) 3.4 A (C) 3.2 A (D) 3.8 A (E) 3.6 A

33. The image formed by a diverging lens of a real object is never: (A) erect (B) real (C) smaller than the object (D) virtual (E) same as the object

34. The following are true about fundamental frequency of a vibrating string except:
(i) the shorter the string, the higher the frequency of the fundamental (ii) the lesser the force applied, the higher the frequency of the fundamental (iii) the lighter the string, the higher the frequency of the fundamental (iv) the higher the tension, the higher the frequency of the fundamental (v) the heavier the string, the higher the frequency of the fundamental (A) i, ii &iii (B) I, iii & v (C) i & iii (D) ii & v (E) iv & v

35. A sound wave emitted from the bottom of a ship travels at 3500 ms^{-1} vertically downwards through water to an ocean bed 900 m deep, and is reflected upwards. What is the time interval between the instant the sound is emitted and the instant the echo is received? (A) 60.4° (B) 66.4° (C) 82.0° (D) 80.2° (E) 70.6°