Angka Giliran: _____ **No. Tempat Duduk:** _____

UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2006/2007

April 2007

ZCA 102/4 - Physics II (Electricity and Magnetism)
[Fizik II (Keelektrikan dan Kemagnetan)]

Duration: 3 hours
[Masa : 3 jam]

Please ensure that this examination paper contains **SEVENTEEN** printed pages before you begin the examination.

*[Sila pastikan bahawa kertas peperiksaan ini mengandungi **TUJUH BELAS** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]*

Instruction:
PART A. Answer all **THIRTY** multiple choice questions. Circle your answers on the question paper.

PART B. Answer all **FOUR** structured questions on the answer script.

*[**Arahan**:*
*BAHAGIAN A. Jawab kesemua **TIGA PULUH** soalan objektif. Bulatkan jawapan anda di atas kertas soalan.*

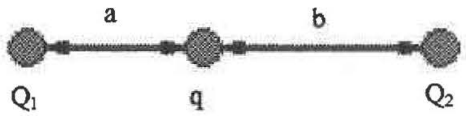
*BAHAGIAN B. Jawab kesemua **EMPAT** soalan struktur di atas skrip jawapan.*

Angka giliran:_____ **No. Tempat Duduk:**_____

PART A. Answer all **THIRTY** multiple choice questions. Circle your answers on the question paper.
*[BAHAGIAN A. Jawab kesemua **TIGA PULUH** soalan objektif. Bulatkan jawapan anda di atas kertas soalan.]*

1. If a = 3.0 mm, b = 4.0 mm, Q_1 = 60 nC, Q_2 = -80 nC, and q = 36 nC in the figure, what is the magnitude of the total electric force on q?

   [Jika a = 3.0 mm, b = 4.0 mm, Q_1 = 60 nC, Q_2 = -80 nC, dan q = 36 nC dalam rajah, apakah magnitud jumlah daya elektrik ke atas q?]



   a. 5.0 N
   b. 4.4 N
   c. 3.8 N
   d. 5.7 N
   e. 0.60 N

2. A uniform linear charge of 2.0 nC/m is distributed along the x axis from x = 0 to x = 3 m. Which of the following integrals is correct for the y component of the electric field at y = 4 m on the y axis?

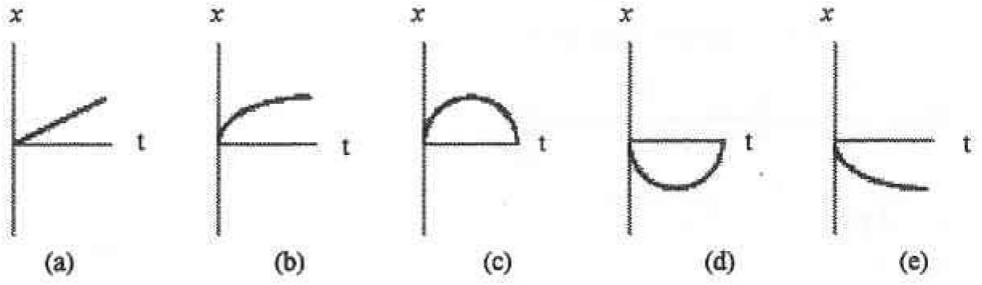
   [Satu cas linear seragam 2.0 nC/m bertabur di sepanjang paksi x dari x = 0 ke x = 3 m. Manakah antara kamiran berikut adalah benar untuk komponen y bagi medan elektrik pada y = 4 m atas paksi y?]

   a. $\int_0^3 \frac{72dx}{(16+x^2)^{3/2}}$
   b. $\int_0^3 \frac{18dx}{(16+x^2)^{3/2}}$
   c. $\int_0^3 \frac{72dx}{16+x^2}$
   d. $\int_3^0 \frac{18dx}{16+x^2}$
   e. none of these *tiada di atas*)

Angka giliran:_____ **No. Tempat Duduk:**_____

3. A negatively charged particle is moving in the +x-direction when it enters a region with a uniform electric field pointing in the +x-direction. Which graph gives its position as a function of time correctly? (Its initial position is $x = 0$ at $t = 0$.)

[Satu zarah bercas negatif bergerak dalam arah +x apabila ia memasuki kawasan yang mengandungi medan elektrik seragam yang juga dalam arah +x. Graf manakah yang menunjukkan kedudukannya sebagai fungsi masa yang betul? (Kedudukan awalnya ialah $x = 0$ pada $t = 0$.)]



4. A charge of 0.80 nC is placed at the center of a cube that measures 4.0 m along each edge. What is the electric flux through one face of the cube?

[Satu cas 0.80 nC diletakkan di pusat kubus yang berukuran 4.0 m setiap sisinya. Apakah fluks elektrik melalui satu permukaan kubus tersebut?]

a. 90 N · m^2/C
b. 15 N · m^2/C
c. 45 N · m^2/C
d. 23 N · m^2/C
e. 64 N · m^2/C

5. A solid nonconducting sphere (radius = 12 cm) has a charge of uniform density (30 nC/m^3) distributed throughout its volume. Determine the magnitude of the electric field 15 cm from the center of the sphere.

[Satu sfera bukan konduktor yang pejal (jejari = 12 cm) mempunyai ketumpatan cas seragam (30 nC/m^3) yang tertabur keseluruhan isipadunya. Tentukan magnitud medan elektrik 15 cm dari pusat sfera?]

a. 22 N/C
b. 49 N/C
c. 31 N/C
d. 87 N/C
e. 26 N/C

Angka giliran:_____ **No. Tempat Duduk:**_____

6. The electric flux through the two adjacent spherical surfaces shown below is known to be the same.
[Fluks elektrik melalui dua permukaan sfera yang bersebelahan seperti yang ditunjukkan di bawah diketahui adalah sama.]

It is also known that there is no charge inside either spherical surface. We can conclude that
[Juga diketahui bahawa tiada cas berada dalam kedua-dua sfera. Kita boleh membuat kesimpulan bahawa]

a. there is no electric field present in this region of space.
[tiada medan elektrik berada dalam kawasan ini.]
b. there is a constant E field present in this region of space.
[terdapat medan E yang malar yang berada dalam kawasan ini.]
c. the electric flux has a constant value of zero.
[fluks elektrik mempunyai nilai sifar yang malar.]
d. any of the above may be correct.
[mana-mana di atas boleh jadi benar.]
e. only **a** and **b** above may be correct.
[hanya **a** *dan* **b** *di atas boleh jadi benar.]*

7. An uncharged spherical conducting shell surrounds a charge $-q$ at the center of the shell. Then charge $+3q$ is placed on the outside of the shell. When static equilibrium is reached, the charges on the inner and outer surfaces of the shell are respectively
[Satu petala konduktor sfera tak bercas meliputi satu cas $-q$ di pusat petala tersebut. Kemudian, cas $+3q$ diletakkan di luar petala. Apabila keseimbangan statik dicapai, cas di atas permukaan dalam dan luar petala masing-masing adalah]

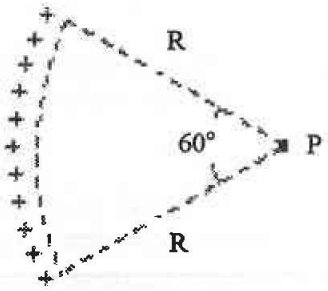
a. $+q, -q$.
b. $-q, +q$.
c. $+q, +2q$.
d. $+2q, +q$.
e. $+3q, 0$.

Angka giliran:_____ **No. Tempat Duduk:**_____

8. Points A [at (2, 3) m] and B [at (5, 7) m] are in a region where the electric field is uniform and given by **E** = (4**i** + 3**j**) N/C. What is the potential difference $V_A - V_B$?
[Titik-titik A [pada (2, 3) m] dan B[pada (5, 7) m] terletak dalam kawasan dimana medan elektrik adalah seragam dan diberi sebagai **E** *= (4**i** + 3**j**) N/C. Apakah beza keupayaan* $V_A - V_B$ *?]*

a. 33 V
b. 27 V
c. 30 V
d. 24 V
e. 11 V

9. Charge of uniform density (3.5 nC/m) is distributed along the circular arc shown. Determine the electric potential (relative to zero at infinity) at point P.
[Cas dengan ketumpatan seragam (3.5 nC/m) bertabur sepanjang lengkungan bulat seperti yang ditunjukkan. Tentukan keupayaan elektrik (relatif kepada sifar pada infiniti) di titik P.]



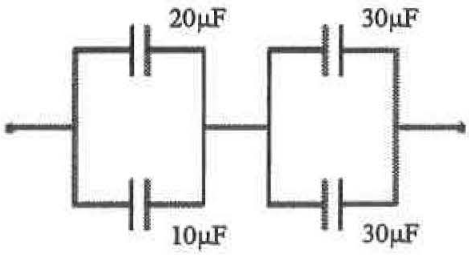
a. 61 V
b. 42 V
c. 52 V
d. 33 V
e. 22 V

Angka giliran:_____ **No. Tempat Duduk:**_____

10. Equipotentials are lines along which
[Sama keupayaan adalah garis-garis dimana]

a. the electric field is constant in magnitude and direction.
[medan elektrik adalah malar pada magnitud dan arahnya.]
b. the electric charge is constant in magnitude and direction.
[cas elektrik adalah malar pada magnitud dan arahnya.]
c. maximum work against electrical forces is required to move a charge at constant speed.
[kerja maksimum terhadap daya-daya elektrik diperlukan untuk mengerakkan satu cas pada kelajuan malar.]
d. a charge may be moved at constant speed without work against electrical forces.
[satu cas boleh digerakkan pada kelajuan malar tanpa kerja terhadap daya-daya elektrik.]
e. charges move by themselves.
[cas-cas bergerak sendiri.]

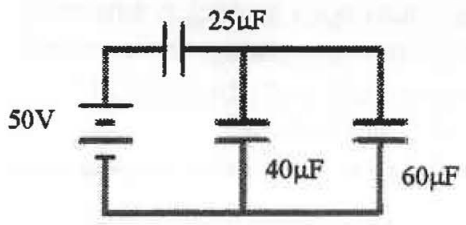
11. What is the equivalent capacitance of the combination shown?
[Apakah kapasitans setara bagi susunatur yang ditunjukkan?]



a. 20 μF
b. 90 μF
c. 22 μF
d. 4.6 μF
e. 67 μF

Angka giliran:_____ **No. Tempat Duduk:**_____

12. Determine the energy stored in the 40-μF capacitor.
[Tentukan tenaga yang tersimpan dalam kapasitor 40-μF.]



a. 2.4 mJ
b. 1.6 mJ
c. 2.0 mJ
d. 2.9 mJ
e. 4.0 mJ

13. A parallel plate capacitor of capacitance C_0 has plates of area A with separation d between them. When it is connected to a battery of voltage V_0, it has charge of magnitude Q_0 on its plates. It is then disconnected from the battery and the plates are pulled apart to a separation $2d$ without discharging them. After the plates are $2d$ apart, the magnitude of the charge on the plates and the potential difference between them are
[Satu kapasitor plat selari dengan kapasitans C_0 mempunyai luas plat A dan jarak pemisahan d antara plat-plat. Apabila ia disambungkan kepada satu bateri dengan voltan V_0, ia mengandungi cas bermagnitud Q_0 di atas plat-platnya. Ia kemudiannya diputuskan daripada bateri dan plat-plat tersebut ditarik dengan jarak pemisahan $2d$ tanpa menyahcaskannya. Setelah plat-plat kapasitor berjarak $2d$ antaranya, magnitud cas di atas plat-plat dan beza keupayaan antaranya ialah]

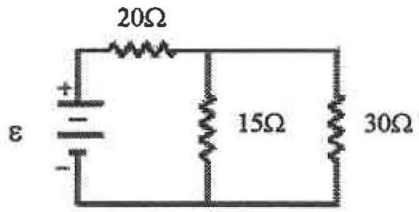
a. $\frac{1}{2}Q_0, \frac{1}{2}V_0$
b. $Q_0, \frac{1}{2}V_0$
c. Q_0, V_0
d. $Q_0, 2V_0$
e. $2Q_0, 2V_0$

Angka giliran:_____ **No. Tempat Duduk:**_____

14. What is the resistance of a wire made of a material with a resistivity of $3.2\times10^{-8}\ \Omega\cdot m$ if its length is 2.5 m and its diameter is 0.50 mm?
[Apakah rintangan dawai yang diperbuat daripada suatu bahan dengan kerintangan $3.2\times10^{-8}\ \Omega\cdot m$ jika panjangnya ialah 2.5 m dan diameternya ialah 0.50 mm?]

a. 0.16 Ω
b. 0.10 Ω
c. 1.28 Ω
d. 0.41 Ω
e. 0.81 Ω

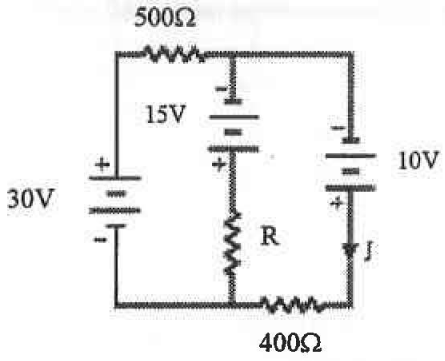
15. What is the current in the 15-Ω resistor when $\mathcal{E}$ = 9.0 V?
[Apakah arus dalam perintang 15-Ω apabila $\mathcal{E}$= 9.0 V?]



a. 0.20 A
b. 0.30 A
c. 0.10 A
d. 0.26 A
e. 0.60 A

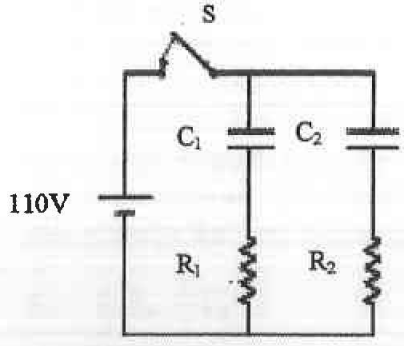
Angka giliran:_____ **No. Tempat Duduk:**_____

16. Determine the magnitude and sense (direction) of the current in the 500-Ω resistor when I = 30 mA.
[Tentukan magnitud dan arah arus dalam perintang 500-Ω apabila I = 30 mA.]



a. 56 mA left to right *(kiri ke kanan)*
b. 56 mA right to left *(kanan ke kiri)*
c. 48 mA left to right *(kiri ke kanan)*
d. 48 mA right to left *(kanan ke kiri)*
e. 26 mA left to right *(kiri ke kanan)*

17. The capacitors are completely discharged in the circuit shown below.
[Kapasitor-kapasitor dalam litar di bawah tidak bercas.]

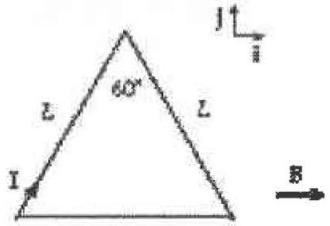


The two resistors have the same resistance R and the two capacitors have the same capacitance C. After the switch is closed, the current
[Kedua-dua perintang mempunyai rintangan R yang sama dan kedua-dua kapasitor mempunyai kapasitans C yang sama. Apabila suis ditutup, arus]

a. is greatest in C_1 *(terbesar dalam C_1)*.
b. is greatest in C_2 *(terbesar dalam C_2)*.
c. is greatest in R_1 *(terbesar dalam R_1)*.
d. is greatest in R_2 *(terbesar dalam R_2)*.
e. is the same in C_1, C_2, R_1 and R_2 *(adalah sama dalam C_1, C_2, R_1 dan R_2)*.

Angka giliran:_____ **No. Tempat Duduk:**_____

18. A straight wire is bent into the shape shown. Determine the net magnetic force on the wire.
[Satu dawai lurus dibengkok menjadi bentuk yang ditunjukkan. Tentukan daya magnet bersih ke atas dawai.]



a. Zero (*sifar*)
b. *IBL* in the +*z* direction (*dalam arah* +*z*)
c. *IBL* in the -*z* direction (*dalam arah* -*z*)
d. 1.7 *IBL* in the +*z* direction (*dalam arah* +*z*)
e. 1.4 *IBL* in the -*z* direction (*dalam arah* -*z*)

19. A circular loop (radius = 0.50 m) carries a current of 3.0 A and has unit normal vector of $(2\mathbf{i} - \mathbf{j} + 2\mathbf{k})/3$. What is the *x* component of the torque on this loop when it is placed in a uniform magnetic field of $(2\mathbf{i} - 6\mathbf{j})$T?
[Satu gelung bulat (jejari = 0.50 m) membawa arus 3.0 A dan mempunyai vektor normal unit $(2\mathbf{i} - \mathbf{j} + 2\mathbf{k})/3$. *Apakah komponen x bagi tork gelung ini apabila ia diletakkan dalam medan magnet seragam* $(2\mathbf{i} - 6\mathbf{j})$*T?]*

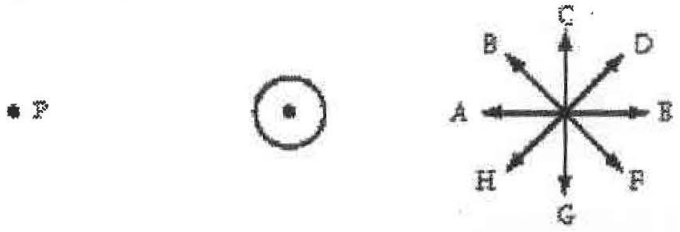
a. 4.7 N · m
b. 3.1 N · m
c. 19 N · m
d. 9.4 N · m
e. 12 N · m

20. One reason why we know that magnetic fields are not the same as electric fields is because the force exerted on a charge +*q*
[Satu sebab kenapa kita tahu medan magnet tidak sama dengan medan elektrik kerana daya ke atas cas +q]

a. is in opposite directions in electric and magnetic fields.
[berarah berlawanan dalam medan elektrik dan medan magnet.]
b. is in the same direction in electric and magnetic fields.
[berarah sama dalam medan elektrik dan medan magnet.]
c. is parallel to a magnetic field and perpendicular to an electric field.
[selari dengan medan magnet dan serenjang dengan medan elektrik.]
d. is parallel to an electric field and perpendicular to a magnetic field.
[selari dengan medan elektrik dan serenjang dengan medan magnet.]
e. is zero in both if the charge is not moving.
[adalah sifar dalam kedua-dua medan jika cas tidak bergerak.]

Angka giliran:_____ **No. Tempat Duduk:**_____

21. The diagram below shows the position of a long straight wire perpendicular to t page and a set of directions labeled A through H. When the current in the wire directed up out of the page, the direction of the magnetic field at point P is
[Rajah di bawah menunjukkan kedudukan satu dawai lurus panjang yang serenja dengan mukasurat dan satu set arah bertanda A hingga H. Apabila arus dalam daw berarah ke atas keluar daripada mukasurat, arah medan magnet di titik P ialah]



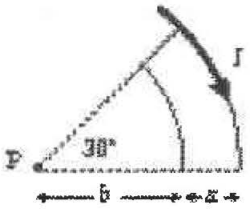
a. E.
b. F.
c. G.
d. H.
e. A.

22. One long wire carries a current of 30 A along the entire x axis. A second long wire carries a current of 40 A perpendicular to the xy plane and passes through the point (0, 4, 0) m. What is the magnitude of the resulting magnetic field at the point y = 2.0 m on the y axis?
[Satu dawai panjang membawa arus 30 A sepanjang paksi x. Satu dawai panjang kedua membawa arus 40 A serenjang dengan satah xy dan melalui titik (0, 4, 0) m. Apakah magnitud medan magnet yang terhasil pada titik y = 2.0 m di atas paksi y?]

a. 4.0 μT
b. 5.0 μT
c. 3.0 μT
d. 7.0 μT
e. 1.0 μT

Angka giliran:_____ **No. Tempat Duduk:**_____

23. If a = 2.0 cm, b = 5.0 cm, and I = 20 A, what is the magnitude of the magnetic field at the point P?
[Jika a = 2.0 cm, b = 5.0 cm, dan I = 20 A, apakah magnitud medan magnet di titik P?]



a. 4.5 μT
b. 7.5 μT
c. 9.0 μT
d. 6.0 μT
e. 3.6 μT

24. A long solenoid (diameter = 5.0 cm) is wound with 960 turns per meter of thin wire through which a current of 300 mA is maintained. A wire carrying 12 A is inserted along the axis of the solenoid. What is the magnitude of the magnetic field at a point 2.0 cm from the axis?
[Satu solenoid panjang (diameter = 5.0 cm) dililit dengan 960 pusingan se meter dengan dawai nipis dimana arus 300 mA ditetapkan. Satu dawai membawa 12 A dimasukkan di paksi solenoid tersebut. Apakah magnitud medan magnet di titik 2.0 cm daripada paksi?]

a. 0.36 mT
b. 0.48 mT
c. 0.38 mT
d. 0.12 mT
e. 0.24 mT

Angka giliran:_____ **No. Tempat Duduk:**_____

25. Two long parallel wires lie in the *xz* plane. One wire passes through the point (–2 m, 0, 0) and the other through the point (+2 m, 0, 0). The wires carry equal currents in the positive *z* direction.
[Dua dawai panjang selari terletak dalam satah xz. Satu dawai melalui titik (–2 m, 0, 0) dan yang satu lagi melalui titik (+2 m, 0, 0). Kedua-dua dawai membawai arus yang sama dalam arah z positif.]

1. The magnetic field at (–3 m,0,0) is in the negative *y* direction.
   [Medan magnet di (-3 m,0,0) adalah dalam arah y negatif.]
2. The magnetic field at (–1 m,0,0) is in the positive *y* direction.
   [Medan magnet di (-1 m,0,0) adalah dalam arah y positif.]
3. The magnetic field at (+1 m,0,0) is in the positive *y* direction.
   [Medan magnet di +1 m,0,0) adalah dalam arah y positif].
4. The magnetic field at (+3 m,0,0) is in the negative *y* direction.
   [Medan magnet di (+3 m,0,0) adalah dalam arah y negatif.]

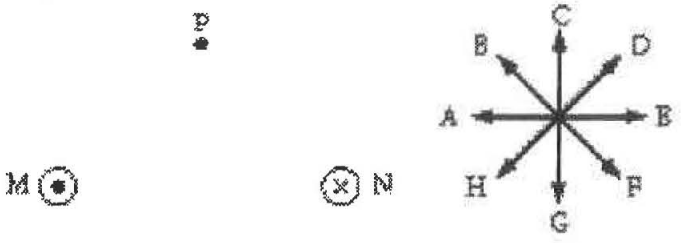
a. 1 and 2 are correct (*1 dan 2 betul*).
b. 1 and 4 are correct (*1 dan 4 betul*).
c. 2 and 3 are correct (*2 dan 3 betul*).
d. 3 and 4 are correct (*3 dan 4 betul*).
e. None of the above are correct (*Tiada satu di atas yang betul*).

26. The reason the north pole of a bar magnet free to rotate points north is because
[Satu sebab kenapa kutub utara magnet bar yang bebas berputar menunjuk ke utara ialah]

a. the south geographic pole of the earth is the earth's magnetic north pole.
[kutub selatan geografi bumi adalah kutub utara magnet bumi.]
b. the south geographic pole of the earth is the earth's magnetic south pole.
[kutub selatan geografi bumi adalah kutub selatan magnet bumi.]
c. there is a net accumulation of negative magnetic charge at the earth's south geographic pole.
[terdapat cas magnet negatif bersih yang terkumpul di kutub selatan geografi bumi.]
d. there is a net accumulation of positive magnetic charge at the earth's north geographic pole.
[terdapat cas magnet positif bersih yang terkumpul di kutub utara geografi bumi.]
e. the north geographic pole of the earth is the earth's magnetic north pole.
[kutub utara geografi bumi adalah kutub utara magnet bumi.]

Angka giliran:_____ **No. Tempat Duduk:**_____

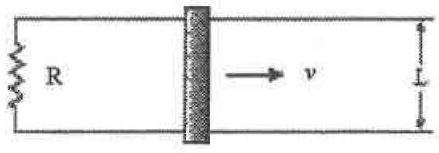
27. Equal currents of magnitude *I* travel out of the page in wire M and into the page in wire N. Eight directions are indicated by letters A through H.
[Arus yang sama bermagnitud I mengalir keluar daripada mukasurat dalam dawai M dan kedalam mukasurat dalam dawai N. Lapan arah yang bertanda huruf-huruf A hingga H ditunjukkan.]



The direction of the magnetic field at point P is
[Arah medan magnet di titik P ialah]

a. A.
b. B.
c. C.
d. D.
e. E.

28. A bar (L = 80 cm) moves on two frictionless rails, as shown, in a region where the magnetic field is uniform (B = 0.30 T) and into the paper. If v = 50 cm/s and R = 60 mΩ, what is the magnetic force on the moving bar?
[Satu bar (L = 80 cm) bergerak di atas dawai tanpa geseran seperti yang ditunjukkan, dalam kawasan dimana medan magnet adalah seragam (B = 0.30 T) dan berarah dalam mukasurat. Jika v = 50 cm/s and R = 60 mΩ, apakah daya magnet ke atas bar yang bergerak?]



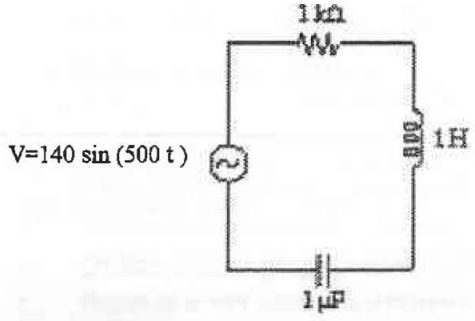
a. 0.48 N to the right (*0.48 N ke kanan*)
b. 0.48 N to the left (*0.48 N ke kiri*)
c. 0.32 N to the left (*0.32 N ke kiri*)
d. 0.32 N to the right (*0.32 N ke kanan*)
e. None of the above (*Tiada di atas*)

Angka giliran:_____ **No. Tempat Duduk:**_____

29. Coil 1, connected to a 100 Ω resistor, sits inside coil 2. Coil 1 is connected to a source of 60 cycle per second AC current. Which statement about coil 2 is correct?
[Gelung 1 yang disambung kepada satu perintang 100 Ω terletak dalam gelung 2. Gelung 1 disambung kepada satu sumber arus AU (arus ulangalik) 60 kitar se saat. Manakah pernyataan tentang gelung 2 yang benar?]

a. No current will be induced in coil 2.
[Tiada arus akan teraruh dalam gelung 2.]
b. DC current (current flow in only one direction) will be induced in coil 2.
[Arus terus (arus mengalir hanya dalam satu arah) akan teraruh dalam gelung 2.]
c. AC current (current flow in alternating directions) will be induced in coil 2.
[Arus ulangalik (arus mengalir dalam arah ulangalik) akan teraruh dalam gelung 2.]
d. DC current will be induced in coil 2, but its direction will depend on the initial direction of flow of current in coil 1.
[Arus terus akan teraruh dalam gelung 2 tetapi arahnya bergantung kepada arah awal arus yang mengalir dalam gelung 1.]
e. Both AC and DC current will be induced in coil 2.
[Kedua-dua arus ulangalik dan arus terus akan teraruh dalam gelung 2.]

30. Determine the resonant frequency of the circuit.
[Tentukan frekuensi resonan bagi litar di bawah.]



a. 159 Hz
b. 32 Hz
c. 5 Hz
d. 500 Hz
e. 79.5 Hz

(60 marks/markah)

PART B. Answer all **FOUR** structured questions on the answer script.
*[BAHAGIAN B. Jawab kesemua **EMPAT** soalan struktur di atas skrip jawapan.]*

1. Two 2.00-μC point charges are located on the x axis. One is at x = 1.00 m, and the other is at x = –1.00 m.
[Dua cas titik 2.00-μC setiap satunya diletakkan di atas paksi x. Satu di x = 1.00 m, dan satu lagi di x = –1.00 m.]

   (a) Determine the electric field on the y axis at y = 0.500 m.
[Tentukan medan elektrik atas paksi y pada y = 0.500 m.]

   (b) Calculate the electric force on a –3.00-μC charge placed on the y axis at y = 0.500 m.
[Kirakan daya elektrik atas cas –3.00-μC yang diletakkan atas paksi y di y = 0.500 m.]

(10 marks/markah)

2. A solid plastic sphere of radius 10.0 cm has charge with uniform density throughout its volume. The electric field 5.00 cm from the center is 86.0 kN/C radially inward. Find the magnitude of the electric field 15.0 cm from the center.
[Satu sfera plastik pejal berjejari 10.0 cm mempunyai ketumpatan cas seragam di keseluruhan isipadunya. Medan elektrik 5.00 cm dari pusat sfera ialah 86.0 kN/C berarah kedalam sfera secara radial. Carikan magnitud medan elektrik 15.0 cm daripada pusatnya.]

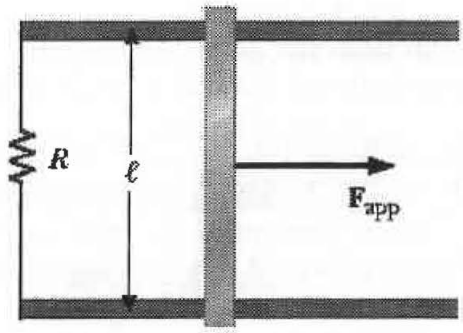
(10 marks/markah)

3. A conducting rod of length ℓ moves on two horizontal, frictionless rails, as shown in Figure 1. If a constant force of 1.00 N moves the bar at 2.00 m/s through a magnetic field **B** that is directed into the page,
*[Satu rod konduktor panjang l bergerak atas dua rel tanpa geseran yang datar seperti yang ditunjukkan dalam Rajah 1. Jika daya malar berukuran 1.00 N menggerakkan rod pada 2.00 m/s melalui medan magnet **B** yang berarah ke dalam mukasurat,]*

(a) what is the current through the 8.00-Ω resistor R?
[apakah arus melalui perintang R 8.00-Ω?]

(b) What is the rate at which energy is delivered to the resistor?
[Apakah kadar tenaga yang dihasilkan dalam perintang?]

(c) What is the mechanical power delivered by the force F_{app}?
[Apakah kuasa mekanikal yang dihasilkan oleh daya F_{app}?]



Figure/Rajah 1.

(10 marks/markah)

4. A 1.00-mF capacitor is connected to a standard electrical outlet (ΔV_{rms} = 120 V; f = 60.0 Hz). Determine the current in the capacitor at t = (1/180) s, assuming that at t = 0, the energy stored in the capacitor is zero.
[Satu kapasitor 1.00-mF disambung kepada sumber elektrik piawai (ΔV_{rms} = 120 V; f = 60.0 Hz). Tentukan arus dalam kapasitor pada t = (1/180) s dengan anggapan bahawa pada t = 0, tenaga yang tersimpan dalam kapasitor adalah sifar.]

(10 marks/markah)